# Technical Report to accompany: On the intersection problem for Steiner triple systems of different orders

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### Introduction

This technical report is intended as a companion to On the intersection problem for Steiner triple systems of different orders by Danziger, Dukes, Griggs and Mendelsohn. For completeness we have included the paper first, followed by the detailed computational results of the following special cases:

- Cases from Lemma 16 (iv):  $b 2, b 3 \in I(27, 31)$ .
- Cases from Lemma 16 (v):  $b 2, b 3 \in I(33, 37)$ .
- Cases from Lemma 22 (ii): I(13, 25) = [0, 22].
- Cases from Lemma 24 (ii): I(15, 27) = [0, 27].
- Cases from Theorem 28: 2, 4, 5, 6  $\in$  I(7, 15), I(7, 19), I(7, 25);5, 7, 8, 9, 10, 11  $\in$  I(9, 19), I(9, 21), I(9, 25), I(9, 27)

All of the results were obtained by modification of the standard hill climbing algorithm for triple systems. See section 2.72 of [4].

# Part I Theoretical background

## 1 Introduction

A Steiner triple system of order v, abbreviated STS(v), is a pair  $(V, \mathcal{B})$  with Va v-set of points and  $\mathcal{B}$  a set of 3-subsets of V, called blocks or triples, such that every pair of distinct elements of V occurs in exactly one triple. A necessary and sufficient condition for the existence of STS(v) is that  $v \equiv 1$  or 3 mod 6. Such orders v are said to be *admissible*. The number of blocks of an STS(v) is v(v-1)/6.

A partial triple system of order v, or PTS(v) is a pair  $(V, \mathcal{B})$  as above, with every pair of distinct elements from V occurring in at most one triple. A PTS(u), say  $(U, \mathcal{B})$ , is said to embed in a PTS(v), say  $(V, \mathcal{B}')$  if  $U \subseteq V$  and  $\mathcal{B} \subseteq \mathcal{B}'$ . Of particular relevance to this paper is the Pasch configuration, which is a PTS(6)with blocks of the form  $\mathcal{B} = \{\{a, b, x\}, \{a, c, y\}, \{b, c, z\}, \{x, y, z\}\}$ . A Pasch trade swaps x with c; this covers the same set of pairs, but with different blocks. A 1-factorization of a graph G is a partition of the edges of G into spanning collections of disjoint edges, called 1-factors. Note that a graph admitting a 1factorization is regular and has chromatic index equal to its degree. For further details on Pasch trades, 1-factorizations, and other basic facts regarding triple systems, the reader is referred to the relevant sections of Triple Systems by Colbourn and Rosa, [4].

For  $u \leq v$ , let I(u, v) be the set of all x such that there exists STS(u) and STS(v), say  $(U, \mathcal{B})$  and  $(V, \mathcal{B}')$  with  $U \subseteq V$ , and  $|\mathcal{B} \cap \mathcal{B}'| = x$ . In [9], Lindner and Rosa essentially finish determining the sets I(v, v).

**Theorem 1.** ([9]) Suppose v is admissible and let b = v(v-1)/6. Then

$$I(v,v) = \begin{cases} \{0, 1, 2, 3, 4, 6, 12\} & \text{if } v = 9, \\ [0,b] \setminus \{b-1, b-2, b-3, b-5\} & \text{otherwise.} \end{cases}$$

In this paper, we obtain some preliminary results on I(u, v) when u < v. In what follows, u and v are assumed to be admissible and b is used to denote u(u-1)/6, the number of blocks in the smaller system.

Other standard notation used in this paper is as follows. If A and B are sets of integers, A+B denotes the set of all sums a+b, where  $a \in A$  and  $b \in B$ . The set A-B is defined analogously. If k is a positive integer, k \* A is defined as the k-fold sum  $A + \cdots + A$ . Write [a, b] for the set of integers x with  $a \leq x \leq b$ .

In [7], the maximum value of I(u, v) is investigated. The necessary conditions were also investigated and are summarized below.

**Lemma 2.** ([7]) For  $u \le v \le 2u + 1$ ,

$$I(u,v) \subseteq \begin{cases} [0,b-(v-u)(2u+1-v)/6] & \text{if } v-u \ge 4, \\ [0,b-(u-1)/2] & \text{if } v-u=2 \text{ and } u \ne 13, \\ [0,b-7] & \text{if } u=13, v=15. \end{cases}$$

In various cases, the upper bounds from Lemma 2 are shown in [7] to be achievable.

It is shown in [6] that  $I(t,t) \subset I(u,v)$  for admissible  $t \leq v - u - 1$  and (u-1)/2. In particular, for u < v there is always an STS(u) and an STS(v) which are disjoint.

**Lemma 3.** ([6]) For  $u < v, 0 \in I(u, v)$ .

In the next section we give the main recursive construction. We then go on to consider the cases v - u = 2, 4 and v = 2u - 1, 2u - 3 in detail. In the nature of a recursive construction it is necessary to find many small cases, however including every case can become overwhelming. We have adopted the approach that any case needed for the recursion is included, whereas special cases have been collected together in a Part II

# 2 Main Construction

A group divisible design with block size 3, or 3-GDD, of type  $T = g_1g_2...g_u$  is a pair  $(X, \mathcal{A})$  with X a set of points partitioned into sets of size  $g_1, g_2, ..., g_u$ called groups and  $\mathcal{A}$  a set of triples from X such that every pair of points in distinct groups belongs to exactly one triple. When all  $g_i$  are equal, the 3-GDD is said to be *uniform*. For the type of a 3-GDD, we may use exponential notation  $g^u$  to denote u groups, each of size g.

Note that an STS(v) is a 3-GDD of type 1<sup>v</sup>. A 3-GDD of type 1<sup>v-h</sup>h<sup>1</sup> is sometimes said to be an STS having a *hole*; we abbreviate this object as

ISTS(v; h). When h = 1, this is simply an STS(v); when h = 3, this is an STS(v) missing one block. A 3-GDD of type  $n^3$  is equivalent to a *Latin square* of side n and by abuse of notation is called a Latin square. A Latin square of side n exists for every n.

For later use, we summarize some other known existence results on 3-GDDs. The comprehensive reference [3] can be consulted for details.

**Lemma 4.** For every  $t \ge 3$ , there exist 3-GDDs of type  $6^t$ ,  $12^t$ ,  $6^t8^1$ ,  $6^t12^1$ , and  $12^t6^1$ . For  $t \not\equiv 2 \pmod{3}$ ,  $t \ge 3$ , there exists a 3-GDD of type  $4^t6^1$ .

Write I(3GDD(T)) for the set of intersection numbers of two 3-GDDs of the same type T on the same points. Intersections of 3-GDDs have been investigated in [2].

**Lemma 5.** ([2]) If 6|g, then  $I(3\text{GDD}(g^t)) = [0, b] \setminus \{b - 1, b - 2, b - 3, b - 5\}$ , where  $b = g^2 t(t-1)/6$ .

Define  $I_{h \subset h'}(u, v)$  to be the set of all values, x say, such that there exist  $ISTS(u; h), (U, H, \mathcal{B})$ , and  $ISTS(v; h'), (V, H', \mathcal{B}')$ , where  $U \subseteq V, H \subseteq H'$ , and  $U \cap H' = H$  with  $|\mathcal{B} \cap \mathcal{B}'| = x$ .

Lemma 6.  $I(u,v) \supseteq I_{h \subset h'}(u,v) + I(h,h')$ .

*Proof.* Suppose there exist ISTS(u; h),  $(U, H, \mathcal{B})$ , and ISTS(v; h'),  $(V, H', \mathcal{B}')$ , where  $U \subseteq V$ ,  $H \subseteq H'$ , and  $U \cap H' = H$  with  $|\mathcal{B} \cap \mathcal{B}'| = x$ . Suppose there exist STS(h),  $(H, \mathcal{A})$ , and STS(h'),  $(H', \mathcal{A}')$ , with  $|\mathcal{A} \cap \mathcal{A}'| = y$ . Then  $(U, \mathcal{B} \cup \mathcal{A})$  is an STS(u) and  $(V, \mathcal{B}' \cup \mathcal{A}')$  is an STS(v), and these have exactly x + y triples in common.

Note that the proof of Lemma 6 fails if the condition  $U \cap H' = H$  is dropped from the definition of  $I_{h \subset h'}(u, v)$ , since then there may be blocks in  $\mathcal{B} \cap \mathcal{A}'$ .

**Theorem 7.** Suppose there is a 3-GDD of type  $T = g_1 \cdots g_t$  and let  $s < g_i$  for every *i* be such that *s*,  $g_i + s$ , and  $g_i + 2s + 1$  are admissible for  $i = 1, \ldots, t$ . Then

$$I(\Sigma_{i}g_{i} + s, \Sigma_{i}g_{i} + 2s + 1)$$
  

$$\supseteq I(3\text{GDD}(T)) + \sum_{i} I_{s \subset 2s+1}(g_{i} + s, g_{i} + 2s + 1) + I(s, 2s + 1).$$

Proof. Since s, and hence 2s + 1, are admissible and in different congruence classes mod 6,  $6|g_i$  for all *i*. Take two 3-GDDs intersecting in  $\alpha$  blocks on the same set of points X with partition  $X = \bigcup X_i$  with  $|X_i| = g_i$  for each *i*. Construct ISTS $(g_i + s; s)$  on  $X_i \cup Y$  and an ISTS $(g_i + 2s + 1; 2s + 1)$  on  $X_i \cup Y'$ with holes  $Y \subset Y'$ , respectively. Suppose these ISTS intersect in  $\beta_i$  blocks. Finally place subsystems on Y and Y' which intersect in  $\gamma$  blocks. The result is an STS $(\Sigma_i g_i + s)$  intersecting an STS $(\Sigma_i g_i + 2s + 1)$  in  $\alpha + \sum_i \beta_i + \gamma$  blocks.  $\Box$  An obvious drawback of the main construction is the current lack of knowledge about  $I_{h\subset h'}(u,v)$  and I(3GDD(T)) for non-uniform 3-GDD types T. The following application of Wilson's fundamental construction allows us to get a partial result towards the latter question.

**Theorem 8.** Suppose  $T = g_1 \dots g_t$  is the type of a 3-GDD with b blocks and for  $m \ge 1$ , let mT denote the type  $(mg_1) \dots (mg_t)$ . Then

 $I(3\text{GDD}(mT)) \supseteq b * I(3\text{GDD}(m^3)).$ 

*Proof.* Consider a 3-GDD of type T with blocks  $B_1, \ldots, B_b$ . Give every point weight m. Replace  $B_i = \{x, y, z\}$  with the set of blocks of a 3-GDD of type  $m^3$  whose three groups correspond to the weightings of points x, y, z. For each i, this can be done with any  $\beta_i \in I(3\text{GDD}(m^3))$  common blocks. Thus we obtain two 3-GDDs of type mT intersecting in  $\sum_{i=1}^b \beta_i$  blocks.

#### Corollary 9.

(i)  $I(3\text{GDD}(12^t 18^1)) \supseteq \{0, 3, 6, \dots, 24t(t+2) - 6, 24t(t+2)\}$  for  $t \not\equiv 2 \pmod{3}$ and

(ii)  $I(3GDD(18^{t}24^{1})) \supseteq \{0, 3, 6, \dots, 18t(3t+5) - 6, 18t(3t+5)\}$  for all  $t \ge 3$ .

*Proof.* Note that  $I(3\text{GDD}(3^3)) = \{0,3,9\}$  and  $b * \{0,3,9\} = \{0,3,6,\ldots,9b-6,9b\}$ . For (i) apply Theorem 8 with m = 3 and  $T = 4^t 6^1$ . The number of blocks of a 3-GDD of type T is 8t(t+2)/3. So  $I(12^t 18^1) \supseteq 8t(t+2)/3 * \{0,3,9\}$ . For (ii) let m = 3 and  $T = 6^t 8^1$ . The number of blocks of a 3-GDD of type T is 2t(3t+5). So  $I(18^t 12^1) \supseteq 2t(3t+5) * \{0,3,9\}$ . □

### **3** v - u = 2

Lemma 10.  $I(7,9) = \{0, 1, 2, 4\}.$ 

*Proof.* By Theorem 2, we have  $I(7,9) \subseteq [0,4]$ . Consider the STS(9) on points  $\{\infty, 1, \ldots, 6, A, B\}$  given below.

Any STS(7) on  $\{\infty, 1, \ldots, 6\}$  which intersects this in three blocks must do so in three of the blocks  $\{1, 2, 3\}$ ,  $\{4, 5, 6\}$ ,  $\{\infty, 1, 4\}$ ,  $\{\infty, 2, 6\}$ ,  $\{\infty, 3, 5\}$ . Because the first two are disjoint, at least two of the blocks must contain  $\infty$ . Then the STS(7) must contain the last three of these blocks. But the system can then not be completed without either of the blocks  $\{1, 2, 3\}$  or  $\{4, 5, 6\}$ .

This proves  $I(7,9) \subseteq \{0,1,2,4\}$ . Examples of STS(7) meeting the above STS(9) in 0,1,2, and 4 blocks are given below.

 $\begin{array}{l} \{\infty,1,2\},\{\infty,3,4\},\{\infty,5,6\},\{1,4,6\},\{1,3,5\},\{2,3,6\},\{2,4,5\}\\ \{\infty,1,5\},\{\infty,2,4\},\{\infty,3,6\},\{1,2,3\},\{1,4,6\},\{2,5,6\},\{3,4,5\}\\ \{\infty,1,4\},\{\infty,2,5\},\{\infty,3,6\},\{1,2,3\},\{1,5,6\},\{2,4,6\},\{3,4,5\}\\ \{\infty,1,4\},\{\infty,2,6\},\{\infty,3,5\},\{1,2,3\},\{1,5,6\},\{2,4,5\},\{3,4,6\} \end{array}$ 

By using computer search, we have determined I(13, 15).

Lemma 11. I(13, 15) = [0, 19].

*Proof.* Consider the STS(13)  $(U, \mathcal{B})$  with blocks

 $\begin{array}{l} \{0,1,2\}, \ \{0,3,4\}, \ \{0,5,6\}, \ \{0,7,8\}, \ \{0,9,10\}, \ \{0,11,12\}, \ \{1,3,5\}, \ \{1,4,7\}, \ \{1,6,8\}, \\ \{1,9,11\}, \ \{1,10,12\}, \ \{2,3,9\}, \ \{2,4,5\}, \ \{2,6,10\}, \ \{2,7,12\}, \ \{2,8,11\}, \ \{3,6,11\}, \ \{3,7,10\}, \\ \{3,8,12\}, \ \{4,6,12\}, \ \{4,8,9\}, \ \{4,10,11\}, \ \{5,7,11\}, \ \{5,8,10\}, \ \{5,9,12\}, \ \{6,7,9\} \end{array}$ 

Below are blocks  $\mathcal{B}'$  for an STS(15) on  $U \cup \{A, B\}$  having 19 blocks in common with  $\mathcal{B}$ . We have separated these blocks according to their intersection with  $\mathcal{B}$ .

 $\begin{array}{l} \{0,1,2\}, \ \{0,3,4\}, \ \{0,7,8\}, \ \{0,11,12\}, \ \{1,3,5\}, \ \{1,4,7\}, \ \{1,6,8\}, \ \{1,9,11\}, \ \{1,10,12\}, \\ \{2,4,5\}, \ \{2,6,10\}, \ \{2,8,11\}, \ \{3,6,11\}, \ \{3,7,10\}, \ \{3,8,12\}, \ \{4,6,12\}, \ \{5,7,11\}, \ \{5,8,10\}, \\ \{6,7,9\} \end{array}$ 

 $\begin{array}{l} \{0,5,9\}, \{2,9,12\}, \ \{4,9,10\}, \ \{3,9,A\}, \ \{1,A,B\}, \ \{5,12,A\}, \ \{0,6,A\}, \ \{2,7,A\}, \ \{0,10,B\}, \ \{2,3,B\}, \ \{10,11,A\}, \ \{7,12,B\}, \ \{5,6,B\}, \ \{8,9,B\}, \ \{4,8,A\}, \ \{4,11,B\} \end{array}$ 

We now give three Pasch configurations in  $\mathcal{B}'$ . These cover disjoint pairs and have 1, 2 and 4 blocks in common with  $\mathcal{B} \cap \mathcal{B}'$ , repsectively.

$$\begin{split} &\{0,5,9\}, \{0,10,B\}, \{5,8,10\}, \{8,9,B\} \\ &\{4,9,10\}, \{4,6,12\}, \{2,9,12\}, \{2,6,10\} \\ &\{0,1,2\}, \{0,3,4\}, \{1,3,5\}, \{2,4,5\} \end{split}$$

Applying Pasch trades to zero or more of these, we can decrease the intersection with  $\mathcal{B}$  by any of  $0, 1, 2, \ldots, 7$ . Thus  $[12, 19] \subseteq I(13, 15)$ .

To show  $11 = 19 - 8 \in I(13, 15)$ , we take two (edge-disjoint) Pasch configurations with 8 total blocks in  $\mathcal{B} \cap \mathcal{B}'$  and trade each.

 $\{0, 3, 4\}, \{0, 11, 12\}, \{3, 6, 11\}, \{4, 6, 12\}$  $\{1, 3, 5\}, \{1, 10, 12\}, \{3, 8, 12\}, \{5, 8, 10\}$ 

Although Pasch trades are more difficult to construct when  $|\mathcal{B} \cap \mathcal{B}'|$  is smaller, we can demonstrate  $[0, 10] \subseteq I(13, 15)$  with the same STS(13) above and by direct construction of various STS(15).

 $\begin{array}{l} \{6,10,A\}, \ \{0,5,7\}, \ \{7,A,B\}, \ \{1,5,B\}, \ \{0,6,B\}, \ \{3,5,12\}, \ \{0,11,A\}, \ \{1,8,A\}, \ \{1,4,10\}, \\ \{0,3,10\}, \ \{8,10,11\}, \ \{2,3,A\}, \ \{4,12,A\}, \ \{1,3,11\}, \ \{2,8,B\}, \ \{4,5,11\}, \ \{0,1,9\}, \ \{3,4,B\}, \\ \{8,9,12\}, \ \{2,5,10\}, \ \{5,6,8\}, \ \{5,9,A\}, \ \{0,2,12\}, \ \{4,6,7\}, \ \{3,7,8\}, \ \{1,6,12\}, \ \{0,4,8\}, \\ \{7,9,10\}, \ \{1,2,7\}, \ \{10,12,B\}, \ \{7,11,12\}, \ \{2,4,9\}, \ \{9,11,B\}, \ \{3,6,9\}, \ \{2,6,11\} \end{array}$ 

 $\{5, 7, 11\}$ 

 $\begin{array}{l} \{3,4,11\}, \{1,6,7\}, \{10,11,B\}, \{0,3,6\}, \{6,12,B\}, \{3,7,B\}, \{9,A,B\}, \{2,4,B\}, \{0,9,12\}, \\ \{2,6,A\}, \{7,8,10\}, \{8,11,12\}, \{1,5,B\}, \{5,8,9\}, \{3,9,10\}, \{4,5,12\}, \{1,3,12\}, \{7,12,A\}, \\ \{0,1,10\}, \{3,8,A\}, \{5,6,10\}, \{1,11,A\}, \{1,2,8\}, \{0,4,7\}, \{2,7,9\}, \{0,8,B\}, \{6,9,11\}, \\ \{0,2,11\}, \{1,4,9\}, \{2,3,5\}, \{4,6,8\}, \{2,10,12\}, \{4,10,A\}, \{0,5,A\} \end{array}$ 

 $\begin{array}{l} \{5,9,12\}, \ \{1,4,7\} \\ \{2,8,B\}, \ \{4,8,12\}, \ \{3,4,5\}, \ \{2,3,A\}, \ \{6,10,A\}, \ \{3,9,11\}, \ \{1,3,10\}, \ \{0,2,6\}, \ \{2,5,10\}, \\ \{4,A,B\}, \ \{10,11,12\}, \ \{0,8,11\}, \ \{1,2,12\}, \ \{6,12,B\}, \ \{7,12,A\}, \ \{1,11,B\}, \ \{5,11,A\}, \\ \{8,9,A\}, \ \{0,4,10\}, \ \{3,6,8\}, \ \{5,6,7\}, \ \{0,5,B\}, \ \{4,6,11\}, \ \{2,7,11\}, \ \{9,10,B\}, \ \{1,6,9\}, \\ \{0,7,9\}, \ \{2,4,9\}, \ \{0,1,A\}, \ \{1,5,8\}, \ \{7,8,10\}, \ \{0,3,12\}, \ \{3,7,B\} \end{array}$ 

 $\begin{array}{l} \{0,9,10\}, \ \{1,10,12\}, \ \{4,6,12\} \\ \{0,1,4\}, \ \{1,6,A\}, \ \{0,6,11\}, \ \{4,8,10\}, \ \{0,2,8\}, \ \{2,3,12\}, \ \{0,7,A\}, \ \{4,5,11\}, \ \{7,11,B\}, \\ \{5,8,B\}, \ \{0,3,B\}, \ \{3,10,11\}, \ \{3,6,7\}, \ \{1,3,8\}, \ \{8,11,A\}, \ \{0,5,12\}, \ \{6,10,B\}, \ \{3,4,A\}, \\ \{9,11,12\}, \ \{1,2,11\}, \ \{7,8,12\}, \ \{1,5,7\}, \ \{12,A,B\}, \ \{4,7,9\}, \ \{2,5,6\}, \ \{5,10,A\}, \ \{6,8,9\}, \\ \{3,5,9\}, \ \{2,7,10\}, \ \{2,9,A\}, \ \{1,9,B\}, \ \{2,4,B\} \end{array}$ 

 $\begin{array}{l} \{4,6,12\}, \ \{1,4,7\}, \ \{5,7,11\}, \ \{3,6,11\} \\ \{0,1,5\}, \ \{1,3,12\}, \ \{2,6,9\}, \ \{1,8,B\}, \ \{0,9,12\}, \ \{3,7,9\}, \ \{4,8,A\}, \ \{2,12,A\}, \ \{5,8,12\}, \\ \{2,5,10\}, \ \{6,7,8\}, \ \{0,6,B\}, \ \{0,2,7\}, \ \{5,6,A\}, \ \{0,4,11\}, \ \{9,10,B\}, \ \{4,5,9\}, \ \{7,10,A\}, \\ \{3,5,B\}, \ \{2,3,8\}, \ \{0,3,A\}, \ \{3,4,10\}, \ \{7,12,B\}, \ \{2,4,B\}, \ \{1,2,11\}, \ \{8,9,11\}, \ \{1,9,A\}, \\ \{10,11,12\}, \ \{11,A,B\}, \ \{0,8,10\}, \ \{1,6,10\} \end{array}$ 

 $\begin{array}{l} \{1,4,7\}, \ \{0,3,4\}, \ \{2,6,10\}, \ \{0,7,8\}, \ \{1,6,8\} \\ \{2,5,9\}, \ \{0,5,10\}, \ \{0,6,12\}, \ \{7,10,12\}, \ \{1,12,A\}, \ \{4,5,12\}, \ \{0,2,A\}, \ \{5,6,B\}, \ \{4,6,9\}, \\ \{5,7,A\}, \ \{1,2,3\}, \ \{3,A,B\}, \ \{0,1,B\}, \ \{2,7,11\}, \ \{3,9,12\}, \ \{1,9,10\}, \ \{2,12,B\}, \ \{2,4,8\}, \\ \{8,11,12\}, \ \{4,11,B\}, \ \{3,10,11\}, \ \{1,5,11\}, \ \{7,9,B\}, \ \{8,10,B\}, \ \{8,9,A\}, \ \{3,5,8\}, \ \{3,6,7\}, \\ \{4,10,A\}, \ \{0,9,11\}, \ \{6,11,A\} \end{array}$ 

 $\begin{array}{l} \{3,6,11\}, \{0,3,4\}, \{4,8,9\}, \{1,10,12\}, \{0,9,10\}, \{5,7,11\} \\ \{3,7,8\}, \{1,2,3\}, \{0,6,7\}, \{5,6,10\}, \{4,12,B\}, \{2,8,A\}, \{4,7,10\}, \{1,4,11\}, \{2,5,9\}, \\ \{1,7,9\}, \{3,9,B\}, \{1,6,B\}, \{0,8,11\}, \{2,7,B\}, \{9,11,12\}, \{2,4,6\}, \{11,A,B\}, \{2,10,11\}, \\ \{6,8,12\}, \{6,9,A\}, \{3,10,A\}, \{7,12,A\}, \{3,5,12\}, \{1,5,8\}, \{0,1,A\}, \{4,5,A\}, \{0,2,12\}, \\ \{8,10,B\}, \{0,5,B\} \end{array}$ 

 $\begin{array}{l} \{2,7,12\}, \ \{1,10,12\}, \ \{0,5,6\}, \ \{1,6,8\}, \ \{3,8,12\}, \ \{2,4,5\}, \ \{3,7,10\} \\ \{3,5,9\}, \ \{0,8,9\}, \ \{1,3,4\}, \ \{2,3,6\}, \ \{7,11,B\}, \ \{0,1,11\}, \ \{1,2,A\}, \ \{4,9,10\}, \ \{9,12,B\}, \\ \{0,7,A\}, \ \{6,11,12\}, \ \{4,A,B\}, \ \{6,9,A\}, \ \{6,10,B\}, \ \{0,3,B\}, \ \{2,9,11\}, \ \{5,7,8\}, \ \{0,4,12\}, \\ \{1,7,9\}, \ \{5,10,11\}, \ \{5,12,A\}, \ \{1,5,B\}, \ \{4,6,7\}, \ \{4,8,11\}, \ \{3,11,A\}, \ \{0,2,10\}, \ \{2,8,B\}, \\ \{8,10,A\} \end{array}$ 

 $\begin{array}{l} \{0,1,2\}, \ \{0,3,4\}, \ \{0,5,6\}, \ \{3,8,12\}, \ \{2,4,5\}, \ \{1,6,8\}, \ \{3,7,10\}, \ \{2,3,9\} \\ \{1,7,9\}, \ \{3,6,A\}, \ \{1,10,A\}, \ \{4,9,B\}, \ \{0,8,9\}, \ \{6,7,B\}, \ \{8,10,11\}, \ \{9,12,A\}, \ \{0,7,11\}, \\ \{1,3,B\}, \ \{3,5,11\}, \ \{2,10,B\}, \ \{2,11,A\}, \ \{2,6,12\}, \ \{5,9,10\}, \ \{11,12,B\}, \ \{4,6,10\}, \\ \{0,10,12\}, \ \{6,9,11\}, \ \{5,8,B\}, \ \{2,7,8\}, \ \{1,4,11\}, \ \{1,5,12\}, \ \{4,7,12\}, \ \{0,A,B\}, \ \{5,7,A\}, \\ \{4,8,A\} \end{array}$ 

 $\begin{array}{l} \{4,10,11\}, \ \{5,7,11\}, \ \{4,6,12\}, \ \{0,7,8\}, \ \{2,3,9\}, \ \{3,8,12\}, \ \{3,6,11\}, \ \{4,8,9\}, \ \{1,6,8\} \\ \{5,12,A\}, \ \{1,12,B\}, \ \{1,7,9\}, \ \{3,7,A\}, \ \{0,3,B\}, \ \{9,11,12\}, \ \{6,7,B\}, \ \{2,11,B\}, \ \{2,4,7\}, \\ \{0,1,11\}, \ \{2,8,10\}, \ \{8,11,A\}, \ \{3,5,10\}, \ \{1,3,4\}, \ \{0,6,10\}, \ \{1,2,5\}, \ \{7,10,12\}, \ \{0,2,12\}, \\ \{2,6,A\}, \ \{5,8,B\}, \ \{5,6,9\}, \ \{9,10,B\}, \ \{1,10,A\}, \ \{0,9,A\}, \ \{0,4,5\}, \ \{4,A,B\} \end{array}$ 

 $\begin{array}{l} \{4,6,12\}, \ \{4,8,9\}, \ \{0,5,6\}, \ \{4,10,11\}, \ \{3,7,10\}, \ \{2,6,10\}, \ \{5,9,12\}, \ \{1,4,7\}, \ \{1,6,8\}, \\ \{1,9,11\} \\ \{0,3,9\}, \ \{7,8,B\}, \ \{3,8,11\}, \ \{2,7,9\}, \ \{1,2,A\}, \ \{6,7,11\}, \ \{2,11,12\}, \ \{2,3,B\}, \ \{1,5,10\}, \end{array} \right.$ 

 $\{3, 4, 5\}, \{6, 9, B\}, \{9, 10, A\}, \{2, 5, 8\}, \{3, 6, A\}, \{4, A, B\}, \{0, 2, 4\}, \{5, 7, A\}, \{10, 12, B\}, \{0, 8, 10\}, \{0, 1, B\}, \{1, 3, 12\}, \{5, 11, B\}, \{0, 7, 12\}, \{8, 12, A\}, \{0, 11, A\}$ 

We now outline a general construction for values near the maximum possible intersection b - 3t of STS(u) and STS(u + 2), although only the two cases in Example 12 will actually be required. Let  $\alpha(t)$  denote the PTS having 6t points  $X_t = \{a, x_0, y_0\} \cup \{x_i, y_i, z_i : i = 1, ..., 2t - 1\}$  and 4t - 1 blocks



Figure 1: the PTS  $\alpha(1)$  and  $\alpha(2)$ 

The figure shows diagrams for  $\alpha(1)$  and  $\alpha(2)$ . We note that the underlying graph of  $\alpha(t)$  can be decomposed into an "outside" cycle of length 6t and 2t-1"inside" triples of the form  $\{x_{i-1}, y_{i-1}, y_i\}$ . Thus suppose an STS(6t + 1), say  $(U, \mathcal{B})$ , contains copies of PTS  $\alpha(t_1), \ldots, \alpha(t_s)$  on disjoint sets of points, where  $t = t_1 + \cdots + t_s$ . Let  $\infty$  be the unique point not among the  $\alpha(t_i)$ . Form an STS(6t + 3)  $(V, \mathcal{B}')$  as follows: remove the blocks of the  $\alpha_i$  (a total of 4t - s), add the inside triples, join new points A, B to 1-factors of the disjoint union of outside cycles, and include  $\{\infty, A, B\}$ . We have  $|\mathcal{B} \cap \mathcal{B}'| = b - 4t + s$ . Note that certain variants on  $\alpha(t)$  could be used in a similar manner.

In [7], STS containing t disjoint copies of  $\alpha(1)$  were used to obtain the maximum value b-3t for I(6t+1, 6t+3) when  $t \neq 2$ , and an STS(13) containing  $\alpha(2)$  was used to obtain the maximum possible b-3t-1 for I(13, 15).

**Example 12.** Using a computer to complete PTS by hill-climbing, we note that there exists an STS(19) containing disjoint  $\alpha(1)$  and  $\alpha(2)$ , and an STS(25) containing disjoint  $\alpha(1), \alpha(1)$  and  $\alpha(2)$ . Thus, b-3t-1 belongs to both I(19, 21) and I(25, 27).

• STS(19) containing  $\alpha(1), \alpha(2)$ :

 $\{0,1,2\},\ \{1,3,4\},\ \{2,4,5\},\ \{4,6,7\},\ \{5,7,8\},\ \{7,9,10\},\ \{8,10,11\},\ \{12,13,14\},\ \{14,15,16\},\ \{12,16,17\}$ 

 $\begin{array}{l} \{0,10,15\}, \ \{0,5,\infty\}, \ \{3,11,17\}, \ \{7,15,\infty\}, \ \{2,3,16\}, \ \{2,8,15\}, \ \{2,6,14\}, \ \{5,14,17\}, \\ \{7,11,14\}, \ \{2,11,\infty\}, \ \{0,3,12\}, \ \{1,8,17\}, \ \{6,9,13\}, \ \{2,10,13\}, \ \{8,13,16\}, \ \{4,9,14\}, \\ \{3,7,13\}, \ \{10,16,\infty\}, \ \{3,14,\infty\}, \ \{4,15,17\}, \ \{0,7,17\}, \ \{0,4,13\}, \ \{1,6,15\}, \ \{1,5,13\}, \\ \{3,6,8\}, \ \{5,6,16\}, \ \{0,6,11\}, \ \{5,12,15\}, \ \{1,9,\infty\}, \ \{0,8,14\}, \ \{2,7,12\}, \ \{0,9,16\}, \\ \{3,5,10\}, \ \{4,8,\infty\}, \ \{1,11,12\}, \ \{6,10,17\}, \ \{4,10,12\}, \ \{5,9,11\}, \ \{11,13,15\}, \\ \{2,9,17\}, \ \{4,11,16\}, \ \{13,17,\infty\}, \ \{6,12,\infty\}, \ \{1,7,16\}, \ \{1,10,14\}, \ \{8,9,12\}, \\ \{3,9,15\} \end{array}$ 

• STS(25) containing  $\alpha(1), \alpha(1), \alpha(2)$ : {0,1,2}, {1,3,4}, {2,4,5}, {4,6,7}, {5,7,8}, {7,9,10}, {8,10,11}, {12,13,14}, {14,15,16}, {12,16,17}, {18,19,20}, {20,21,22}, {18,22,23} {13,17,23}, {3,12,23}, {0,11, $\infty$ }, {6,8,19}, {9,12,19}, {2,11,15}, {0,8,17}, {7,11,14}, {1,6,9}, {7,17,20}, {6,12,21}, {3,7,21}, {0,10,12}, {7,19,22}, {6,13,22}, {3,6,10}, {8,14,18}, {1,5,17}, {2,7,23}, {11,13,18}, {6,11,17}, {3,13,15}, {6,15,23}, {3,16,18}, {5,6,18}, {1,19,23}, {5,20, $\infty$ }, {0,16,23}, {2,19, $\infty$ }, {2,3,20}, {8,23, $\infty$ }, {13,16,21}, {9,13, $\infty$ }, {11,19,21}, {2,12,22}, {4,10, $\infty$ }, {4,12,18}, {2,8,13}, {9,14,20} {1,18, $\infty$ }, {10,17,22}, {0,6,20}, {5,9,22}, {14,21,23}, {3,9,11}, {4,13,20}, {10,18,21}, {7,12, $\infty$ }, {0,3,19}, {8,12,20}, {3,8,22}, {0,4,14}, {2,6,16}, {2,10,14}, {0,9,18}, {0,15,22}, {0,7,13}, {7,15,18}, {4,11,22}, {5,12,15}, {5,13,19}, {1,11,12}, {5,11,16}, {4,17,21}, {10,15,19}, {16,22, $\infty$ , {1,8,21}, {1,14,22}, {15,21, $\infty$ }, {8,9,16}, {14,17,19}, {2,17,18}, {9,15,17}, {1,15,20}, {3,5,14}, {10,16,20}, {4,8,15}, {4,16,19}, {11,20,23}, {6,14, $\infty$ , {4,9,23}, {3,17, $\infty$ }, {1,10,13}, {1,7,16}, {5,10,23}, {2,9,21}, {0,5,21}

It is now possible to finish deciding I(u, v) for v - u = 2.

Theorem 13.

$$I(6t+1, 6t+3) = \begin{cases} [0, b-3t] \setminus \{3\} & \text{for } t = 1, \\ [0, b-3t] \setminus \{20\} & \text{for } t = 2, \\ [0, b-3t] & \text{for } t \ge 3. \end{cases}$$

*Proof.* The first two cases are handled in Lemmas 10 and 11. Let  $t \ge 3$  and take s = 1 and  $g_i = 6$  for i = 1, ..., t. By Theorem 7, we have

$$I(6t+1,6t+3) \supseteq I(3\text{GDD}(6^t)) + \sum_{i=1}^t I_{1\subset 3}(7,9) + I(1,3)$$
  
= ([0,6t(t-1)] \ ({6t(t-1)} - {1,2,3,5})) + t \* {0,1,2,4}  
= [0,b-3t] \ {b-3t-1}

It remains to show that  $b - 3t - 1 \in I(6t + 1, 6t + 3)$  for  $t \ge 3$ . Example 12 gives the result for t = 3 and t = 4. For  $t \ge 5$ , use Theorem 7 with 3-GDD of type  $6^{t-2}12^1$ , which has  $\frac{1}{3}(6^2\binom{t-2}{2} + 6 \cdot 12(t-2)) = 6t^2 - 6t - 12$  blocks. Fill groups with t - 2 pairs of STS(7) and STS(9) intersecting in 4 blocks, and one STS(13) and STS(15) intersecting in 19 blocks. Thus,  $6t^2 - 6t - 12 + 4(t-2) + 19 =$  $6t^2 - 2t - 1 \in I(6t + 1, 6t + 3)$ .

### 4 v - u = 4

The following results aid in determining  $I_{3\subset 7}(u, u+4)$ .

Let X be an *n*-set and consider a partition  $H_1, \ldots, H_k$  of X with  $|H_i| = h_i$ for  $i = 1, \ldots, k$ . Write  $x \sim y$  if  $x, y \in H_i$  for some *i*. Consider an  $n \times n$  array A with rows, columns, and entries indexed by X such that (a) A(x, y) is blank if and only if  $x \sim y$  for some *i*, and (b) the entries A(a, y) with  $a \nsim y$  exhaust  $\{z : a \not\sim z\}$ . The array A is called an *incomplete Latin square* with hole sizes  $h_1, \ldots, h_k$ , or ILS $(h_1, \ldots, h_k)$ . As with GDDs, we may write the hole sizes of an ILS using exponential notation. We note that an ILS $(h_1, \ldots, h_k)$  can be "filled" with Latin squares of sides  $h_1, \ldots, h_k$  to form a Latin square of side n. For  $t \ge 3$ , it is not hard to construct an ILS $(2^t)$  (and an ILS $(2^t1^1)$ ) by doubling a Latin square of side t (and then prolonging along an off-diagonal transversal). An explicit construction of ILS $(2^t1^1)$  is given in [7].

The set consisting of the number of common (non-blank) entries to a pair of  $ILS(h_1, \ldots, h_k)$  on the same symbols is denoted  $I(ILS(h_1, \ldots, h_k))$ .

**Lemma 14.** Let  $t \geq 3$  and suppose  $2t + 1 \equiv 1, 3 \pmod{6}$ . Then

$$I_{3\subset 7}(6t+3, 6t+7) \supseteq I(\mathrm{ILS}(2^{t}1^{1})) + 3 * I(2t+1, 2t+1).$$

Proof. Take two ILS(2<sup>t</sup>1<sup>1</sup>), say  $A_1, A_2$  having point partition  $X = \{1, 1'\} \cup \ldots \cup \{t, t'\} \cup \{\infty\}$  and with  $\alpha$  common entries. Fill the 2×2 holes of  $A_1$  to obtain the square  $A_1^*$  of side 2t + 1 missing the  $(\infty, \infty)$  entry. Let  $U = \{x_r, x_c, x_e : x \in X\}$  and suppose  $\mathcal{B}_r, \mathcal{B}_c, \mathcal{B}_e$  and  $\mathcal{B}'_r, \mathcal{B}'_c, \mathcal{B}'_e$  are block sets of STS(2t + 1) on points X with subscripts r, c, e, respectively, with  $|B_r \cap B'_r| = \beta_r, |B_c \cap B'_c| = \beta_c$ , and  $|B_e \cap B'_e| = \beta_e$ . Now form an STS(6t + 3) on the points U having as blocks  $\{\infty_r, \infty_c, \infty_e\}$  and

$$\mathcal{B} = \{\{x_r, y_c, z_e\} : A_1^*(x, y) = z\} \cup \mathcal{B}_r \cup \mathcal{B}_c \cup \mathcal{B}_e.$$

We also have an STS(6t + 7) on the points  $U \cup \{A, B, C, D\}$  containing a sub-STS(7) on  $\{\infty_r, \infty_c, \infty_e, A, B, C, D\}$  and with other blocks

$$\mathcal{B}' = \{\{x_r, y_c, z_e\} : A_2(x, y) = z\} \cup \mathcal{B}'_r \cup \mathcal{B}'_c \cup \mathcal{B}'_e \cup \mathcal{D}_s\}$$

where  $\mathcal{D}$  are blocks arising from joining four disjoint 1-factors of  $K_{2,2,2}$  on  $\{i_r, i'_r\} \cup \{i_c, i'_c\} \cup \{i_e, i'_e\}$  to distinct points A, B, C, D for  $i = 1, \ldots, t$ . We have  $|\mathcal{B} \cap \mathcal{B}'| = \alpha + \beta_r + \beta_c + \beta_e \in I_{3\subset 7}(6t+3, 6t+7)$ .

### Corollary 15.

(i)  $[0, 57] \setminus \{48, 52, 54, 55, 56\} \subseteq I_{3\subset 7}(21, 25),$ (ii)  $[0, 100] \setminus \{93, 95, 97, 98, 99\} \subseteq I_{3\subset 7}(27, 31), and$ (iii)  $[0, 301] \setminus \{296, 298, 299, 300\} \subseteq I_{3\subset 7}(45, 49)$ 

*Proof.* (i) By swapping up to 3 pairs of rows incident with the same hole in an ILS $(2^{3}1^{1})$ , we have  $6, 16, 26, 36 \in I(\text{ILS}(2^{3}1^{1}))$ . Swapping all pairs of corresponding rows and columns, we have disjoint ILS $(2^{3}1^{1})$ . Now use Lemma 14 to get

$$I_{3\subset 7}(21,25) \supseteq \{0,6,16,26,36\} + 3 * I(7) = [0,57] \setminus \{48,52,54,55,56\}.$$

(ii) As above, we have  $0, 8, 22, 36, 50, 64 \in I(\text{ILS}(2^41^1))$ . By swapping a single  $2 \times 2$  subsquare, we also have  $\text{ILS}(2^41^1)$  agreeing in all but four entries. So by Lemma 14, we have

 $I_{3\subset 7}(27,31) \supseteq \{0, 8, 22, 36, 50, 60, 64\} + 3 * I(9) = [0, 100] \setminus \{93, 95, 97, 98, 99\}.$ 

(iii) The proof is similar to part (i) but with an  $ILS(2^71^1)$  and we leave the details to the reader.  $\Box$ 

#### Lemma 16.

(i) I(9, 13) = [0, 8],(ii)  $I_{3\subset 7}(15, 19) = [0, 26],$ (iii)  $I_{3\subset 7}(21, 25) = [0, 57],$ (iv) I(27, 31) = [0, b - 16],(v) I(33, 37) = [0, b - 20], and (vi) I(45, 49) = [0, b - 28].

*Proof.* Note first that, apart from cases (ii) and (iii), each claimed set is as large as possible, by Lemma 2. We subtract one from the maximum intersection for parts (ii) and (iii) in order to accommodate the hole.

(i) Consider the STS(9) with blocks

 $\{0,1,2\},\ \{3,4,5\},\ \{6,7,8\},\ \{0,3,6\},\ \{1,4,7\},\ \{2,5,8\},\ \{0,4,8\},\ \{1,5,6\},\ \{2,3,7\},\ \{0,5,7\},\ \{1,3,8\},\ \{2,4,6\}.$ 

The following STS(13) on  $\{0, \ldots, 8\} \cup \{A, B, C, D\}$  have intersections  $0, \ldots, 8$  with the above system.

 $\begin{array}{l} \{1,4,A\}, \ \{4,6,B\}, \ \{3,4,7\}, \ \{2,5,D\}, \ \{0,A,C\}, \ \{2,3,A\}, \ \{8,A,B\}, \ \{0,1,8\}, \ \{4,8,D\}, \\ \{1,2,7\}, \ \{0,3,D\}, \ \{2,6,8\}, \ \{0,4,5\}, \ \{1,3,6\}, \ \{2,4,C\}, \ \{5,7,8\}, \ \{6,C,D\}, \ \{0,2,B\}, \\ \{1,5,C\}, \ \{7,B,C\}, \ \{0,6,7\}, \ \{5,6,A\}, \ \{3,8,C\}, \ \{7,A,D\}, \ \{3,5,B\}, \ \{1,B,D\} \end{array}$ 

 $\{2, 4, 6\}$ 

 $\begin{array}{l} \{2,3,D\}, \ \{1,2,B\}, \ \{4,7,B\}, \ \{2,8,C\}, \ \{3,A,C\}, \ \{2,5,A\}, \ \{1,3,6\}, \ \{0,1,5\}, \ \{1,4,8\}, \\ \{6,7,C\}, \ \{0,8,A\}, \ \{1,7,A\}, \ \{4,5,C\}, \ \{0,3,4\}, \ \{0,B,C\}, \ \{0,2,7\}, \ \{1,C,D\}, \ \{5,7,D\}, \\ \{4,A,D\}, \ \{8,B,D\}, \ \{3,7,8\}, \ \{3,5,B\}, \ \{0,6,D\}, \ \{5,6,8\}, \ \{6,A,B\} \end{array}$ 

 $\begin{array}{l} \{0,5,7\}, \ \{2,5,8\} \\ \{0,2,6\}, \ \{0,C,D\}, \ \{5,B,C\}, \ \{3,4,6\}, \ \{1,B,D\}, \ \{0,1,A\}, \ \{2,3,C\}, \ \{2,A,B\}, \ \{3,7,B\}, \\ \{5,6,D\}, \ \{3,A,D\}, \ \{0,3,8\}, \ \{1,3,5\}, \ \{1,2,7\}, \ \{8,A,C\}, \ \{1,4,8\}, \ \{7,8,D\}, \ \{4,5,A\}, \\ \{2,4,D\}, \ \{0,4,B\}, \ \{6,7,A\}, \ \{6,8,B\}, \ \{4,7,C\}, \ \{1,6,C\} \end{array}$ 

 $\begin{array}{l} \{0,5,7\}, \ \{2,4,6\}, \ \{1,4,7\} \\ \{2,7,8\}, \ \{1,5,C\}, \ \{3,8,A\}, \ \{7,C,D\}, \ \{8,B,C\}, \ \{2,5,D\}, \ \{0,6,C\}, \ \{3,4,C\}, \ \{3,5,B\}, \\ \{7,A,B\}, \ \{6,B,D\}, \ \{5,6,A\}, \ \{1,2,B\}, \ \{3,6,7\}, \ \{1,6,8\}, \ \{0,1,A\}, \ \{1,3,D\}, \ \{0,2,3\}, \\ \{2,A,C\}, \ \{4,5,8\}, \ \{4,A,D\}, \ \{0,8,D\}, \ \{0,4,B\} \end{array}$ 

 $\begin{array}{l} \{0,1,2\}, \ \{1,3,8\}, \ \{0,5,7\}, \ \{1,4,7\} \\ \{1,6,A\}, \ \{7,A,C\}, \ \{6,8,C\}, \ \{1,5,C\}, \ \{7,8,B\}, \ \{0,3,4\}, \ \{4,C,D\}, \ \{2,3,C\}, \ \{3,A,D\}, \\ \{3,5,B\}, \ \{3,6,7\}, \ \{5,8,D\}, \ \{4,A,B\}, \ \{2,5,A\}, \ \{1,B,D\}, \ \{2,7,D\}, \ \{2,4,8\}, \ \{2,6,B\}, \\ \{0,8,A\}, \ \{0,B,C\}, \ \{0,6,D\}, \ \{4,5,6\} \end{array}$ 

 $\begin{array}{l} \{0,5,7\}, \ \{2,3,7\}, \ \{6,7,8\}, \ \{0,3,6\}, \ \{2,4,6\} \\ \{2,B,D\}, \ \{3,B,C\}, \ \{2,8,A\}, \ \{3,5,D\}, \ \{4,A,D\}, \ \{0,1,4\}, \ \{0,A,B\}, \ \{6,C,D\}, \ \{1,8,C\}, \\ \{0,2,C\}, \ \{5,6,A\}, \ \{1,6,B\}, \ \{1,2,5\}, \ \{1,3,A\}, \ \{0,8,D\}, \ \{4,5,C\}, \ \{7,A,C\}, \ \{5,8,B\}, \\ \{3,4,8\}, \ \{1,7,D\}, \ \{4,7,B\} \end{array}$ 

 $\begin{array}{l} \{2,4,6\}, \ \{1,5,6\}, \ \{6,7,8\}, \ \{0,3,6\}, \ \{1,3,8\}, \ \{2,5,8\} \\ \{8,B,D\}, \ \{4,8,C\}, \ \{0,1,4\}, \ \{4,7,B\}, \ \{6,B,C\}, \ \{2,A,C\}, \ \{5,7,D\}, \ \{0,5,B\}, \ \{3,7,A\}, \\ \{3,4,D\}, \ \{6,A,D\}, \ \{4,5,A\}, \ \{0,C,D\}, \ \{1,A,B\}, \ \{1,7,C\}, \ \{0,2,7\}, \ \{0,8,A\}, \ \{3,5,C\}, \\ \{1,2,D\}, \ \{2,3,B\} \end{array}$ 

 $\begin{array}{l} \{0,1,2\}, \ \{3,4,5\}, \ \{6,7,8\}, \ \{0,3,6\}, \ \{1,4,7\}, \ \{1,5,6\}, \ \{2,4,6\} \\ \{4,B,C\}, \ \{0,7,C\}, \ \{2,C,D\}, \ \{1,8,D\}, \ \{4,8,A\}, \ \{1,A,B\}, \ \{5,7,D\}, \ \{0,5,A\}, \ \{0,4,D\}, \\ \{2,5,B\}, \ \{2,3,8\}, \ \{3,7,B\}, \ \{0,8,B\}, \ \{1,3,C\}, \ \{2,7,A\}, \ \{6,A,C\}, \ \{5,8,C\}, \ \{3,A,D\}, \\ \{6,B,D\} \end{array}$ 

 $\begin{array}{l} \{0,1,2\}, \ \{3,4,5\}, \ \{6,7,8\}, \ \{0,3,6\}, \ \{1,4,7\}, \ \{2,5,8\}, \ \{0,5,7\}, \ \{2,4,6\} \\ \{1,3,D\}, \ \{4,A,B\}, \ \{5,6,D\}, \ \{6,A,C\}, \ \{0,4,C\}, \ \{2,3,B\}, \ \{2,7,A\}, \ \{0,8,B\}, \ \{4,8,D\}, \\ \{2,C,D\}, \ \{3,8,A\}, \ \{7,B,D\}, \ \{1,6,B\}, \ \{1,8,C\}, \ \{3,7,C\}, \ \{5,B,C\}, \ \{0,A,D\}, \ \{1,5,A\} \\ \end{array}$ 

(ii) See the Appendix.

(iii) The five exceptional values not in Corollary 15 are given in the Appendix.

(iv) Using part (iii) of Corollary 15,

$$I(27,31) \supseteq I_{3\subset 7}(27,31) + I(3,7) \supseteq [0,101] \setminus \{98,99\}.$$

The remaining two intersection values (not required for the recursion which follows) are given by computer construction in the technical report [?].

(v) From the Latin square construction in [7] for max I(33, 37), we have similarly that

$$I(33,37) \supseteq J + 3 * I_{3\subset 3}(13,13) + I(3,7) = J + ([0,76] \setminus \{73,74\}),$$

where  $J = I(ILS(2^5))$ . With row swaps as in the proof of Corollary 15, we have  $J \supseteq \{0, 16, 32, \ldots, 80\}$ . So  $I(33, 37) \supseteq [0, 156] \setminus \{153, 154\}$ . The remaining two cases (not required for the recursion which follows) are presented in the technical report [?].

(vi) Consider two 3-GDDs of type  $12^{3}6^{1}$  (which have 216 blocks), together with three and seven extra points. As in Theorem 7, we can fill the groups of size 12 and extra points with ISTS(15;3) and ISTS(19;7), respectively. On the group of size 6, we place STS(9) and STS(13), filling the holes on the extra points. Therefore, by parts (i) and (ii),

$$I(45, 49) \supseteq 216 + 3 * [0, 26] + [0, 8] = [216, 302].$$

This, taken with Corollary 15, completes the proof.

**Lemma 17.** For  $t \ge 3$ , I(12t+3, 12t+7) = [0, b-8t].

*Proof.* We apply the main construction with s = 3 and 3-GDD of type  $12^t$ :

$$I(12t+3, 12t+7) \supseteq I(12^{t}) + t * I_{3\subset 7}(15, 19) + I(3, 7)$$
  
=  $([0, 24t(t-1)] \setminus (\{24t(t-1)\} - \{1, 2, 3, 5\}))$   
+ $[0, 26t] + \{0, 1\}$   
=  $[0, 24t^{2} + 2t + 1] = [0, b - 8t].$ 

Lemma 18. I(12t + 21, 12t + 25) = [0, b - 8t - 12].

*Proof.* First note that the cases t = 0, 1, 2 are handled by parts (iii), (v), and (vi) of Lemma 16, respectively. We split the proof for  $t \ge 3$  into two cases. First, suppose  $t \not\equiv 2 \pmod{3}$ . Apply the main construction with s = 3 and 3-GDD of type  $12^t 18^1$ , using Corollary 9:

$$\begin{split} I(12t+21,12t+25) &\supseteq I(12^t18^1) + t * I_{3\subset 7}(15,19) + I_{3\subset 7}(21,25) + I(3,7) \\ &\supseteq \{0,3,6,\ldots,24t(t+2) - 6,24t(t+2)\} \\ &\quad + [0,26t] + [0,57] + \{0,1\} \\ &= [0,24t^2 + 74t + 58] = [0,b-8t-12]. \end{split}$$

Now if  $t \equiv 2 \pmod{3}$ , let t' = 2(t-2)/3 + 1. Observe  $t' \ge 3$  since in this case  $t \ge 5$ . Use 3-GDD of type  $18^{t'}24^1$  to get the same result as above.  $\Box$ 

Combining the previous two results, the case v = u + 4 is now complete. **Theorem 19.** I(6t + 3, 6t + 7) = [0, b - 4t].

## 5 v = 2u - 1 and 2u - 3

We begin with a result analogous to Theorem 7. The proof is similar, but relies on an easy group doubling construction for 3-GDDs: that is, any 3-GDD of type  $g_1 \cdots g_t$  embeds in a 3-GDD of type  $(2g_1) \cdots (2g_t)$ .

**Theorem 20.** Suppose there is a 3-GDD of type  $T = g_1 \cdots g_t$  and let  $s < g_i$  for every *i* be such that *s*,  $g_i + s$ , and  $2g_i + s$  are admissible for  $i = 1, \ldots, t$ . Then

$$I(\Sigma_i g_i + s, 2\Sigma_i g_i + s) \supseteq I(3\text{GDD}(T)) + \sum_i I_{s \subset s}(g_i + s, 2g_i + s) + I(s, s).$$

**Remark 21.** We could in fact state this more generally with  $2g_i$  replaced by  $h_i$ , where  $h_i \ge 2g_i$ . However, as noted in [7], such a construction achieves the upper bound in Lemma 2 only when  $h_i = 2g_i$ .

Lemma 22. (i) I(7,13) = [0,5], and (ii) I(13,25) = [0,22].

*Proof.* (i) The following STS(7) intersect the STS(13) given in Lemma 11 in  $0, 1, \ldots, 5$  blocks, respectively.

 $\{0,1,3\}, \{0,2,4\}, \{0,5,8\}, \{1,2,5\}, \{1,4,8\}, \{2,3,8\}, \{3,4,5\} \\ \{0,1,3\}, \{0,2,4\}, \{0,5,6\}, \{1,2,5\}, \{1,4,6\}, \{2,3,6\}, \{3,4,5\} \\ \{0,1,2\}, \{0,3,6\}, \{0,4,5\}, \{1,3,5\}, \{1,4,6\}, \{2,3,4\}, \{2,5,6\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,6\}, \{1,4,5\}, \{2,3,5\}, \{2,4,6\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,8\}, \{1,3,5\}, \{1,4,8\}, \{2,3,8\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{0,1,2\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\} \\ \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}, \{2,4,5\}, \{1,3,$ 

(ii) A computer construction is given in the technical report [?]. We note that this case is not used in the recursion.  $\Box$ 

**Theorem 23.** I(6t+1, 12t+1) = [0, b-2t].

*Proof.* For t = 1, 2, the result follows from Lemma 22. For  $t \ge 3$ , apply Theorem 20 with 3-GDD of type  $6^t$  and s = 1. We have by Lemma 5

$$I(6t+1,12t+1) \supseteq I(3\text{GDD}(6^{t})) + \sum_{i=1}^{t} I_{1\subset 1}(7,13) + I(1,1)$$
  
= ([0,6t(t-1)] \ ({6t(t-1)} - {1,2,3,5})) + t \* [0,5]  
= [0,b-2t].

But from Lemma 2,  $I(6t + 1, 12t + 1) \subseteq [0, b - 2t]$ . Hence the result follows.  $\Box$ 

#### Lemma 24.

(i) I(9, 15) = [0, 8], and (ii) I(15, 27) = [0, 27].

*Proof.* (i) The following STS(15) have intersections  $0, \ldots, 8$  with the STS(9) given in Lemma 16.

 $\begin{array}{l} \{4,7,F\}, \ \{4,5,C\}, \ \{5,B,F\}, \ \{2,B,E\}, \ \{3,5,E\}, \ \{0,3,F\}, \ \{4,6,8\}, \ \{2,C,D\}, \ \{1,5,7\}, \\ \{6,E,F\}, \ \{2,3,8\}, \ \{4,D,E\}, \ \{7,8,E\}, \ \{6,7,D\}, \ \{A,D,F\}, \ \{0,A,E\}, \ \{1,6,B\}, \ \{0,5,D\}, \\ \{3,6,A\}, \ \{5,8,A\}, \ \{0,6,C\}, \ \{2,7,A\}, \ \{0,1,8\}, \ \{1,4,A\}, \ \{8,B,D\}, \ \{1,2,F\}, \ \{A,B,C\}, \\ \{2,5,6\}, \ \{3,7,C\}, \ \{1,3,D\}, \ \{3,4,B\}, \ \{8,C,F\}, \ \{1,C,E\}, \ \{0,7,B\}, \ \{0,2,4\} \end{array} \right.$ 

 $\begin{array}{l} \{2,4,6\} \\ \{0,8,E\}, \ \{3,A,C\}, \ \{1,3,F\}, \ \{2,7,D\}, \ \{6,7,A\}, \ \{0,1,6\}, \ \{6,C,E\}, \ \{1,4,C\}, \ \{1,B,D\}, \\ \{0,C,D\}, \ \{2,5,C\}, \ \{5,7,B\}, \ \{A,D,F\}, \ \{3,D,E\}, \ \{B,C,F\}, \ \{5,6,F\}, \ \{5,A,E\}, \ \{1,7,E\}, \\ \{7,8,C\}, \ \{0,7,F\}, \ \{4,B,E\}, \ \{0,4,A\}, \ \{0,3,5\}, \ \{4,8,F\}, \ \{3,4,7\}, \ \{1,5,8\}, \ \{2,3,8\}, \\ \{6,8,D\}, \ \{2,E,F\}, \ \{0,2,B\}, \ \{4,5,D\}, \ \{1,2,A\}, \ \{8,A,B\}, \ \{3,6,B\} \end{array}$ 

 $\begin{array}{l} \{0,1,2\}, \ \{1,5,6\} \\ \{1,C,F\}, \ \{8,A,F\}, \ \{2,B,E\}, \ \{0,3,8\}, \ \{2,6,8\}, \ \{3,A,C\}, \ \{1,4,8\}, \ \{8,B,D\}, \ \{1,D,E\}, \\ \{3,6,D\}, \ \{2,A,D\}, \ \{6,7,B\}, \ \{3,5,E\}, \ \{5,7,8\}, \ \{0,7,D\}, \ \{4,C,D\}, \ \{1,3,7\}, \ \{6,E,F\}, \\ \{7,A,E\}, \ \{2,4,5\}, \ \{0,B,F\}, \ \{0,6,C\}, \ \{0,4,E\}, \ \{1,A,B\}, \ \{2,3,F\}, \ \{3,4,B\}, \ \{4,6,A\}, \\ \{2,7,C\}, \ \{8,C,E\}, \ \{0,5,A\}, \ \{4,7,F\}, \ \{5,B,C\}, \ \{5,D,F\} \end{array}$ 

 $\begin{array}{l} \{0,5,7\}, \ \{3,4,5\}, \ \{2,3,7\} \\ \{7,8,E\}, \ \{2,5,D\}, \ \{1,2,6\}, \ \{6,D,F\}, \ \{4,8,F\}, \ \{0,6,A\}, \ \{5,6,C\}, \ \{B,D,E\}, \ \{5,B,F\}, \\ \{0,4,B\}, \ \{7,A,F\}, \ \{4,6,E\}, \ \{3,C,F\}, \ \{4,7,D\}, \ \{2,A,B\}, \ \{1,7,C\}, \ \{0,2,8\}, \ \{0,C,D\}, \end{array}$ 

 $\{0,1,F\}, \{1,8,D\}, \{5,8,A\}, \{6,7,B\}, \{2,4,C\}, \{3,A,D\}, \{1,3,B\}, \{1,5,E\}, \{A,C,E\}, \{2,E,F\}, \{1,4,A\}, \{0,3,E\}, \{8,B,C\}, \{3,6,8\}$ 

 $\begin{array}{l} \{0,5,7\}, \ \{0,4,8\}, \ \{6,7,8\}, \ \{0,3,6\} \\ \{B,C,D\}, \ \{1,4,B\}, \ \{4,C,E\}, \ \{0,E,F\}, \ \{2,4,7\}, \ \{2,6,D\}, \ \{4,6,F\}, \ \{0,2,B\}, \ \{6,A,E\}, \\ \{5,6,B\}, \ \{0,A,C\}, \ \{3,8,C\}, \ \{5,D,F\}, \ \{4,5,A\}, \ \{1,7,A\}, \ \{1,2,E\}, \ \{1,3,F\}, \ \{A,B,F\}, \\ \{1,5,8\}, \ \{0,1,D\}, \ \{8,A,D\}, \ \{2,3,A\}, \ \{1,6,C\}, \ \{3,4,D\}, \ \{2,5,C\}, \ \{7,C,F\}, \ \{3,5,E\}, \\ \{2,8,F\}, \ \{3,7,B\}, \ \{7,D,E\}, \ \{8,B,E\} \end{array}$ 

 $\begin{array}{l} \{0,5,7\}, \ \{1,5,6\}, \ \{1,3,8\}, \ \{0,3,6\}, \ \{0,4,8\} \\ \{4,6,A\}, \ \{6,B,D\}, \ \{7,8,C\}, \ \{0,E,F\}, \ \{0,2,B\}, \ \{4,5,C\}, \ \{0,1,C\}, \ \{2,3,5\}, \ \{1,4,B\}, \\ \{4,7,E\}, \ \{5,B,F\}, \ \{3,A,E\}, \ \{8,B,E\}, \ \{0,A,D\}, \ \{3,C,F\}, \ \{2,4,F\}, \ \{8,D,F\}, \ \{1,A,F\}, \\ \{A,B,C\}, \ \{1,2,E\}, \ \{2,C,D\}, \ \{3,4,D\}, \ \{6,C,E\}, \ \{5,8,A\}, \ \{1,7,D\}, \ \{5,D,E\}, \ \{3,7,B\}, \\ \{2,7,A\}, \ \{2,6,8\}, \ \{6,7,F\} \end{array}$ 

 $\begin{array}{l} \{2,4,6\}, \ \{2,3,7\}, \ \{0,4,8\}, \ \{1,5,6\}, \ \{0,5,7\}, \ \{2,5,8\} \\ \{2,C,F\}, \ \{3,4,A\}, \ \{2,A,E\}, \ \{3,5,D\}, \ \{1,7,F\}, \ \{4,7,E\}, \ \{1,8,A\}, \ \{4,B,D\}, \ \{4,5,F\}, \\ \{5,C,E\}, \ \{0,A,F\}, \ \{8,E,F\}, \ \{3,6,E\}, \ \{0,2,B\}, \ \{0,6,C\}, \ \{6,7,A\}, \ \{3,B,F\}, \ \{3,8,C\}, \\ \{5,A,B\}, \ \{6,D,F\}, \ \{0,D,E\}, \ \{1,2,D\}, \ \{1,B,E\}, \ \{0,1,3\}, \ \{7,B,C\}, \ \{1,4,C\}, \ \{6,8,B\}, \\ \{A,C,D\}, \ \{7,8,D\} \end{array}$ 

 $\begin{array}{l} \{1,5,6\}, \ \{3,4,5\}, \ \{2,4,6\}, \ \{0,3,6\}, \ \{2,3,7\}, \ \{2,5,8\}, \ \{0,4,8\} \\ \{3,8,D\}, \ \{0,1,7\}, \ \{6,7,F\}, \ \{1,4,A\}, \ \{5,7,D\}, \ \{4,B,C\}, \ \{6,C,E\}, \ \{1,8,F\}, \ \{0,2,C\}, \\ \{4,D,F\}, \ \{2,B,F\}, \ \{5,A,C\}, \ \{7,8,C\}, \ \{0,D,E\}, \ \{1,3,B\}, \ \{5,E,F\}, \ \{6,B,D\}, \ \{7,A,B\}, \\ \{6,8,A\}, \ \{1,C,D\}, \ \{4,7,E\}, \ \{3,A,E\}, \ \{0,5,B\}, \ \{3,C,F\}, \ \{1,2,E\}, \ \{8,B,E\}, \ \{0,A,F\}, \\ \{2,A,D\} \end{array}$ 

 $\begin{array}{l} \{0,1,2\}, \ \{3,4,5\}, \ \{6,7,8\}, \ \{1,3,8\}, \ \{1,4,7\}, \ \{2,5,8\}, \ \{0,4,8\}, \ \{0,5,7\} \\ \{7,B,E\}, \ \{8,D,E\}, \ \{2,7,A\}, \ \{1,D,F\}, \ \{7,C,D\}, \ \{0,3,D\}, \ \{2,3,E\}, \ \{1,A,E\}, \ \{0,C,E\}, \\ \{0,B,F\}, \ \{1,6,C\}, \ \{0,6,A\}, \ \{1,5,B\}, \ \{4,6,D\}, \ \{5,6,E\}, \ \{2,6,F\}, \ \{3,7,F\}, \ \{2,B,D\}, \\ \{8,B,C\}, \ \{3,6,B\}, \ \{4,A,B\}, \ \{3,A,C\}, \ \{2,4,C\}, \ \{4,E,F\}, \ \{8,A,F\}, \ \{5,A,D\}, \ \{5,C,F\} \\ \end{array}$ 

(ii) A computer construction is given in the technical report [?]. We note that this case is not used in the recursion.  $\Box$ 

**Theorem 25.** For  $t \ge 1$ , I(6t + 3, 12t + 3) = [0, b - 4t].

*Proof.* For t = 1, 2, the result follows from Lemma 24. For  $t \ge 3$ , apply Theorem 20 with 3-GDD of type  $6^t$  and s = 3. The calculation proceeds

$$I(6t+3,12t+3) \supseteq I(3\text{GDD}(6^t)) + \sum_{i=1}^t I_{3\subset 3}(9,15) + I(3,3)$$
  
= ([0,6t(t-1)] \ ({6t(t-1)} - {1,2,3,5})) + t \* [0,7] + {1}  
= [1,b-4t],

where  $I_{3\subset 3}(9,15) = [0,7]$  follows from part (i) of Lemma 24. Moreover,  $0 \in I(6t+3,12t+3)$  by Lemma 3. ¿From Lemma 2,  $I(6t+3,12t+3) \subseteq [0,b-4t]$ . Hence the result follows.

### **6** $v \ge 2u + 1$

An important family of regular graphs are the *circulant graphs*. Recall that a graph with n vertices (say  $\mathbb{Z}_n$ ) is circulant if there are nonzero *distances*  $m_1, \ldots, m_s$  such that xy is an edge if and only if  $x - y = \pm m_i$  for some i. The order of such an edge is  $n/\gcd(n, m_i)$ .

The following is an easy consequence of Theorem 1 and the Doyen-Wilson theorem, [5], which states that any STS(u) can be embedded in an STS(v) provided  $v \ge 2u + 1$ .

Lemma 26. If  $v \ge 2u + 1$ , then

$$I(u,v) \supseteq I(u,u) = \begin{cases} \{0,1,2,3,4,6,12\} & \text{if } v = 9, \\ [0,b] \setminus \{b-1,b-2,b-3,b-5\} & \text{otherwise.} \end{cases}$$

*Proof.* Let  $(U, \mathcal{B})$  be an STS(u). Take an STS  $(U, \mathcal{B}')$  with  $|\mathcal{B} \cap \mathcal{B}'| \in I(u, u)$ , and embed in an STS(v).

For convenience, we also call upon a recent result on embeddings of PTS into STS.

**Theorem 27.** ([1]) Any PTS(u) embeds in an STS(v), provided  $v \ge 2u + 1$  is admissible.

With these tools, we can now prove the following theorem.

**Theorem 28.** If  $v \ge 2u + 1$ , then I(u, v) = [0, b].

*Proof.* The result is clear when u = 3, so we assume  $u \ge 7$ . By Lemma 26, it suffices to show  $\{b - 1, b - 2, b - 3, b - 5\} \subset I(u, v)$  for  $u \ne 9$  and additionally that  $\{b - 4, b - 7\} \subset I(9, v)$ .

First, assume u = 7 (respectively 9). Let  $(U, \mathcal{B})$  be an STS(u). For r = 1, 2, 3, 5 (respectively r = 1, 2, 3, 4, 5, 7), we note that it is possible to remove r triples  $B_1, \ldots, B_r$  from  $\mathcal{B}$  such that there exist pairs  $\{x_i, y_i\} \subset B_i$   $(i = 1, \ldots, r)$  with the graph on vertices U formed by these pairs being 2-edge-colourable. Suppose  $\kappa : \{1, \ldots, r\} \to \{a_1, a_2\}$  gives such a colouring. Now form a PTS(u+2) on  $U \cup \{a_1, a_2\}$  with triples

$$\mathcal{B} \setminus \{B_1, \ldots, B_r\} \cup \{\{\kappa(i), x_i, y_i\} : i =, \ldots, r\}.$$

By Theorem 27, this PTS embeds into an STS(v), say  $(V, \mathcal{B}')$  whenever  $v \geq 2u + 5$ ; that is, for  $v \geq 19$  (respectively  $v \geq 25$ ). Because one pair from each  $B_i$  is covered in the PTS, no  $B_i$  can belong to  $\mathcal{B}'$ . Thus we have  $|\mathcal{B} \setminus \mathcal{B}'| = r$ , i.e.  $|\mathcal{B} \cap \mathcal{B}'| = b - r$ . For u = 7,  $v \leq 19$  and u = 9,  $v \leq 25$ , we have generated STS with the required intersections on computer and they are in the technical report [?]. This completes the proof for  $u \leq 9$ .

Suppose now that  $u \ge 13$ . We claim there exists a PTS(v - u) whose leave L admits a 1-factorization into u factors, and contains a subgraph isomorphic

to three triangles joined at a vertex. In fact, Stern and Lenz show in [10] that there exists such a PTS whose leave L is circulant and contains a full orbit of triangles, provided  $u \ge 13$ . In each of the cases of their proof (except the first, which treats the special case u = 9, v = 19) at least one difference triple is omitted from the cyclic PTS. Suppose  $(x+i, y+i, z+i) \pmod{v-u}$  is an orbit of triangles in L. Then (x, y, z), (x, 2x - y, z + x - y), and (x, 2x - z, y + x - z)are three triangles in L meeting our requirement. Now, as in [10], we may complete to an STS(v) missing a sub-STS(u) by joining 1-factors of L to u new points. The six edges incident with x in the triangles above must be joined to six distinct points. Among the triples formed are  $T_1 \cup T_2 \cup T_3$ , where

$$T_j = \{\{x, y_j, a_j\}, \{x, z_j, b_j\}, \{y_j, z_j, c_j\}\}, \quad j = 1, 2, 3,$$

and the  $a_j$  and  $b_j$  are all distinct. These nine triples are distinct: a pair from any group are clearly distinct for different j, the first group is disjoint from the second because the  $a_j, b_j$  are distinct, and the first and second groups are disjoint from the third because  $x \notin \{y, z, 2x - y, 2x - z, y + x - z, z + x - y\}$ . Now place an STS(u), say  $(U, \mathcal{B})$ , on the u new points and align the 3-subsets  $\{a_j, b_j, c_j\}, j = 1, 2, 3$ , with triples of S. This is possible because all possible configurations for three blocks exist in any STS of order at least 13 (see [8]). For r = 1, 2, 3, an STS(v)  $(V, \mathcal{B}')$ , which intersects S in exactly b - r triples, is formed by exchanging  $T_j \cup \{\{a_j, b_j, c_j\}\}$  with

$$\{\{x, a_j, b_j\}, \{y_j, b_j, c_j\}, \{z_j, a_j, c_j\}, \{x, y_j, z_j\}\}$$

for  $1 \leq j \leq h$ . Finally, take an STS(u) (U, C) with  $|\mathcal{B} \cap C| = b - 4$  blocks. Align C on the new points so that, say,  $\{a_1, b_1, c_1\} \in \mathcal{B} \cap C$ . We destroy this triple via an exchange as above to create an STS(v) agreeing with  $\mathcal{B}$  in b - 5 blocks.  $\Box$ 

### 7 Conclusion and further work

For convenience we summarize the results of [9] and of this paper in a single theorem which is a statement of current knowledge.

**Theorem 29.** For  $u \leq v$ , let I(u, v) be the set of all x such that there exists STS(u) and STS(v), say (U, B) and (V, B') with  $U \subseteq V$  and  $|\mathcal{B} \cap \mathcal{B}'| = x$ . Let b = u(u-1)/6. Then

$$I(u,u) = \begin{cases} \{0, 1, 2, 3, 4, 6, 12\} & \text{if } u = 9, \\ [0,b] \setminus \{b-1, b-2, b-3, b-5\} & \text{otherwise.} \end{cases}$$

(ii)

$$I(u, u+2) = \begin{cases} \{0, 1, 2, 4\} = [0, b - (u-1)/2] \setminus \{3\} & \text{if } u = 7, \\ [0, 19] = [0, b - (u-1)/2] \setminus \{20\} & \text{if } u = 13, \\ [0, b - (u-1)/2] & \text{otherwise.} \end{cases}$$

- (iii) I(u, v) = [0, b (v u)(2u + 1 v)/6] if v = u + 4, 2u 3 or 2u 1.
- (iv) I(u, v) = [0, b] if  $v \ge 2u + 1$ .

This leaves the spectrum of I(u, v),  $u + 6 \le v \le 2u - 5$  unresolved but given the results above, we think it is quite reasonable to conjecture:

**Conjecture 30.** For  $u + 4 \le v \le 2u - 1$ , I(u, v) = [0, b - (v - u)(2u + 1 - v)/6].

From [7], we know b - (v - u)(2u + 1 - v)/6 is the maximum possible value of I(u, v) when  $u \le v \le 2u + 1$  and this bound is achieved for various cases (when v = u + 6, u + 8, u + 10, 2u - 5) not treated in this paper. By Theorem 3, the minimum possible value 0 of I(u, v) is also achieved in these cases.

Finally, it should also be noted that while many of the same computational and recursive techniques employed here for I(u, v) and in [7] for the maximum value of I(u, v) can be extended to other values of v near u (as in part (v) of Lemma 16) or 2u + 1, we are near the limit of both the reasonable computation limit and size of output for the base cases and exceptional values using these techniques. Further, we presently lack a good understanding of how to determine I(u, v) in general and even for the restriction to a given "fiber"  $\frac{u}{v} \to k$ , where 1 < k < 2.

# Appendix: Computer generated objects needed for the recursive constructions Appendix (a) $I_{3\subset 7}(15, 19)$

For  $I_{3\subset 7}(15, 19)$ , we first give four pairs of ISTS(15; 3) and ISTS(19; 7) with intersections 23, 24, 25, 26. Moreover, various block-disjoint Pasch configurations are shown to be contained in the intersections. By applying zero or more Pasch trades to each ISTS(15; 3), we see that  $I_{3\subset 7}(15, 19) \supseteq \{4\} \cup [6, 26]$ .

Let  $U = \{0, \ldots, 15\}, H = \{0, 1, 2\}, V = U \cup \{A, B, C, D\}$ , and  $H' = H \cup \{A, B, C, D\}$ . Below, we give block sets for ISTS(15; 3)  $(U, H, \mathcal{B})$  and ISTS(19; 7)  $(V, H', \mathcal{B}')$  having intersections 23, 24, 25, 26. First,  $\mathcal{B} \setminus \mathcal{B}'$  is given, then  $\mathcal{B} \cap \mathcal{B}'$  with Pasch configurations noted, then  $\mathcal{B}' \setminus \mathcal{B}$ .

**a–i:** 7, 11, 15, 19, 23  $\in I_{3\subset 7}(15, 19)$ 

 $\{5,8,14\},\ \{4,7,12\},\ \{6,8,13\},\ \{6,10,11\},\ \{3,9,13\},\ \{4,10,13\},\ \{4,9,14\},\ \{5,7,13\},\ \{3,7,11\},\ \{4,8,11\},\ \{5,10,12\}$ 

**a**-**ii:** 4, 8, 12, 16, 20,  $24 \in I_{3\subset 7}(15, 19)$ 

 $\{5,7,13\},\ \{4,7,12\},\ \{5,10,12\},\ \{6,9,12\},\ \{6,7,14\},\ \{4,8,11\},\ \{5,8,14\},\ \{3,10,14\},\ \{6,10,11\},\ \{3,9,13\}$ 

 $\{0,3,4\}, \{0,5,6\}, \{5,9,11\}, \{6,8,13\}$ 

 $\begin{array}{l} \{5,7,14\}, \ \{6,10,12\}, \ \{4,11,B\}, \ \{9,12,B\}, \ \{6,11,A\}, \ \{6,7,B\}, \ \{10,11,D\}, \ \{5,12,C\}, \ \{6,9,C\}, \\ \{5,8,D\}, \ \{3,10,B\}, \ \{9,13,A\}, \ \{4,12,D\}, \ \{4,7,C\}, \ \{5,13,B\}, \ \{8,11,C\}, \ \{10,14,C\}, \ \{3,14,A\}, \\ \{7,13,D\}, \ \{3,13,C\}, \ \{6,14,D\}, \ \{5,10,A\}, \ \{4,8,A\}, \ \{7,12,A\}, \ \{8,14,B\}, \ \{3,9,D\} \end{array}$ 

**a–iii:** 9, 13, 17, 21, 25  $\in I_{3\subset 7}(15, 19)$ 

 $\{5, 11, 14\}, \{3, 10, 11\}, \{4, 9, 14\}, \{5, 8, 13\}, \{4, 10, 12\}, \{6, 7, 12\}, \{3, 8, 9\}, \{6, 10, 13\}, \{4, 7, 13\}, \{$ 

Pasch 1:  $\{0,5,6\}, \{0,11,12\}, \{5,9,12\}, \{6,9,11\}$ Pasch 2:  $\{1,8,10\}, \{1,12,14\}, \{2,8,12\}, \{2,10,14\}$ Pasch 3:  $\{2,4,5\}, \{2,3,6\}, \{1,4,6\}, \{1,3,5\}$ Pasch 4:  $\{2,7,11\}, \{2,9,13\}, \{1,11,13\}, \{1,7,9\}$  $\{4,8,11\}, \{0,3,4\}, \{0,7,8\}, \{5,7,10\}, \{0,9,10\}, \{3,12,13\}, \{0,13,14\}, \{6,8,14\}, \{3,7,14\}$ 

 $\begin{array}{l} \{4,10,13\}, \ \{9,14,A\}, \ \{10,12,D\}, \ \{10,11,A\}, \ \{11,14,D\}, \ \{6,12,B\}, \ \{7,12,C\}, \ \{4,14,B\}, \\ \{4,9,C\}, \ \{8,9,B\}, \ \{3,8,A\}, \ \{7,13,B\}, \ \{3,11,C\}, \ \{6,10,C\}, \ \{5,13,A\}, \ \{3,9,D\}, \ \{6,7,A\}, \\ \{5,11,B\}, \ \{3,10,B\}, \ \{4,12,A\}, \ \{5,8,D\}, \ \{5,14,C\}, \ \{4,7,D\}, \ \{6,13,D\}, \ \{8,13,C\} \end{array}$ 

**a-iv:** 6, 10, 14, 18, 22,  $26 \in I_{3 \subset 7}(15, 19)$ 

 $\{3, 9, 13\}, \{5, 7, 14\}, \{3, 8, 12\}, \{4, 8, 11\}, \{6, 7, 13\}, \{5, 10, 11\}, \{6, 10, 12\}, \{4, 9, 14\}$ 

Pasch 1:  $\{0,3,4\},\{0,11,12\},\{3,7,11\},\{4,7,12\}$  Pasch 2:  $\{0,5,6\},\{0,13,14\},\{5,8,13\},\{6,8,14\}$ Pasch 3:  $\{0,7,8\},\{0,9,10\},\{2,7,10\},\{2,8,9\}$  Pasch 4:  $\{2,4,5\},\{2,3,6\},\{1,4,6\},\{1,3,5\}$ Pasch 5:  $\{2,12,13\},\{2,11,14\},\{1,12,14\},\{1,11,13\}$ 

 $\{3, 10, 14\}, \{1, 7, 9\}, \{4, 10, 13\}, \{5, 9, 12\}, \{6, 9, 11\}, \{1, 8, 10\}$ 

 $\begin{array}{l} \{9,14,D\}, \ \{3,9,C\}, \ \{4,11,D\}, \ \{5,11,A\}, \ \{7,13,C\}, \ \{7,14,A\}, \ \{4,14,B\}, \ \{5,14,C\}, \ \{8,11,B\}, \\ \{6,13,D\}, \ \{10,12,D\}, \ \{10,11,C\}, \ \{5,10,B\}, \ \{3,12,B\}, \ \{6,12,C\}, \ \{4,8,C\}, \ \{5,7,D\}, \ \{3,8,D\}, \\ \{4,9,A\}, \ \{8,12,A\}, \ \{6,10,A\}, \ \{6,7,B\}, \ \{9,13,B\}, \ \{3,13,A\} \end{array}$ 

To complete the interval [0, 26], five further examples are required. Consider the following ISTS(15; 3).

 $\begin{array}{l} \{1,12,14\}, \ \{4,8,11\}, \ \{0,3,4\}, \ \{2,3,6\}, \ \{4,9,14\}, \ \{0,5,6\}, \ \{2,4,5\}, \ \{4,10,13\}, \ \{0,7,8\}, \\ \{2,7,10\}, \ \{5,7,13\}, \ \{0,9,10\}, \ \{2,8,9\}, \ \{5,8,14\}, \ \{0,11,12\}, \ \{2,11,14\}, \ \{5,9,11\}, \ \{0,13,14\}, \\ \{2,12,13\}, \ \{5,10,12\}, \ \{1,3,5\}, \ \{3,7,11\}, \ \{6,7,14\}, \ \{1,4,6\}, \ \{3,8,12\}, \ \{6,8,13\}, \ \{1,7,9\}, \\ \{3,9,13\}, \ \{6,9,12\}, \ \{1,8,10\}, \ \{3,10,14\}, \ \{6,10,11\}, \ \{1,11,13\}, \ \{4,7,12\} \end{array}$ 

The following ISTS(19; 7) have intersections 0, 1, 2, 3, 5 with this system.

 $\begin{array}{l} \{10,14,C\}, \ \{3,7,D\}, \ \{11,12,A\}, \ \{4,6,D\}, \ \{9,13,B\}, \ \{2,9,14\}, \ \{12,13,C\}, \ \{1,10,13\}, \\ \{3,8,B\}, \ \{2,6,13\}, \ \{1,3,14\}, \ \{3,9,C\}, \ \{0,7,9\}, \ \{6,10,B\}, \ \{1,9,12\}, \ \{2,7,12\}, \ \{2,5,10\}, \\ \{8,10,D\}, \ \{11,14,B\}, \ \{3,5,13\}, \ \{7,13,A\}, \ \{8,13,14\}, \ \{8,9,A\}, \ \{4,12,B\}, \ \{1,6,7\}, \ \{4,11,C\}, \\ \{3,6,12\}, \ \{1,4,8\}, \ \{0,6,8\}, \ \{2,8,11\}, \ \{6,14,A\}, \ \{7,10,11\}, \ \{11,13,D\}, \ \{5,9,D\}, \ \{5,7,B\}, \\ \{0,4,13\}, \ \{0,3,11\}, \ \{5,8,12\}, \ \{4,5,A\}, \ \{12,14,D\}, \ \{1,5,11\}, \ \{2,3,4\}, \ \{0,10,12\}, \ \{0,5,14\}, \\ \{7,8,C\}, \ \{6,9,11\}, \ \{5,6,C\}, \ \{3,10,A\}, \ \{4,7,14\}, \ \{4,9,10\} \end{array}$ 

 $\begin{cases} 0,9,10 \} & \{4,6,14\}, \ \{1,5,10\}, \ \{3,4,C\}, \ \{8,14,A\}, \ \{2,10,13\}, \ \{0,6,8\}, \ \{4,10,D\}, \ \{0,3,5\}, \\ \{11,12,A\}, \ \{1,7,14\}, \ \{2,5,14\}, \ \{8,9,C\}, \ \{7,9,D\}, \ \{4,9,A\}, \ \{5,13,A\}, \ \{3,6,B\}, \ \{0,12,14\}, \\ \{5,9,B\}, \ \{3,11,D\}, \ \{0,7,11\}, \ \{7,10,12\}, \ \{4,12,B\}, \ \{11,14,C\}, \ \{1,6,13\}, \ \{13,14,D\}, \\ \{3,10,A\}, \ \{5,12,C\}, \ \{7,13,C\}, \ \{8,10,11\}, \ \{1,3,12\}, \ \{4,5,7\}, \ \{3,8,13\}, \ \{1,9,11\}, \ \{1,4,8\}, \\ \{5,6,11\}, \ \{11,13,B\}, \ \{2,6,9\}, \ \{9,12,13\}, \ \{2,3,7\}, \ \{6,12,D\}, \ \{2,8,12\}, \ \{2,4,11\}, \ \{7,8,B\}, \\ \{6,7,A\}, \ \{5,8,D\}, \ \{3,9,14\}, \ \{0,4,13\}, \ \{6,10,C\}, \ \{10,14,B\} \end{cases}$ 

 $\begin{array}{l} \{1,3,5\}, \ \{2,4,5\}, & \{6,12,A\}, \ \{2,10,13\}, \ \{4,10,A\}, \ \{0,8,12\}, \ \{1,7,12\}, \ \{13,14,D\}, \ \{2,3,7\}, \\ \{0,5,13\}, \ \{2,12,14\}, \ \{1,4,8\}, \ \{9,11,D\}, \ \{3,9,B\}, \ \{6,7,B\}, \ \{4,12,B\}, \ \{4,7,11\}, \ \{3,8,D\}, \\ \{3,6,C\}, \ \{9,12,C\}, \ \{8,10,B\}, \ \{0,7,14\}, \ \{4,6,D\}, \ \{5,6,10\}, \ \{1,9,10\}, \ \{1,6,13\}, \ \{5,12,D\}, \\ \{10,11,12\}, \ \{2,6,9\}, \ \{8,9,13\}, \ \{0,3,10\}, \ \{9,14,A\}, \ \{5,14,B\}, \ \{3,11,A\}, \ \{7,13,A\}, \ \{5,7,9\}, \\ \{3,12,13\}, \ \{0,6,11\}, \ \{2,8,11\}, \ \{4,13,C\}, \ \{7,8,C\}, \ \{10,14,C\}, \ \{5,11,C\}, \ \{0,4,9\}, \\ \{11,13,B\}, \ \{6,8,14\}, \ \{7,10,D\}, \ \{5,8,A\}, \ \{1,11,14\}, \ \{3,4,14\} \end{array}$ 

 $\begin{array}{l} \{6,7,14\} , \ \{4,7,12\}, \ \{0,3,4\}, \ \{0,9,10\}, \ \{4,10,13\}, \\ \{1,6,10\}, \ \{5,10,A\}, \ \{2,7,8\}, \ \{7,9,A\}, \\ \{3,10,B\}, \ \{9,12,13\}, \ \{3,14,A\}, \ \{5,6,C\}, \ \{4,8,A\}, \ \{0,8,14\}, \ \{4,11,B\}, \ \{2,6,11\}, \ \{8,10,11\}, \\ \{8,13,C\}, \ \{7,10,D\}, \ \{0,6,12\}, \ \{5,7,B\}, \ \{3,5,11\}, \ \{0,5,13\}, \ \{6,9,B\}, \ \{13,14,B\}, \ \{3,6,8\}, \\ \{1,4,5\}, \ \{8,12,B\}, \ \{2,10,14\}, \ \{2,3,13\}, \ \{1,8,9\}, \ \{4,14,C\}, \ \{11,12,A\}, \ \{10,12,C\}, \ \{2,4,9\}, \\ \{0,7,11\}, \ \{12,14,D\}, \ \{9,11,C\}, \ \{13,12\}, \ \{11,13,D\}, \ \{1,11,14\}, \ \{6,13,A\}, \ \{5,9,14\}, \\ \{5,8,D\}, \ \{2,5,12\}, \ \{1,7,13\}, \ \{3,9,D\}, \ \{3,7,C\}, \ \{4,6,D\} \end{array}$ 

### Appendix (b) $I_{3\subset 7}(21, 25)$

We now give direct constructions for  $54, 55, 56 \in I_{3\subset 7}(21, 25)$ . The other two cases not already covered in Corollary 15 are handled through Pasch trades.

**b–i:** 48, 52, 56  $\in I_{3\subset 7}(21, 25)$ 

 $\{ 6, 15, 19 \}, \ \{ 5, 10, 17 \}, \ \{ 9, 12, 14 \}, \ \{ 14, 16, 20 \}, \ \{ 10, 11, 18 \}, \ \{ 9, 11, 20 \}, \ \{ 7, 9, 13 \}, \ \{ 13, 15, 18 \}, \ \{ 7, 8, 19 \}, \ \{ 3, 8, 16 \}, \ \{ 4, 6, 12 \}, \ \{ 3, 4, 5 \}, \ \{ 13, 17, 20 \}$ 

 $\begin{array}{l} \textbf{Pasch 1:} \{0,7,18\} \{0,10,19\} \{7,10,20\} \{18,19,20\} \textbf{Pasch 2:} \{5,8,11\} \{2,5,20\} \{8,12,20\} \{2,11,12\} \\ \{7,14,17\}, \{2,8,17\}, \{0,6,20\}, \{9,10,16\}, \{4,8,9\}, \{1,16,18\}, \{0,8,13\}, \{1,6,13\}, \{10,12,15\}, \\ \{3,10,13\}, \{11,14,15\}, \{4,17,18\}, \{1,5,9\}, \{5,12,13\}, \{3,12,18\}, \{5,6,18\}, \{1,11,17\}, \\ \{15,16,17\}, \{3,9,19\}, \{4,7,16\}, \{1,3,20\}, \{2,10,14\}, \{0,4,11\}, \{2,4,19\}, \{0,12,16\}, \{6,8,10\}, \\ \{2,13,16\}, \{11,13,19\}, \{6,11,16\}, \{5,16,19\}, \{8,14,18\}, \{5,7,15\}, \{0,3,17\}, \{2,9,18\}, \\ \{1,7,12\}, \{1,4,10\}, \{1,8,15\}, \{1,1,4,19\}, \{2,3,15\}, \{3,7,11\}, \{4,15,20\}, \{2,6,7\}, \{4,13,14\}, \\ \{6,9,17\}, \{3,6,14\}, \{0,9,15\}, \{12,17,19\}, \{0,5,14\} \end{array}$ 

 $\begin{array}{l} \{9,13,20\}, \ \{3,5,B\}, \ \{7,9,B\}, \ \{4,5,C\}, \ \{7,13,D\}, \ \{6,19,B\}, \ \{5,17,D\}, \ \{7,8,C\}, \ \{5,10,A\}, \\ \{14,16,A\}, \ \{17,20,A\}, \ \{11,20,C\}, \ \{9,11,D\}, \ \{9,12,A\}, \ \{10,17,C\}, \ \{15,18,B\}, \ \{10,18,D\}, \\ \{3,8,A\}, \ \{4,6,A\}, \ \{15,19,C\}, \ \{4,12,B\}, \ \{13,17,B\}, \ \{11,18,A\}, \ \{16,20,D\}, \ \{14,20,B\}, \\ \{3,4,D\}, \ \{6,15,D\}, \ \{3,16,C\}, \ \{7,19,A\}, \ \{9,14,C\}, \ \{6,12,C\}, \ \{13,15,A\}, \ \{8,19,D\}, \\ \{10,11,B\}, \ \{8,16,B\}, \ \{12,14,D\}, \ \{13,18,C\} \end{array} \right)$ 

**b-ii:**  $54 \in I_{3\subset 7}(21, 25)$ 

 $\begin{array}{l} \{14,17,18\}, \ \{5,8,15\}, \ \{3,7,8\}, \ \{7,11,13\}, \ \{10,16,18\}, \ \{14,15,19\}, \ \{3,6,15\}, \ \{13,15,16\}, \\ \{12,19,20\}, \ \{4,15,17\}, \ \{3,9,19\}, \ \{5,10,12\}, \ \{4,6,16\}, \ \{8,14,20\}, \ \{4,9,11\} \end{array}$ 

 $\begin{array}{l} \{1,3,14\}, \{0,4,7\}, \{3,5,11\}, \{0,12,15\}, \{10,11,15\}, \{4,5,20\}, \{6,9,12\}, \{6,8,10\}, \{8,12,18\}, \\ \{6,11,14\}, \{1,4,10\}, \{1,15,20\}, \{2,5,18\}, \{6,17,19\}, \{0,8,16\}, \{9,13,18\}, \{0,6,18\}, \\ \{2,11,12\}, \{3,10,20\}, \{1,18,19\}, \{2,7,19\}, \{1,5,9\}, \{1,6,13\}, \{1,7,17\}, \{0,10,19\}, \{7,15,18\}, \\ \{7,12,14\}, \{5,6,7\}, \{2,10,17\}, \{0,5,14\}, \{11,16,19\}, \{1,12,16\}, \{11,18,20\}, \{4,12,13\}, \\ \{10,13,14\}, \{4,8,19\}, \{0,9,20\}, \{8,9,17\}, \{1,8,11\}, \{2,3,16\}, \{7,9,10\}, \{2,8,13\}, \{13,17,20\}, \\ \{5,13,19\}, \{2,6,20\}, \{5,16,17\}, \{2,9,15\}, \{0,3,13\}, \{9,14,16\}, \{7,16,20\}, \{2,4,14\}, \{3,4,18\}, \\ \{0,11,17\}, \{3,12,17\} \end{array}$ 

 $\begin{array}{l} \{3,15,19\}, \ \{4,15,16\}, \ \{8,14,15\}, \ \{4,9,A\}, \ \{14,20,D\}, \ \{8,20,A\}, \ \{4,11,D\}, \ \{7,8,D\}, \\ \{16,18,A\}, \ \{12,19,A\}, \ \{10,18,D\}, \ \{7,11,B\}, \ \{3,8,C\}, \ \{5,10,A\}, \ \{15,17,D\}, \ \{3,9,B\}, \\ \{6,16,B\}, \ \{6,15,A\}, \ \{14,18,B\}, \ \{9,11,C\}, \ \{10,16,C\}, \ \{12,20,C\}, \ \{4,6,C\}, \ \{3,7,A\}, \\ \{14,19,C\}, \ \{7,13,C\}, \ \{19,20,B\}, \ \{11,13,A\}, \ \{5,12,D\}, \ \{9,19,D\}, \ \{17,18,C\}, \ \{3,6,D\}, \\ \{5,8,B\}, \ \{10,12,B\}, \ \{13,15,B\}, \ \{5,15,C\}, \ \{13,16,D\}, \ \{4,17,B\}, \ \{14,17,A\} \end{array} \right.$ 

**b-iii:**  $55 \in I_{3\subset 7}(21, 25)$ 

 $\begin{array}{l} \{6,11,12\},\ \{5,7,17\},\ \{11,14,18\},\ \{4,7,13\},\ \{5,9,16\},\ \{9,18,20\},\ \{15,19,20\},\ \{12,13,16\},\ \{10,11,17\},\ \{3,8,12\},\ \{4,15,17\},\ \{8,11,15\},\ \{8,14,19\},\ \{3,6,10\} \end{array}$ 

 $\begin{array}{l} \hline \\ \{9,10,12\}, \{1,5,8\}, \{4,8,10\}, \{3,16,17\}, \{5,10,14\}, \{1,6,13\}, \{0,16,18\}, \{4,5,20\}, \{2,10,20\}, \\ \{6,7,20\}, \{2,5,12\}, \{13,17,19\}, \{0,13,14\}, \{4,11,16\}, \{1,16,20\}, \{8,17,18\}, \{8,9,13\}, \\ \{7,15,16\}, \{1,9,11\}, \{1,12,19\}, \{3,14,20\}, \{6,9,19\}, \{2,4,19\}, \{0,6,17\}, \{2,6,18\}, \{9,14,15\}, \\ \{0,3,19\}, \{11,13,20\}, \{6,8,16\}, \{0,8,20\}, \{7,11,19\}, \{13,15\}, \{10,16,19\}, \{12,17,20\}, \\ \{1,7,10\}, \{2,3,11\}, \{10,13,18\}, \{2,13,15\}, \{0,4,12\}, \{3,7,18\}, \{1,4,18\}, \{4,6,14\}, \{3,5,13\}, \\ \{3,4,9\}, \{0,5,11\}, \{2,14,16\}, \{12,15,18\}, \{5,18,19\}, \{1,14,17\}, \{7,12,14\}, \{2,9,17\}, \\ \{5,6,15\}, \{0,10,15\}, \{0,7,9\}, \{2,7,8\} \end{array}$ 

 $\begin{array}{l} \hline \\ \{8,11,12\}, \{11,15,17\}, \{3,8,D\}, \{5,16,C\}, \{3,12,C\}, \{8,15,C\}, \{15,20,B\}, \{5,9,B\}, \\ \{10,11,B\}, \{11,18,D\}, \{7,13,C\}, \{3,10,A\}, \{9,20,D\}, \{4,17,C\}, \{4,7,A\}, \{15,19,A\}, \\ \{19,20,C\}, \{6,12,D\}, \{8,14,A\}, \{13,16,D\}, \{9,16,A\}, \{7,17,B\}, \{12,16,B\}, \{11,14,C\}, \\ \{14,18,B\}, \{18,20,A\}, \{14,19,D\}, \{4,15,D\}, \{5,17,A\}, \{6,11,A\}, \{9,18,C\}, \{8,19,B\}, \\ \{5,7,D\}, \{3,6,B\}, \{12,13,A\}, \{4,13,B\}, \{10,17,D\}, \{6,10,C\} \end{array}$ 

# Part II The Computational Results

## A Cases from Lemma 16:

Consider the following PTS(7) appearing in [7].

$$\beta_0: \{\{0,1,2\},\{1,3,4\},\{2,3,5\},\{4,5,6\}\}$$

This has the property that its underlying graph is 4-edge-colourable with the degree two vertices 0 and 6 incident with disjoint pairs of colours.

In a similar way, we have  $PTS(9) \beta_2$  and  $\beta_3$  whose underlying graphs can be edge-decomposed into 2 and 3 "new" triples, respectively, and a 4-edgecolourable graph G. Moreover, exactly six of the vertices of G have degree two, and all six pairs of colours are "missing" at these vertices. We leave it to the reader to check these conditions.

Ba	now	$\beta_3$	new
$\begin{array}{c} \beta_2\\ \{0,1,2\}\\ \{2,3,4\}\\ \{2,5,6\}\\ \{2,7,8\}\\ \{3,5,7\}\\ \{4,6,8\}\end{array}$	new $\{2, 5, 7\}$ $\{2, 6, 8\}$	$\begin{array}{c} \hline \{0,1,2\}\\ \{1,3,4\}\\ \{1,6,7\}\\ \{2,4,7\}\\ \{2,5,6\}\\ \{3,5,7\}\\ \{4,6,8\} \end{array}$	$\{1, 2, 6\} \\ \{1, 4, 7\} \\ \{2, 5, 7\}$

Using  $\beta_0, \beta_2$ , and  $\beta_3$ , we can show existence of STS(u + 4) intersecting an STS(u) in max I(u, u+4) - 2 and max I(u, u+4) - 3 blocks. In each of the cases which follow, we specify an STS(u) containing a PTS consisting of linked copies of  $\beta_0$  (on points  $\{0, \ldots, 6\}, \{6, \ldots, 12\}$ , etc.), followed by a copy of either  $\beta_2$  or  $\beta_3$  on  $\{u - 9, \ldots, u - 1\}$ . As in Example 12, we remove the triples of this PTS, add back the new triples, join colour classes of edges in the remaining graph G to four new points, and join pairs of the new points to the deficient vertices in G.

A(a) (iv):max 
$$-2$$
, max  $-3 \in I(27, 31)$   
max  $-2 \in I(27, 31)$ 

PTS:  $\{0, 1, 2\}, \{1, 3, 4\}, \{2, 3, 5\}, \{4, 5, 6\}, \{6, 7, 8\}, \{7, 9, 10\}, \{8, 9, 11\}, \{10, 11, 12\}, \{12, 13, 14\}, \{13, 15, 16\}, \{14, 15, 17\}, \{16, 17, 18\}, \{18, 19, 20\}, \{20, 21, 22\}, \{20, 23, 24\}, \{20, 25, 26\}, \{21, 23, 25\}, \{22, 24, 26\}$  $\{4, 12, 24\}, \{4, 19, 23\}, \{7, 16, 22\}, \{5, 12, 16\}, \{2, 18, 24\}, \{0, 6, 15\}, \{1, 9, 13\}, \{8, 13, 19\}, \{8, 15, 21\}, \{1, 8, 23\}, \{1, 7, 20\}, \{5, 13, 20\}, \{7, 15, 18\}, \{4, 10, 26\}, \{2, 4, 21\}, \{2, 8, 14\}, \{8, 18, 26\}, \{3, 7, 12\}, \{2, 7, 11\}, \{3, 16, 21\}, \{6, 14, 18\}, \{1, 5, 19\}, \{10, 15, 25\}, \{11, 16, 24\}, \{3, 9, 20\}, \{9, 12, 17\}, \{17, 21, 26\},$   $\{11, 13, 21\}, \{4, 14, 16\}, \{11, 15, 20\}, \{10, 18, 23\}, \{0, 16, 20\}, \{3, 6, 13\}, \\ \{1, 11, 18\}, \{0, 13, 26\}, \{2, 16, 23\}, \{1, 6, 16\}, \{12, 18, 22\}, \{8, 17, 24\}, \{9, 14, 22\}, \\ \{4, 8, 20\}, \{9, 16, 25\}, \{2, 15, 26\}, \{0, 19, 25\}, \{1, 14, 21\}, \{11, 14, 19\}, \{5, 9, 24\}, \\ \{6, 9, 21\}, \{0, 14, 24\}, \{1, 17, 25\}, \{5, 8, 22\}, \{2, 6, 10\}, \{0, 9, 18\}, \{5, 11, 17\}, \\ \{0, 3, 8\}, \{2, 9, 19\}, \{2, 12, 20\}, \{0, 5, 10\}, \{6, 12, 23\}, \{0, 11, 22\}, \{4, 11, 25\}, \\ \{6, 17, 20\}, \{9, 23, 26\}, \{12, 15, 19\}, \{1, 15, 24\}, \{10, 13, 24\}, \{5, 7, 26\}, \\ \{5, 18, 21\}, \{7, 14, 23\}, \{1, 12, 26\}, \{8, 10, 16\}, \{0, 4, 7\}, \{7, 17, 19\}, \{6, 11, 26\}, \\ \{7, 13, 25\}, \{3, 15, 22\}, \{8, 12, 25\}, \{10, 14, 20\}, \{0, 12, 21\}, \{6, 24, 25\}, \\ \{3, 14, 26\}, \{10, 19, 21\}, \{5, 15, 23\}, \{3, 10, 17\}, \{16, 19, 26\}, \{4, 13, 18\}, \\ \{13, 22, 23\}, \{3, 18, 25\}, \{1, 10, 22\}, \{2, 13, 17\}, \{6, 19, 22\}, \{0, 17, 23\}, \\ \{4, 9, 15\}, \{4, 17, 22\}, \{3, 19, 24\}, \{7, 21, 24\}, \{3, 11, 23\}, \{2, 22, 25\}, \{5, 14, 25\} \end{cases}$ 

#### $\max -3 \in I(27, 31)$

PTS:  $\{0, 1, 2\}, \{1, 3, 4\}, \{2, 3, 5\}, \{4, 5, 6\}, \{6, 7, 8\}, \{7, 9, 10\}, \{8, 9, 11\}, \{1, 3, 4\}, \{2, 3, 5\}, \{4, 5, 6\}, \{6, 7, 8\}, \{7, 9, 10\}, \{8, 9, 11\}, \{1, 3, 4\}, \{2, 3, 5\}, \{4, 5, 6\},$  $\{10, 11, 12\}, \{12, 13, 14\}, \{13, 15, 16\}, \{14, 15, 17\}, \{16, 17, 18\}, \{18, 19, 20\},$  $\{19, 21, 22\}, \{20, 23, 24\}, \{20, 22, 25\}, \{19, 24, 25\}, \{21, 23, 25\}, \{22, 24, 26\}$  $\{0, 13, 20\}, \{1, 11, 19\}, \{4, 11, 24\}, \{6, 11, 23\}, \{0, 4, 26\}, \{6, 21, 26\}, \{5, 12, 19\}, \{6, 21, 26\}, \{5, 12, 19\}, \{6, 21, 26\}, \{5, 12, 19\}, \{6, 21, 26\}, \{6,$  $\{1, 8, 16\}, \{2, 12, 21\}, \{14, 18, 21\}, \{5, 9, 13\}, \{9, 18, 24\}, \{1, 6, 18\}, \{4, 7, 19\},$  $\{7, 13, 18\}, \{3, 17, 19\}, \{13, 17, 25\}, \{2, 9, 17\}, \{10, 13, 26\}, \{3, 7, 16\}, \{3, 11, 22\}, \{2, 9, 17\}, \{10, 13, 26\}, \{3, 7, 16\}, \{3, 11, 22\}, \{10, 13, 26\}, \{2, 9, 17\}, \{10, 13, 26\}, \{2, 9, 17\}, \{10, 13, 26\}, \{2, 9, 16\}, \{2, 9, 17\}, \{10, 13, 26\}, \{2, 9, 16\}, \{2, 9, 16\}, \{3, 16\}, \{3, 11, 22\}, \{10, 13, 26\}, \{2, 9, 16\}, \{2, 9, 16\}, \{2, 9, 16\}, \{2, 9, 16\}, \{3, 16\}$  $\{5, 15, 23\}, \{8, 13, 22\}, \{9, 19, 23\}, \{8, 17, 23\}, \{7, 25, 26\}, \{8, 14, 24\}, \{6, 17, 24\},$  $\{11, 15, 21\}, \{0, 8, 25\}, \{11, 16, 26\}, \{5, 10, 21\}, \{9, 14, 16\}, \{12, 18, 23\}, \{2, 10, 24\}, \{11, 15, 21\}, \{12, 18, 23\}, \{2, 10, 24\}, \{11, 16, 26\}, \{12, 18, 23\}, \{2, 10, 24\}, \{11, 16, 26\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{12, 18, 23\}, \{2, 10, 24\}, \{2, 1$  $\{3, 10, 23\}, \{11, 18, 25\}, \{3, 8, 21\}, \{7, 20, 21\}, \{0, 6, 12\}, \{4, 9, 22\}, \{1, 10, 15\}, \{3, 10, 23\}, \{1, 10, 15\}, \{1, 1$  $\{5, 7, 22\}, \{2, 20, 26\}, \{16, 21, 24\}, \{1, 5, 20\}, \{4, 8, 15\}, \{10, 14, 19\}, \{2, 11, 13\}, \{2, 11, 13\}, \{2, 11, 13\}, \{3, 12, 12, 13\}, \{1,$  $\{3, 13, 24\}, \{0, 7, 11\}, \{11, 17, 20\}, \{2, 18, 22\}, \{4, 10, 18\}, \{0, 10, 17\}, \{6, 13, 19\}, \{11, 17, 20\}, \{2, 18, 22\}, \{4, 10, 18\}, \{11, 17, 20\}, \{2, 18, 22\}, \{4, 10, 18\}, \{11, 17, 20\}, \{2, 18, 22\}, \{4, 10, 18\}, \{11, 17, 20\}, \{2, 18, 22\}, \{4, 10, 18\}, \{11, 17, 20\}, \{2, 18, 22\}, \{3, 10, 10\}, \{11, 17, 20\}, \{2, 18, 22\}, \{3, 10, 10\}, \{11, 17, 20\}, \{2, 18, 22\}, \{4, 10, 18\}, \{11, 17, 20\}, \{2, 18, 22\}, \{3, 10, 10\}, \{11, 17, 20\}, \{11, 17, 20\}, \{2, 18, 22\}, \{3, 10, 18\}, \{11, 17, 20$  $\{5, 8, 18\}, \{3, 18, 26\}, \{8, 10, 20\}, \{3, 15, 25\}, \{3, 12, 20\}, \{2, 6, 15\}, \{2, 8, 19\},$  $\{0, 9, 21\}, \{5, 16, 25\}, \{15, 19, 26\}, \{1, 14, 25\}, \{4, 14, 20\}, \{5, 17, 26\}, \{4, 12, 16\}, \{4,$  $\{12, 15, 22\}, \{8, 12, 26\}, \{4, 17, 21\}, \{6, 10, 25\}, \{7, 15, 24\}, \{2, 4, 25\}, \{6, 16, 20\},$  $\{0, 22, 23\}, \{1, 7, 23\}, \{5, 11, 14\}, \{3, 6, 9\}, \{9, 15, 20\}, \{2, 7, 14\}, \{2, 16, 23\}, \{0, 5, 24\}, \{2, 16, 23\}, \{1, 14\}, \{2, 16, 23\}, \{2, 16, 23\}, \{2, 16, 23\}, \{2, 16, 23\}, \{3, 16, 23\},$  $\{9, 12, 25\}, \{1, 13, 21\}, \{0, 16, 19\}, \{1, 12, 24\}, \{1, 17, 22\}, \{7, 12, 17\}$ 

A(b) (v): $\max -2, \max -3 \in I(33, 37)$ 

 $\max -2 \in I(33, 37)$ 

PTS:  $\{0, 1, 2\}, \{1, 3, 4\}, \{2, 3, 5\}, \{4, 5, 6\}, \{6, 7, 8\}, \{7, 9, 10\}, \{8, 9, 11\}, \{10, 11, 12\}, \{12, 13, 14\}, \{13, 15, 16\}, \{14, 15, 17\}, \{16, 17, 18\}, \{18, 19, 20\}, \{19, 21, 22\}, \{20, 21, 23\}, \{22, 23, 24\}, \{24, 25, 26\}, \{26, 27, 28\}, \{26, 29, 30\}, \{26, 31, 32\}, \{27, 29, 31\}, \{28, 30, 32\}$  $\{12, 21, 30\}, \{0, 17, 25\}, \{0, 4, 31\}, \{10, 13, 24\}, \{5, 21, 31\}, \{7, 13, 31\}, \{9, 12, 27\}, \{5, 14, 28\}, \{3, 17, 24\}, \{6, 9, 15\}, \{1, 6, 25\}, \{4, 21, 26\}, \{11, 18, 27\}, \{4, 23, 27\}, \{0, 6, 19\}, \{2, 20, 30\}, \{8, 25, 27\}, \{4, 12, 15\}, \{1, 11, 14\}, \{3, 12, 31\}, \{5, 24, 30\}, \{0, 9, 21\}, \{8, 18, 22\}, \{2, 17, 21\}, \{8, 24, 28\}, \{7, 14, 16\}, \{12, 19, 32\}, \{25, 28, 31\}, \{9, 23, 31\}, \{11, 24, 31\}, \{11, 17, 28\}, \{16, 20, 26\}, \{6, 10, 18\}, \{9, 16, 30\}, \{10, 19, 30\}, \{4, 14, 30\}, \{5, 9, 26\}, \{14, 18, 21\}, \{0, 5, 10\}, \{13, 19, 29\}, \{7, 18, 26\}, \{6, 14, 24\}, \{8, 14, 32\}, \{5, 16, 19\}, \{2, 8, 13\}, \{2, 8, 13\}, \{2, 8, 13\}, \{2, 8, 13\}, \{2, 8, 13\}, \{3, 12, 24\}, \{3, 14, 24\}, \{3, 14, 24\}, \{4, 14, 32\}, \{5, 16, 19\}, \{2, 8, 13\}, \{2, 8, 13\}, \{3, 12, 24\}, \{3, 14, 24\}, \{3, 14, 32\}, \{5, 16, 19\}, \{2, 8, 13\}, \{4, 24$   $\{1, 19, 28\}, \{6, 16, 27\}, \{0, 7, 28\}, \{1, 17, 31\}, \{3, 8, 19\}, \{15, 19, 26\}, \{6, 11, 26\},$  $\{14, 19, 23\}, \{5, 12, 25\}, \{13, 20, 27\}, \{21, 24, 29\}, \{5, 7, 15\}, \{1, 8, 15\},$  $\{9, 19, 25\}, \{5, 22, 27\}, \{10, 22, 25\}, \{2, 12, 26\}, \{2, 15, 24\}, \{4, 10, 29\}, \{2, 15, 24\}, \{4, 10, 29\}, \{4$  $\{0, 12, 22\}, \{7, 22, 30\}, \{3, 9, 14\}, \{4, 8, 16\}, \{3, 18, 29\}, \{3, 13, 30\}, \{4, 7, 25\},$  $\{10, 14, 26\}, \{16, 25, 29\}, \{2, 10, 28\}, \{1, 12, 20\}, \{2, 4, 11\}, \{7, 11, 19\},$  $\{8, 17, 30\}, \{16, 22, 28\}, \{3, 7, 32\}, \{7, 24, 27\}, \{8, 20, 31\}, \{5, 11, 20\},$  $\{6, 13, 21\}, \{17, 22, 26\}, \{4, 20, 28\}, \{3, 10, 20\}, \{4, 9, 18\}, \{9, 17, 29\},$  $\{8, 10, 21\}, \{0, 3, 16\}, \{11, 16, 21\}, \{2, 16, 32\}, \{2, 6, 23\}, \{6, 20, 29\}, \{0, 15, 30\}, \{11, 16, 21\}, \{2, 16, 32\}, \{2, 6, 23\}, \{2, 20, 29\}, \{2, 15, 30\}, \{2, 20, 20\}, \{3,$  $\{15, 23, 32\}, \{2, 14, 27\}, \{4, 13, 22\}, \{1, 16, 23\}, \{21, 25, 32\}, \{13, 23, 25\},$  $\{4, 19, 24\}, \{3, 15, 25\}, \{7, 17, 20\}, \{9, 20, 32\}, \{0, 14, 29\}, \{1, 27, 30\},$  $\{7, 12, 23\}, \{5, 13, 17\}, \{6, 12, 17\}, \{6, 30, 31\}, \{2, 19, 31\}, \{14, 20, 25\},$  $\{12, 16, 24\}, \{14, 22, 31\}, \{8, 12, 29\}, \{1, 13, 26\}, \{6, 22, 32\}, \{10, 16, 31\},$  $\{1, 10, 32\}, \{15, 18, 31\}, \{10, 15, 27\}, \{5, 8, 23\}, \{3, 6, 28\}, \{11, 25, 30\},$  $\{1, 7, 21\}, \{0, 8, 26\}, \{3, 21, 27\}, \{9, 13, 28\}, \{18, 24, 32\}, \{3, 23, 26\}, \{2, 7, 29\}, \{2, 7, 29\}, \{3, 21, 21\}, \{3, 21\}, \{3, 2$  $\{3, 11, 22\}, \{17, 19, 27\}, \{15, 21, 28\}, \{2, 9, 22\}, \{10, 17, 23\}, \{11, 15, 29\},$  $\{23, 28, 29\}, \{11, 13, 32\}, \{2, 18, 25\}, \{0, 20, 24\}, \{15, 20, 22\}, \{1, 22, 29\}, \{1, 22, 29\}, \{1, 22, 29\}, \{1, 22, 29\}, \{1, 22, 29\}, \{1, 22, 29\}, \{1, 22, 29\}, \{1, 22, 29\}, \{2, 18, 25\},$  $\{18, 23, 30\}, \{5, 29, 32\}, \{1, 5, 18\}, \{12, 18, 28\}, \{0, 27, 32\}, \{1, 9, 24\},$  $\{4, 17, 32\}, \{0, 11, 23\}, \{0, 13, 18\}$ 

#### $\max -3 \in I(33, 37)$

PTS:  $\{0, 1, 2\}, \{1, 3, 4\}, \{2, 3, 5\}, \{4, 5, 6\}, \{6, 7, 8\}, \{7, 9, 10\}, \{8, 9, 11\}, \{1, 3, 4\}, \{2, 3, 5\}, \{4, 5, 6\}, \{6, 7, 8\}, \{7, 9, 10\}, \{8, 9, 11\}, \{1, 3, 4\}, \{2, 3, 5\}, \{4, 5, 6\},$  $\{10, 11, 12\}, \{12, 13, 14\}, \{13, 15, 16\}, \{14, 15, 17\}, \{16, 17, 18\}, \{18, 19, 20\},$  $\{19, 21, 22\}, \{20, 21, 23\}, \{22, 23, 24\}, \{24, 25, 26\}, \{25, 27, 28\}, \{26, 29, 30\},$  $\{26, 28, 31\}, \{25, 30, 31\}, \{27, 31, 29\}, \{28, 30, 32\}$  $\{12, 17, 21\}, \{17, 24, 27\}, \{15, 21, 26\}, \{3, 8, 26\}, \{4, 23, 31\}, \{8, 19, 28\}, \{7, 18, 21\},$  $\{4, 21, 27\}, \{3, 11, 24\}, \{5, 24, 32\}, \{12, 20, 30\}, \{2, 8, 29\}, \{1, 14, 32\}, \{4, 10, 24\},$  $\{2, 20, 24\}, \{12, 16, 24\}, \{0, 11, 28\}, \{15, 18, 29\}, \{1, 18, 24\}, \{6, 9, 31\}, \{1, 8, 17$  $\{2, 14, 28\}, \{0, 20, 29\}, \{10, 16, 28\}, \{0, 17, 26\}, \{5, 18, 27\}, \{2, 21, 30\}, \{6, 12, 27\}, \{2, 21, 30\}, \{6, 12, 27\}, \{2, 21, 30\}, \{6, 12, 27\}, \{2, 21, 30\}, \{2, 21, 30\}, \{3, 22, 23\}, \{3, 23\}$  $\{3, 21, 25\}, \{13, 24, 28\}, \{11, 15, 27\}, \{0, 16, 23\}, \{3, 20, 28\}, \{14, 27, 30\}, \{1, 16, 31\},$  $\{0, 8, 12\}, \{1, 23, 27\}, \{8, 22, 27\}, \{1, 11, 19\}, \{7, 20, 31\}, \{4, 25, 32\}, \{1, 7, 25\},$  $\{10, 18, 26\}, \{5, 13, 20\}, \{1, 5, 10\}, \{6, 17, 20\}, \{9, 17, 25\}, \{1, 12, 15\}, \{3, 17, 22\}, \{1, 12, 15\}, \{3, 17, 22\}, \{1, 12, 15\}, \{2, 17, 20\}, \{3, 17, 22\}, \{3,$  $\{11, 14, 21\}, \{8, 13, 32\}, \{4, 17, 30\}, \{4, 14, 22\}, \{8, 15, 23\}, \{13, 25, 29\}, \{10, 13, 27\}, \{11, 14, 21\}, \{11, 14, 21\}, \{12, 14, 21\}, \{13, 14, 21\}, \{13, 14, 21\}, \{13, 14, 21\}, \{14, 14, 14\}, \{14,$  $\{3, 7, 27\}, \{2, 4, 15\}, \{15, 24, 30\}, \{3, 14, 29\}, \{0, 21, 31\}, \{14, 18, 25\}, \{4, 9, 26\},$  $\{10, 14, 20\}, \{4, 7, 16\}, \{8, 16, 20\}, \{5, 9, 28\}, \{5, 17, 29\}, \{9, 21, 29\}, \{13, 17, 31\},$  $\{5, 11, 30\}, \{5, 12, 19\}, \{12, 22, 26\}, \{10, 23, 29\}, \{0, 22, 30\}, \{7, 17, 28\}, \{2, 9, 13\}, \{10, 23, 29\}, \{10, 22, 30\}, \{10, 22, 30\}, \{2, 9, 13\}, \{2, 9, 13\}, \{2, 9, 13\}, \{3, 12, 22, 26\}, \{10, 23, 29\}, \{10, 22, 30\}, \{10, 22, 30\}, \{10, 23, 29\}, \{10, 23, 29\}, \{2, 9, 13\}, \{2, 9, 13\}, \{2, 9, 13\}, \{3, 12, 22, 26\}, \{10, 23, 29\}, \{10, 23, 29\}, \{10, 22, 30\}, \{10, 23, 29\}$  $\{19, 24, 31\}, \{0, 4, 13\}, \{1, 20, 26\}, \{8, 14, 31\}, \{8, 10, 30\}, \{6, 13, 23\}, \{7, 23, 30\}, \{1, 20, 26\}, \{2, 14, 31\}, \{3, 10, 30\}, \{4, 13, 23\}, \{4, 23, 30\}, \{4, 13\}, \{4, 20, 26\}, \{4, 14, 31\}, \{4, 10, 30\}, \{4, 13, 23\}, \{4, 23, 30\}, \{4, 13\}, \{4, 20, 26\}, \{4, 14, 31\}, \{4, 10, 30\}, \{4, 13, 23\}, \{4, 23, 30\}, \{4, 31\}, \{4, 3$  $\{8, 21, 24\}, \{11, 13, 18\}, \{6, 10, 19\}, \{7, 14, 19\}, \{1, 6, 22\}, \{1, 13, 21\}, \{16, 19, 30\}, \{1, 13, 21\}, \{13, 21\},$  $\{2, 18, 22\}, \{12, 29, 32\}, \{2, 11, 31\}, \{16, 22, 29\}, \{2, 6, 16\}, \{0, 19, 27\}, \{5, 23, 26\}, \{12, 29\}, \{12, 29\}, \{12, 29\}, \{12, 29\}, \{2, 21\}, \{2,$  $\{2, 10, 17\}, \{6, 11, 29\}, \{0, 3, 18\}, \{6, 14, 24\}, \{17, 19, 32\}, \{9, 15, 19\}, \{4, 12, 28\}, \{17, 19, 32\}, \{17, 19$  $\{13, 19, 26\}, \{2, 26, 27\}, \{2, 23, 32\}, \{4, 19, 29\}, \{4, 8, 18\}, \{15, 31, 32\}, \{18, 23, 28\}, \{13, 19, 26\}, \{13, 26\}, \{13, 26\}, \{2, 26, 27\}, \{2, 23, 32\}, \{2, 23, 32\}, \{2, 23, 32\}, \{3, 23, 28\}, \{4, 23$  $\{0, 7, 32\}, \{11, 17, 23\}, \{2, 19, 25\}, \{5, 7, 15\}, \{15, 20, 25\}, \{1, 9, 30\}, \{10, 22, 25\}, \{10, 22, 25$  $\{3, 13, 30\}, \{3, 6, 15\}, \{7, 24, 29\}, \{9, 16, 27\}, \{6, 18, 30\}, \{9, 14, 23\}, \{9, 20, 22\},$  $\{9, 18, 32\}, \{11, 22, 32\}, \{2, 7, 12\}, \{0, 5, 14\}, \{14, 16, 26\}, \{7, 13, 22\}, \{3, 9, 12\}, \{14, 16, 26\}, \{14, 16,$  $\{5, 16, 21\}, \{7, 11, 26\}, \{15, 22, 28\}, \{5, 22, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{3, 10, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{3, 10, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{3, 10, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{3, 10, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{3, 10, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{3, 10, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{3, 10, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{4, 11, 20\}, \{4, 10, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{4, 10, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{4, 10, 31\}, \{12, 23, 25\}, \{4, 11, 20\}, \{4, 10, 31\}, \{12, 23, 25\}, \{4, 10, 31\}, \{12, 23, 25\}, \{4, 10, 31\}, \{12, 23, 25\}, \{4, 10, 31\}, \{12, 23, 25\}, \{12, 23, 25\}, \{13, 20, 31\}, \{13, 20, 30\}, \{$  $\{5, 8, 25\}, \{20, 27, 32\}, \{12, 18, 31\}, \{10, 21, 32\}, \{11, 16, 25\}, \{6, 26, 32\}, \{3, 16, 32\}, \{5, 8, 25\}, \{20, 27, 32\}, \{20, 2$ 

### B Cases from Lemmas 22 and 24

**B(a)** I(13, 25) = [0, 22]

I(13, 25) = [0, 22]

Consider the following STS(13):  $\{0, 1, 2\}, \{0, 3, 4\}, \{0, 5, 6\}, \{0, 7, 8\}, \{0, 9, 10\}, \{0, 11, 12\}, \{1, 3, 5\}, \{1, 4, 7\}, \{1, 6, 8\}, \{1, 9, 11\}, \{1, 10, 12\}, \{2, 3, 9\}, \{2, 4, 5\}, \{2, 6, 10\}, \{2, 7, 12\}, \{2, 8, 11\}, \{3, 6, 11\}, \{3, 7, 10\}, \{3, 8, 12\}, \{4, 6, 12\}, \{4, 8, 9\}, \{4, 10, 11\}, \{5, 7, 11\}, \{5, 8, 10\}, \{5, 9, 12\}, \{6, 7, 9\}$ 

The STS(25) given below intersect this system in the indicated number of blocks.

intersection 22:

 $\begin{array}{l} \{0,1,2\}, \ \{0,3,4\}, \ \{5,8,10\}, \ \{0,7,8\}, \ \{0,9,10\}, \ \{0,11,12\}, \ \{1,3,5\}, \ \{1,4,7\}, \\ \{6,7,9\}, \ \{1,9,11\}, \ \{1,10,12\}, \ \{2,3,9\}, \ \{2,4,5\}, \ \{2,6,10\}, \ \{2,7,12\}, \\ \{2,8,11\}, \ \{3,6,11\}, \ \{5,7,11\}, \ \{3,8,12\}, \ \{4,6,12\}, \ \{4,8,9\}, \ \{5,9,12\} \end{array}$ 

```
\{4, 16, 17\}, \{5, 13, 19\}, \{8, 13, 22\}, \{0, 20, 22\}, \{7, 15, 18\}, \{10, 11, 17\},
    \{1, 16, 22\}, \{0, 18, 24\}, \{9, 13, 20\}, \{2, 22, 23\}, \{2, 14, 21\}, \{4, 15, 24\},
    \{8, 14, 23\}, \{2, 13, 17\}, \{4, 11, 18\}, \{7, 14, 17\}, \{9, 19, 21\}, \{3, 23, 24\},
    \{11, 15, 20\}, \{0, 5, 15\}, \{10, 21, 23\}, \{1, 17, 20\}, \{10, 14, 15\}, \{5, 16, 23\}, 
    \{5, 6, 14\}, \{12, 17, 23\}, \{6, 8, 16\}, \{7, 20, 23\}, \{8, 15, 21\}, \{1, 18, 21\}, \{0, 13, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 
    \{1, 6, 19\}, \{9, 18, 23\}, \{8, 17, 18\}, \{6, 22, 24\}, \{6, 17, 21\}, \{4, 10, 13\}, \{4, 19, 23\}, 
    \{0, 6, 23\}, \{1, 8, 24\}, \{5, 17, 24\}, \{11, 14, 24\}, \{2, 18, 19\}, \{12, 16, 20\},
    \{11, 16, 21\}, \{8, 19, 20\}, \{2, 15, 16\}, \{11, 19, 22\}, \{12, 21, 24\}, \{7, 16, 19\},
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 $\{4, 18, 19\}, \{3, 5, 22\}, \{0, 14, 24\}, \{3, 23, 24\}, \{3, 14, 17\}, \{1, 3, 21\}, \{9, 19, 21\}, \{1, 3, 21\}, \{1, 3, 21\}, \{2, 19, 21\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{4,$  $\{1, 17, 20\}, \{6, 13, 15\}, \{7, 12, 13\}, \{8, 17, 24\}, \{9, 20, 22\}, \{3, 4, 13\}, \{1, 13, 19\},$  $\{9, 15, 23\}, \{4, 16, 23\}, \{8, 19, 23\}, \{2, 13, 16\}, \{7, 18, 22\}, \{9, 11, 24\}, \{0, 4, 22\}, \{9, 11, 24\}, \{1, 22\}, \{1, 22\}, \{2, 13, 16\}, \{2, 13, 16\}, \{2, 13, 16\}, \{2, 13, 16\}, \{3, 12, 23\}, \{4, 12, 23\},$  $\{6, 19, 20\}, \{9, 13, 17\}, \{5, 13, 24\}, \{6, 17, 18\}, \{10, 13, 18\}, \{3, 15, 19\},$  $\{11, 14, 16\}, \{12, 22, 23\}, \{4, 10, 24\}, \{0, 7, 15\}, \{4, 11, 20\}, \{5, 15, 18\},$  $\{0, 11, 19\}, \{12, 20, 24\}, \{0, 13, 23\}, \{2, 21, 22\}, \{4, 14, 21\}, \{2, 15, 20\}, \{2, 12, 20\}, \{2, 12, 20\}, \{2, 12, 20\}, \{2, 12, 20\}, \{3, 12, 20\}, \{4, 14, 21\}, \{2, 12, 20\}, \{4, 14, 21\}, \{4$  $\{10, 14, 19\}, \{18, 21, 23\}, \{7, 19, 24\}, \{11, 15, 22\}, \{7, 8, 21\}, \{7, 16, 17\},$  $\{15, 16, 24\}, \{0, 3, 16\}, \{10, 17, 22\}, \{1, 5, 16\}, \{0, 8, 20\}, \{12, 14, 15\},$  $\{16, 19, 22\}, \{5, 17, 19\}, \{2, 7, 14\}, \{2, 18, 24\}, \{1, 9, 14\}, \{10, 16, 20\},$  $\{0, 17, 21\}, \{12, 16, 21\}, \{0, 12, 18\}, \{1, 6, 23\}, \{5, 20, 21\}, \{8, 14, 18\},$  $\{11, 12, 17\}, \{8, 13, 22\}, \{3, 18, 20\}, \{10, 15, 21\}, \{2, 12, 19\}, \{6, 14, 22\},$  $\{4, 15, 17\}, \{9, 16, 18\}, \{7, 20, 23\}, \{5, 14, 23\}, \{6, 21, 24\}, \{6, 8, 16\}, \{11, 13, 21\}$ intersection 17:  $\{0, 1, 2\}, \{0, 3, 4\}, \{0, 5, 6\}, \{4, 10, 11\}, \{0, 9, 10\}, \{0, 11, 12\}, \{4, 8, 9\},$  $\{5, 8, 10\}, \{5, 9, 12\}, \{1, 9, 11\}, \{6, 7, 9\}, \{3, 7, 10\}, \{2, 4, 5\}, \{2, 6, 10\},$  $\{4, 6, 12\}, \{2, 8, 11\}, \{3, 6, 11\}$ 

 $\{9, 16, 18\}, \{6, 18, 19\}, \{3, 9, 19\}, \{10, 21, 24\}, \{4, 17, 24\}, \{8, 19, 20\},$  $\{7, 12, 13\}, \{0, 17, 19\}, \{0, 14, 20\}, \{13, 16, 20\}, \{4, 20, 22\}, \{11, 13, 24\},$  $\{11, 14, 18\}, \{6, 22, 24\}, \{3, 8, 21\}, \{4, 7, 15\}, \{12, 19, 24\}, \{12, 18, 22\},$  $\{1, 12, 20\}, \{5, 13, 22\}, \{2, 7, 22\}, \{3, 13, 18\}, \{9, 13, 15\}, \{2, 3, 20\}, \{7, 8, 23\}, \{1, 12, 20\}, \{2, 3, 20\}, \{2, 3, 20\}, \{3, 13, 18\}, \{1, 12, 20\}, \{2, 3, 20\}, \{2, 3, 20\}, \{3, 13, 18\}, \{1, 12, 20\}, \{2, 3, 20\}, \{2, 3, 20\}, \{3, 13, 18\}, \{4, 13, 16\},$  $\{8, 17, 22\}, \{0, 21, 22\}, \{1, 19, 21\}, \{0, 13, 23\}, \{8, 15, 18\}, \{2, 15, 19\},$  $\{13, 17, 21\}, \{2, 13, 14\}, \{2, 12, 16\}, \{4, 18, 21\}, \{0, 7, 18\}, \{7, 20, 24\},$  $\{9, 22, 23\}, \{5, 15, 17\}, \{0, 8, 16\}, \{3, 16, 24\}, \{7, 14, 19\}, \{1, 16, 17\}, \{7, 16, 21\}, \{1, 16, 17\}, \{1,$  $\{0, 15, 24\}, \{3, 5, 14\}, \{1, 4, 13\}, \{4, 19, 23\}, \{3, 12, 17\}, \{10, 13, 19\}, \{2, 21, 23\}, \{10, 13, 19\}, \{2, 21, 23\}, \{10, 13, 19\}, \{2, 21, 23\}, \{10, 13, 19\}, \{2, 21, 23\}, \{2, 21, 23\}, \{2, 21, 23\}, \{2, 21, 23\}, \{3, 21, 23\}, \{$  $\{1, 5, 7\}, \{12, 15, 21\}, \{1, 6, 14\}, \{1, 8, 24\}, \{11, 15, 20\}, \{4, 14, 16\}, \{10, 12, 23\},$  $\{6, 8, 13\}, \{5, 11, 21\}, \{5, 16, 19\}, \{3, 15, 23\}, \{6, 20, 21\}, \{6, 17, 23\}, \{2, 9, 24\}, \{6, 17, 23\}, \{2, 9, 24\}, \{6, 17, 23\}, \{2, 9, 24\}, \{6, 17, 23\}, \{2, 9, 24\}, \{6, 17, 23\}, \{2, 9, 24\}, \{6, 17, 23\}, \{2, 9, 24\}, \{6, 17, 23\}, \{2, 9, 24\}, \{6, 17, 23\}, \{2, 9, 24\}, \{6, 17, 23\}, \{2, 9, 24\}, \{6, 17, 23\}, \{6, 17, 23\}, \{1, 12\}, \{1, 12\}, \{1, 12\}, \{2, 12\}, \{2, 12\}, \{2, 12\}, \{2, 12\}, \{2, 12\}, \{3, 12\}, \{4, 12\}, \{4, 12\}, \{5, 12\}, \{4, 12\}, \{$  $\{7, 11, 17\}, \{14, 15, 22\}, \{1, 10, 15\}, \{5, 20, 23\}, \{10, 14, 17\}, \{8, 12, 14\},$  $\{6, 15, 16\}, \{9, 14, 21\}, \{10, 16, 22\}, \{11, 16, 23\}, \{9, 17, 20\}, \{2, 17, 18\},$  $\{5, 18, 24\}, \{11, 19, 22\}, \{14, 23, 24\}, \{10, 18, 20\}, \{1, 18, 23\}, \{1, 3, 22\}$ intersection 16:  $\{0, 1, 2\}, \{3, 7, 10\}, \{4, 6, 12\}, \{0, 7, 8\}, \{0, 9, 10\}, \{0, 11, 12\}, \{1, 3, 5\}, \{5, 8, 10\},$  $\{1, 6, 8\}, \{3, 8, 12\}, \{1, 10, 12\}, \{2, 3, 9\}, \{2, 4, 5\}, \{2, 6, 10\}, \{4, 8, 9\}, \{5, 7, 11\}$  $\{6, 16, 17\}, \{7, 12, 20\}, \{2, 22, 23\}, \{10, 20, 24\}, \{0, 6, 19\}, \{10, 13, 19\},$  $\{6, 14, 24\}, \{5, 15, 24\}, \{2, 7, 24\}, \{7, 16, 19\}, \{3, 14, 19\}, \{7, 13, 23\}, \{2, 11, 15\}, \{7, 13, 23\}, \{2, 11, 15\}, \{7, 13, 23\}, \{2, 11, 15\}, \{1, 12\}, \{2, 13, 24\}, \{2, 13, 24\}, \{3, 14, 19\}, \{4, 13\},$  $\{4, 18, 21\}, \{10, 11, 22\}, \{1, 14, 23\}, \{2, 18, 19\}, \{12, 14, 15\}, \{0, 13, 17\},$  $\{6, 15, 21\}, \{11, 14, 16\}, \{0, 18, 24\}, \{19, 20, 23\}, \{10, 21, 23\}, \{1, 21, 24\},$  $\{6, 13, 22\}, \{12, 17, 18\}, \{6, 7, 18\}, \{0, 4, 20\}, \{15, 20, 22\}, \{5, 13, 21\}, \{6, 13, 22\}, \{12, 17, 18\}, \{12, 17, 18\}, \{12, 17, 18\}, \{13, 20\}, \{$  $\{8, 17, 22\}, \{4, 7, 15\}, \{9, 15, 18\}, \{1, 9, 19\}, \{5, 6, 20\}, \{4, 13, 14\}, \{2, 12, 13\},$  $\{5, 16, 18\}, \{4, 10, 17\}, \{5, 9, 23\}, \{4, 19, 22\}, \{14, 20, 21\}, \{10, 14, 18\},$  $\{8, 13, 24\}, \{11, 13, 18\}, \{5, 12, 22\}, \{0, 3, 15\}, \{1, 18, 20\}, \{5, 17, 19\}, \{1, 18, 20\}, \{5, 17, 19\}, \{1, 18, 20\}, \{1, 18, 20\}, \{2, 17, 19\}, \{1, 18, 20\}, \{2, 17, 19\}, \{3, 18\}, \{1, 18, 20\}, \{2, 17, 19\}, \{3, 18\}, \{3, 18\}, \{4,$  $\{12, 19, 21\}, \{1, 7, 22\}, \{7, 9, 21\}, \{3, 6, 23\}, \{3, 4, 24\}, \{8, 11, 20\}, \{8, 18, 23\}, \{12, 19, 21\}, \{1, 7, 22\}, \{2, 19, 21\}, \{3, 6, 23\}, \{3, 4, 24\}, \{3, 11, 20\}, \{3, 18, 23\}, \{12, 19, 21\}, \{13, 21\}, \{13, 21\}, \{13, 21\}, \{23, 21\}, \{23, 21\}, \{3, 21\}, \{33,$  $\{2, 16, 20\}, \{7, 14, 17\}, \{2, 17, 21\}, \{3, 18, 22\}, \{2, 8, 14\}, \{0, 21, 22\}, \{2, 16, 20\}, \{2, 16, 20\}, \{2, 16, 20\}, \{2, 17, 21\}, \{3, 18, 22\}, \{2, 16, 20\}, \{2, 16, 20\}, \{3, 18, 22\}, \{4, 16, 20\}, \{4,$  $\{10, 15, 16\}, \{12, 23, 24\}, \{8, 16, 21\}, \{16, 22, 24\}, \{3, 13, 16\}, \{3, 11, 21\}, \{10, 15, 16\}, \{12, 23, 24\}, \{10, 12, 23, 24\}, \{11, 21\}, \{11, 21\}, \{11, 21\}, \{11, 21\}, \{11, 21\}, \{11, 21\}, \{12, 23, 24\}, \{12, 23, 24\}, \{12, 23, 24\}, \{13, 21\}, \{13,$ 

 $\{9, 13, 20\}, \{9, 17, 24\}, \{1, 11, 17\}, \{9, 14, 22\}, \{6, 9, 11\}, \{8, 15, 19\}, \{4, 11, 23\},$  $\{1, 4, 16\}, \{0, 16, 23\}, \{11, 19, 24\}, \{1, 13, 15\}, \{0, 5, 14\}, \{9, 12, 16\},$  $\{15, 17, 23\}, \{3, 17, 20\}$ intersection 15:  $\{0,1,2\}, \{2,8,11\}, \{3,8,12\}, \{0,7,8\}, \{0,9,10\}, \{4,8,9\}, \{1,3,5\}, \{1,4,7\},$  $\{1, 6, 8\}, \{4, 6, 12\}, \{1, 10, 12\}, \{6, 7, 9\}, \{3, 7, 10\}, \{2, 6, 10\}, \{2, 7, 12\}$  $\{5, 10, 24\}, \{5, 8, 20\}, \{0, 12, 23\}, \{14, 23, 24\}, \{0, 5, 13\}, \{11, 19, 24\},$  $\{10, 11, 22\}, \{1, 11, 21\}, \{12, 18, 22\}, \{13, 15, 23\}, \{9, 12, 24\}, \{3, 13, 18\},$  $\{8, 19, 23\}, \{2, 16, 21\}, \{9, 11, 23\}, \{0, 17, 18\}, \{0, 20, 21\}, \{6, 13, 20\},$  $\{13, 21, 24\}, \{5, 9, 14\}, \{6, 11, 15\}, \{4, 11, 20\}, \{16, 20, 22\}, \{7, 18, 20\},$  $\{2, 4, 15\}, \{11, 12, 13\}, \{7, 11, 17\}, \{10, 15, 16\}, \{0, 11, 16\}, \{16, 18, 23\},$  $\{6, 22, 23\}, \{0, 15, 22\}, \{7, 14, 21\}, \{4, 16, 19\}, \{14, 18, 19\}, \{2, 5, 19\}, \{4, 5, 17\},$  $\{9, 17, 22\}, \{3, 17, 24\}, \{4, 13, 14\}, \{0, 6, 14\}, \{0, 4, 24\}, \{0, 3, 19\}, \{6, 17, 19\},$  $\{8, 15, 24\}, \{12, 19, 21\}, \{9, 15, 21\}, \{1, 16, 24\}, \{12, 17, 20\}, \{5, 11, 18\},$  $\{2, 9, 18\}, \{1, 15, 18\}, \{5, 7, 23\}, \{3, 6, 21\}, \{4, 21, 23\}, \{4, 10, 18\}, \{5, 6, 16\},$  $\{3, 4, 22\}, \{14, 15, 17\}, \{7, 15, 19\}, \{1, 17, 23\}, \{2, 14, 22\}, \{7, 22, 24\}, \{7, 22, 24\}, \{1, 17, 23\}, \{2, 14, 22\}, \{1, 22, 24\}, \{1, 22\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{2, 24\}, \{3, 24\}, \{2, 24\}, \{2, 24\}, \{3, 24$  $\{1, 19, 22\}, \{5, 21, 22\}, \{5, 12, 15\}, \{3, 11, 14\}, \{1, 14, 20\}, \{6, 18, 24\},$  $\{8, 16, 17\}, \{10, 20, 23\}, \{12, 14, 16\}, \{10, 13, 19\}, \{1, 9, 13\}, \{7, 13, 16\}, \{1, 9, 13\}, \{7, 13, 16\}, \{1, 9, 13\}, \{1, 9,$  $\{8, 18, 21\}, \{3, 9, 16\}, \{2, 3, 23\}, \{2, 13, 17\}$ intersection 14:  $\{5, 7, 11\}, \{4, 8, 9\}, \{3, 8, 12\}, \{5, 9, 12\}, \{0, 9, 10\}, \{4, 10, 11\}, \{2, 8, 11\},$  $\{1,4,7\}, \{6,7,9\}, \{1,9,11\}, \{1,10,12\}, \{2,3,9\}, \{2,7,12\}, \{2,6,10\}$  $\{11, 16, 19\}, \{2, 19, 21\}, \{9, 13, 19\}, \{10, 15, 21\}, \{12, 13, 17\}, \{5, 15, 16\},$  $\{8, 14, 20\}, \{7, 8, 21\}, \{2, 18, 22\}, \{9, 18, 20\}, \{3, 15, 17\}, \{3, 10, 23\}, \{8, 10, 16\},$  $\{11, 14, 17\}, \{9, 14, 22\}, \{9, 15, 24\}, \{3, 5, 19\}, \{4, 18, 19\}, \{14, 21, 24\},$  $\{3, 13, 20\}, \{4, 23, 24\}, \{11, 12, 18\}, \{7, 10, 13\}, \{5, 20, 23\}, \{1, 15, 18\}, \{1, 12, 18\}, \{1, 12, 18\}, \{2, 20, 23\}, \{1, 12, 18\}, \{2, 20, 23\}, \{2, 20, 23\}, \{2, 20, 23\}, \{3, 20, 20\}, \{4, 23, 24\}, \{11, 12, 18\}, \{2, 20, 23\}, \{2, 20, 23\}, \{2, 20, 23\}, \{3, 20, 20\}, \{4, 23, 24\}, \{2, 20, 23\}, \{3, 20\}, \{4, 23, 24\}, \{4, 24\}, \{4,$  $\{15, 19, 20\}, \{4, 17, 21\}, \{2, 4, 20\}, \{6, 12, 15\}, \{0, 17, 22\}, \{10, 17, 18\},$  $\{0, 4, 12\}, \{4, 15, 22\}, \{9, 21, 23\}, \{1, 2, 14\}, \{6, 11, 20\}, \{1, 6, 19\}, \{0, 13, 14\},$  $\{7, 14, 15\}, \{7, 16, 24\}, \{0, 11, 24\}, \{5, 8, 24\}, \{13, 18, 24\}, \{5, 18, 21\}, \{0, 1, 23\}, \{13, 18, 24\}, \{13, 18, 24\}, \{13, 18, 24\}, \{2, 18, 21\}, \{2, 12, 23\}, \{3, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{4, 12, 24\}, \{5, 12, 24\}, \{4, 12, 24\}, \{5, 12, 24\}, \{$  $\{7, 22, 23\}, \{0, 3, 21\}, \{2, 13, 15\}, \{1, 5, 17\}, \{11, 15, 23\}, \{4, 6, 16\}, \{3, 7, 18\}, \{11, 15, 23\}, \{4, 6, 16\}, \{3, 7, 18\}, \{11, 15, 23\}, \{11, 15, 23\}, \{2, 13, 15\}, \{2, 13, 15\}, \{2, 13, 15\}, \{2, 13, 15\}, \{3, 15\}, \{1, 15\}, \{2, 13, 15\}, \{3, 15\}$  $\{8, 18, 23\}, \{2, 17, 24\}, \{3, 6, 24\}, \{6, 8, 17\}, \{12, 16, 21\}, \{0, 7, 19\}, \{4, 5, 13\},$  $\{3, 11, 22\}, \{12, 19, 24\}, \{10, 20, 24\}, \{0, 8, 15\}, \{12, 14, 23\}, \{2, 16, 23\}, \{2, 16, 23\}, \{2, 16, 23\}, \{3, 11, 22\}, \{12, 12, 12, 24\}, \{13, 20, 24\}, \{13$  $\{11, 13, 21\}, \{8, 19, 22\}, \{1, 20, 21\}, \{1, 8, 13\}, \{1, 3, 16\}, \{13, 16, 22\},$  $\{5, 10, 22\}, \{12, 20, 22\}, \{17, 19, 23\}, \{6, 21, 22\}, \{10, 14, 19\}, \{0, 2, 5\}, \{10, 14, 19\}, \{0, 2, 5\}, \{10, 14, 19\}, \{10, 14, 14, 14\}, \{10, 14, 14, 14\}, \{10, 14, 14, 14\}, \{10, 14, 14, 14\}, \{10, 1$  $\{0, 16, 20\}, \{9, 16, 17\}, \{7, 17, 20\}, \{5, 6, 14\}, \{3, 4, 14\}, \{6, 13, 23\}, \{1, 22, 24\}, \{1, 22, 24\}, \{1, 22, 24\}, \{2, 16, 17\}, \{2, 17, 20\}, \{2, 16, 17\}, \{3, 4, 14\}, \{4, 13, 23\}, \{1, 22, 24\}, \{1, 22, 24\}, \{1, 22, 24\}, \{2, 16, 17\}, \{2, 16, 17\}, \{3, 16, 17\}, \{4, 16\}, \{4$  $\{14, 16, 18\}, \{0, 6, 18\}$ intersection 13:  $\{6,7,9\},\{2,8,11\},\{0,5,6\},\{0,7,8\},\{3,6,11\},\{0,11,12\},\{1,3,5\},\{1,4,7\},$  $\{2, 7, 12\}, \{4, 6, 12\}, \{5, 8, 10\}, \{2, 3, 9\}, \{3, 7, 10\}$  $\{15, 21, 24\}, \{1, 17, 18\}, \{1, 10, 19\}, \{5, 14, 24\}, \{2, 13, 17\}, \{8, 16, 20\},$ 

 $\{15, 21, 24\}, \{1, 17, 18\}, \{1, 10, 19\}, \{5, 14, 24\}, \{2, 13, 17\}, \{8, 10, 20\}, \{2, 18, 22\}, \{7, 11, 23\}, \{7, 22, 24\}, \{0, 13, 16\}, \{7, 14, 18\}, \{8, 13, 23\}, \{1, 8, 24\}, \{2, 4, 15\}, \{5, 20, 23\}, \{8, 18, 19\}, \{8, 9, 22\}, \{3, 16, 18\}, \{9, 16, 17\}, \{4, 5, 16\},$ 

 $\{12, 19, 20\}, \{11, 21, 22\}, \{9, 10, 14\}, \{4, 10, 24\}, \{11, 20, 24\}, \{8, 12, 14\},$  $\{5, 9, 18\}, \{1, 14, 15\}, \{10, 11, 18\}, \{4, 20, 22\}, \{1, 11, 13\}, \{6, 16, 24\},\$  $\{4, 13, 14\}, \{14, 16, 22\}, \{1, 12, 16\}, \{3, 13, 24\}, \{0, 17, 23\}, \{7, 16, 19\},$  $\{14, 17, 20\}, \{9, 15, 19\}, \{0, 9, 21\}, \{3, 8, 15\}, \{5, 12, 21\}, \{3, 19, 23\},$  $\{10, 12, 17\}, \{6, 19, 22\}, \{15, 17, 22\}, \{0, 18, 20\}, \{3, 20, 21\}, \{2, 5, 19\}, \{10, 12, 17\}, \{2, 5, 19\}, \{2, 5, 19\}, \{2, 5, 19\}, \{2, 5, 19\}, \{3, 20, 21\}, \{2, 5, 19\}, \{3, 20, 21\}, \{3, 20, 20\}, \{3, 20$  $\{5, 11, 17\}, \{11, 14, 19\}, \{7, 17, 21\}, \{4, 8, 21\}, \{10, 22, 23\}, \{13, 19, 21\},$  $\{6, 8, 17\}, \{0, 3, 14\}, \{6, 18, 21\}, \{5, 13, 22\}, \{14, 21, 23\}, \{9, 23, 24\}, \{5, 7, 15\},$  $\{7, 13, 20\}, \{9, 12, 13\}, \{2, 16, 23\}, \{4, 9, 11\}, \{0, 4, 19\}, \{12, 18, 24\}, \{1, 2, 21\}, \{1, 2, 21\}, \{1, 2, 21\}, \{1, 2, 21\}, \{1, 2, 21\}, \{1, 2, 21\}, \{1, 2, 21\}, \{1, 2, 21\}, \{1, 2, 21\}, \{1, 2, 21\}, \{1, 2, 21\}, \{2, 21\},$  $\{10, 16, 21\}, \{0, 2, 24\}, \{12, 15, 23\}, \{2, 10, 20\}, \{2, 6, 14\}, \{1, 9, 20\}, \{6, 10, 13\},$  $\{3, 4, 17\}, \{1, 6, 23\}, \{0, 1, 22\}, \{3, 12, 22\}, \{0, 10, 15\}, \{11, 15, 16\}, \{17, 19, 24\},$  $\{13, 15, 18\}, \{6, 15, 20\}, \{4, 18, 23\}$ intersection 12:  $\{5, 8, 10\}, \{0, 3, 4\}, \{2, 7, 12\}, \{4, 6, 12\}, \{2, 8, 11\}, \{0, 11, 12\}, \{1, 3, 5\},\$  $\{2, 4, 5\}, \{4, 8, 9\}, \{3, 6, 11\}, \{4, 10, 11\}, \{5, 7, 11\}$  $\{1, 9, 18\}, \{9, 11, 13\}, \{8, 14, 15\}, \{5, 12, 24\}, \{3, 16, 19\}, \{5, 6, 20\}, \{0, 2, 18\}, \{1, 9, 18\}, \{1, 9, 10\}, \{2, 10\}, \{2, 10\}, \{3, 10\}, \{3, 10\}, \{4, 10$  $\{2, 9, 22\}, \{2, 6, 14\}, \{3, 12, 14\}, \{4, 14, 22\}, \{8, 13, 21\}, \{13, 20, 23\}, \{1, 13, 24\}, \{1, 13, 24\}, \{1, 13, 24\}, \{1, 13, 24\}, \{1, 13, 24\}, \{1, 13, 24\}, \{1, 13, 24\}, \{1, 13, 24\}, \{1, 13, 24\}, \{2, 13, 24\}, \{2, 14\}, \{3, 12, 14\}, \{4, 14, 22\}, \{4, 13, 21\}, \{1, 13, 24\}, \{1, 13, 24\}, \{1, 13, 24\}, \{1, 13, 24\}, \{1, 13, 24\}, \{2, 14\}, \{2, 14\}, \{2, 14\}, \{2, 14\}, \{3, 12, 14\}, \{4, 14, 22\}, \{4, 14, 22\}, \{4, 14, 24\}, \{1, 13, 24\}, \{1, 14, 22\}, \{1, 14, 24\}$  $\{0, 16, 22\}, \{10, 13, 22\}, \{5, 18, 23\}, \{12, 13, 16\}, \{1, 7, 14\}, \{5, 9, 16\}, \{1, 7, 14\}, \{5, 9, 16\}, \{1, 7, 14\}$  $\{1, 15, 19\}, \{14, 17, 19\}, \{4, 15, 17\}, \{2, 16, 23\}, \{3, 21, 22\}, \{14, 18, 21\},$  $\{3, 7, 13\}, \{18, 19, 20\}, \{6, 13, 15\}, \{6, 9, 24\}, \{7, 18, 22\}, \{5, 13, 14\}, \{7, 10, 21\}, \{6, 13, 14\}, \{7, 10, 21\}, \{7,$  $\{3, 17, 23\}, \{17, 18, 24\}, \{1, 6, 22\}, \{5, 17, 22\}, \{1, 12, 17\}, \{4, 7, 20\}, \{1, 12, 17\}, \{4, 7, 20\}, \{1, 12, 17\}, \{2, 12, 12\}, \{3, 12, 12\}, \{4, 1$  $\{10, 12, 19\}, \{6, 7, 19\}, \{11, 17, 21\}, \{8, 19, 22\}, \{2, 17, 20\}, \{12, 20, 22\}, \{12, 20, 22\}, \{12, 20, 22\}, \{13, 20, 21\}, \{13, 20, 21\}, \{14,$  $\{1, 2, 10\}, \{0, 6, 10\}, \{11, 15, 18\}, \{7, 9, 17\}, \{1, 11, 20\}, \{10, 15, 20\},$  $\{12, 15, 23\}, \{1, 16, 21\}, \{0, 5, 19\}, \{0, 9, 15\}, \{7, 15, 16\}, \{0, 1, 8\}, \{15, 22, 24\},$  $\{11, 22, 23\}, \{9, 19, 23\}, \{3, 9, 20\}, \{6, 21, 23\}, \{7, 8, 23\}, \{1, 4, 23\}, \{11, 14, 16\},$  $\{14, 20, 24\}, \{8, 12, 18\}, \{4, 13, 18\}, \{8, 16, 20\}, \{6, 16, 18\}, \{11, 19, 24\},$  $\{0, 13, 17\}, \{2, 13, 19\}, \{5, 15, 21\}, \{4, 16, 24\}, \{10, 23, 24\}, \{10, 16, 17\},$  $\{3, 8, 24\}, \{3, 10, 18\}, \{2, 21, 24\}, \{9, 12, 21\}, \{9, 10, 14\}, \{6, 8, 17\}, \{2, 3, 15\}, \{3, 10, 18\}, \{2, 21, 24\}, \{3, 10, 18\}, \{2, 21, 24\}, \{3, 10, 18\}, \{4, 2, 21, 24\}, \{4, 21, 21\}, \{4, 21, 21\}, \{4, 21, 21\}, \{4, 21\},$ 

 $\{0, 7, 24\}, \{4, 19, 21\}, \{0, 14, 23\}, \{0, 20, 21\}$ 

intersection 11:

 $\{4,8,9\}, \ \{6,7,9\}, \ \{0,5,6\}, \ \{4,6,12\}, \ \{0,9,10\}, \ \{5,7,11\}, \ \{3,8,12\}, \ \{2,3,9\}, \ \{2,4,5\}, \ \{1,9,11\}, \ \{1,10,12\}$ 

 $\{4, 17, 18\}, \{7, 8, 22\}, \{11, 16, 21\}, \{8, 10, 14\}, \{8, 18, 21\}, \{8, 11, 17\}, \\ \{0, 11, 14\}, \{5, 12, 19\}, \{16, 17, 20\}, \{12, 13, 16\}, \{12, 21, 23\}, \{5, 13, 22\}, \\ \{3, 13, 20\}, \{9, 12, 15\}, \{0, 23, 24\}, \{7, 10, 18\}, \{0, 8, 19\}, \{3, 5, 10\}, \{6, 10, 11\}, \\ \{0, 12, 18\}, \{3, 6, 23\}, \{4, 15, 22\}, \{6, 16, 22\}, \{3, 14, 19\}, \{9, 20, 22\}, \{4, 10, 13\}, \\ \{9, 19, 21\}, \{1, 3, 24\}, \{5, 17, 21\}, \{1, 8, 13\}, \{10, 15, 16\}, \{0, 2, 16\}, \{9, 18, 24\}, \\ \{6, 13, 19\}, \{5, 9, 23\}, \{10, 17, 24\}, \{7, 14, 15\}, \{1, 22, 23\}, \{7, 16, 19\}, \\ \{3, 21, 22\}, \{11, 12, 22\}, \{1, 6, 18\}, \{6, 8, 15\}, \{2, 13, 18\}, \{2, 10, 22\}, \{9, 13, 17\}, \\ \{12, 14, 17\}, \{18, 20, 23\}, \{4, 14, 23\}, \{11, 2, 14\}, \{9, 14, 16\}, \{1, 5, 15\}, \\ \{11, 15, 18\}, \{1, 17, 19\}, \{6, 14, 20\}, \{0, 7, 13\}, \{5, 8, 20\}, \{13, 14, 21\}, \\ \{11, 13, 23\}, \{13, 15, 24\}, \{3, 16, 18\}, \{3, 7, 17\}, \{1, 4, 16\}, \{1, 7, 20\}, \{4, 19, 24\}, \\ \{2, 7, 23\}, \{18, 19, 22\}, \{7, 12, 24\}, \{10, 20, 21\}, \{5, 16, 24\}, \{5, 14, 18\}, \\ \{0, 3, 15\}, \{2, 6, 17\}, \{10, 19, 23\}, \{8, 16, 23\}, \{0, 17, 22\}, \{11, 20, 24\}, \\ \{15, 19, 20\}, \{2, 15, 21\}, \{15, 17, 23\}, \{2, 12, 20\}, \{3, 4, 11\}, \{14, 22, 24\}, \\ \end{tabular}$ 

 $\{2, 8, 24\}, \{2, 11, 19\}, \{0, 1, 21\}, \{6, 21, 24\}, \{4, 7, 21\}, \{0, 4, 20\}$ intersection 10:  $\{6,7,9\}, \{5,9,12\}, \{5,8,10\}, \{4,6,12\}, \{0,9,10\}, \{0,11,12\}, \{2,7,12\}, \{2,7,12\}, \{2,7,12\}, \{2,7,12\}, \{3,12\},$  $\{2, 4, 5\}, \{3, 8, 12\}, \{2, 6, 10\}$  $\{11, 16, 21\}, \{0, 21, 23\}, \{2, 9, 19\}, \{1, 10, 13\}, \{9, 17, 22\}, \{10, 18, 21\},$  $\{1, 12, 20\}, \{12, 13, 23\}, \{8, 18, 19\}, \{5, 7, 24\}, \{0, 1, 7\}, \{5, 13, 17\}, \{16, 18, 20\},$  $\{9, 13, 14\}, \{17, 23, 24\}, \{1, 8, 14\}, \{4, 14, 24\}, \{12, 16, 17\}, \{3, 13, 22\},$  $\{9, 15, 23\}, \{4, 18, 22\}, \{7, 11, 19\}, \{12, 14, 18\}, \{7, 15, 22\}, \{5, 6, 23\}, \{1, 2, 22\}, \{1, 2, 22\}, \{2, 3, 22\}, \{3, 3, 22\}, \{4, 12,$  $\{7, 17, 20\}, \{3, 9, 21\}, \{11, 13, 24\}, \{1, 15, 21\}, \{6, 16, 22\}, \{0, 5, 15\}, \{2, 18, 23\}, \{1, 15, 21\}, \{2, 18, 23\}, \{2, 18, 23\}, \{2, 18, 23\}, \{2, 18, 23\}, \{3, 9, 21\}, \{1, 13, 24\}, \{1, 15, 21\}, \{2, 18, 23\}, \{2, 18, 23\}, \{2, 18, 23\}, \{3, 12, 23\}, \{3, 1$  $\{9, 20, 24\}, \{1, 6, 11\}, \{15, 16, 24\}, \{8, 13, 20\}, \{1, 4, 9\}, \{4, 8, 15\}, \{10, 17, 19\},$  $\{6, 14, 17\}, \{3, 10, 24\}, \{5, 20, 21\}, \{0, 18, 24\}, \{2, 8, 24\}, \{10, 20, 22\},\$  $\{12, 19, 21\}, \{6, 21, 24\}, \{7, 8, 23\}, \{8, 21, 22\}, \{0, 3, 16\}, \{0, 13, 19\}, \{5, 11, 22\},$  $\{12, 22, 24\}, \{1, 16, 23\}, \{1, 19, 24\}, \{8, 11, 17\}, \{1, 5, 18\}, \{15, 17, 18\},$  $\{3, 11, 23\}, \{3, 6, 18\}, \{14, 15, 19\}, \{19, 22, 23\}, \{14, 20, 23\}, \{0, 2, 20\}, \{0, 2, 20\}, \{14, 20, 23\}, \{14, 20, 22\}, \{14, 20, 23\}, \{14, 20, 22\}, \{14, 20, 22\}, \{14, 20, 22\}, \{14, 20, 22\}, \{14, 20$  $\{5, 14, 16\}, \{4, 11, 20\}, \{9, 11, 18\}, \{7, 13, 18\}, \{0, 4, 17\}, \{3, 5, 19\}, \{7, 10, 16\},$  $\{6, 13, 15\}, \{0, 6, 8\}, \{2, 17, 21\}, \{2, 3, 14\}, \{4, 10, 23\}, \{0, 14, 22\}, \{10, 12, 15\},$  $\{6, 19, 20\}, \{3, 15, 20\}, \{10, 11, 14\}, \{2, 11, 15\}, \{7, 14, 21\}, \{3, 4, 7\}, \{1, 3, 17\},$  $\{4, 13, 21\}, \{2, 13, 16\}, \{8, 9, 16\}, \{4, 16, 19\}$ intersection 9:  $\{0, 1, 2\}, \{5, 9, 12\}, \{2, 4, 5\}, \{2, 3, 9\}, \{0, 9, 10\}, \{4, 10, 11\}, \{1, 9, 11\}, \{1, 4, 7\},$  $\{1, 6, 8\}$  $\{12, 15, 23\}, \{10, 13, 16\}, \{7, 17, 18\}, \{15, 16, 21\}, \{5, 11, 14\}, \{12, 18, 22\},$  $\{1, 19, 23\}, \{3, 18, 24\}, \{1, 5, 17\}, \{6, 11, 15\}, \{11, 17, 23\}, \{7, 8, 16\}, \{6, 9, 16\}, \{6, 9, 16\}, \{6, 9, 16\}, \{6, 9, 16\}, \{6, 9, 16\}, \{6, 9, 16\}, \{6, 9, 16\}, \{6, 9, 16\}, \{6, 9, 16\}, \{6, 9, 16\}, \{6, 9, 16\}, \{6, 16\}, \{6, 16\}, \{6, 16\}, \{6, 16\}, \{1, 16\},$  $\{0, 16, 17\}, \{10, 12, 19\}, \{0, 3, 7\}, \{3, 4, 22\}, \{0, 5, 8\}, \{16, 19, 20\}, \{2, 14, 23\}, \{10, 12, 19\}, \{11, 12, 19\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 12\}, \{11, 12, 1$  $\{3, 6, 13\}, \{14, 19, 21\}, \{8, 11, 24\}, \{9, 18, 21\}, \{9, 13, 23\}, \{5, 10, 21\}, \{3, 8, 21\}$  $\{9, 17, 22\}, \{5, 20, 23\}, \{17, 19, 24\}, \{3, 15, 17\}, \{12, 13, 24\}, \{2, 17, 20\},$  $\{12, 14, 16\}, \{22, 23, 24\}, \{2, 11, 21\}, \{12, 17, 21\}, \{5, 13, 15\}, \{4, 16, 23\},$  $\{4, 13, 17\}, \{0, 13, 21\}, \{6, 12, 20\}, \{8, 13, 20\}, \{2, 13, 18\}, \{2, 16, 24\},\$  $\{8, 19, 22\}, \{3, 14, 20\}, \{8, 10, 17\}, \{4, 14, 18\}, \{7, 15, 19\}, \{5, 6, 18\}, \{2, 6, 19\}, \{5, 6, 18\}, \{2, 6, 19\}, \{3, 14, 20\}, \{4, 14, 18\}, \{7, 15, 19\}, \{5, 10\}, \{1, 10\}, \{2, 10\}, \{2, 10\}, \{2, 10\}, \{3, 10\}, \{3, 10\}, \{3, 10\}, \{4, 10\}, \{4, 10\}, \{4, 10\}, \{4, 10\}, \{5$  $\{4, 9, 19\}, \{6, 10, 24\}, \{3, 10, 23\}, \{1, 3, 12\}, \{5, 7, 24\}, \{10, 15, 18\}, \{20, 21, 22\}, \{10, 12, 12\}, \{10, 12,$  $\{10, 14, 22\}, \{0, 18, 19\}, \{9, 15, 24\}, \{8, 9, 14\}, \{6, 7, 22\}, \{1, 10, 20\}, \{0, 4, 12\}, \{1, 10, 20\}, \{1, 10, 20\}, \{1, 10, 20\}, \{1, 10, 20\}, \{2, 10, 10, 20\}, \{2, 10, 20\}, \{2, 10, 20\}, \{2, 10, 20\}, \{2, 10, 20\}, \{2, 10, 20\}, \{2, 10, 20\}, \{3, 10, 20\}, \{4, 10, 20\}, \{$  $\{11, 18, 20\}, \{4, 20, 24\}, \{7, 9, 20\}, \{5, 16, 22\}, \{2, 8, 12\}, \{3, 5, 19\}, \{7, 11, 12\},$  $\{0, 11, 22\}, \{8, 18, 23\}, \{2, 15, 22\}, \{0, 14, 24\}, \{2, 7, 10\}, \{3, 11, 16\}, \{0, 15, 20\}, \{0, 12, 20\}, \{1,$  $\{4, 6, 21\}, \{7, 21, 23\}, \{11, 13, 19\}, \{0, 6, 23\}, \{1, 21, 24\}, \{4, 8, 15\}, \{1, 16, 18\},$  $\{1, 13, 22\}, \{1, 14, 15\}, \{7, 13, 14\}, \{6, 14, 17\}$ intersection 8:  $\{5, 9, 12\}, \{0, 3, 4\}, \{4, 6, 12\}, \{2, 7, 12\}, \{1, 10, 12\}, \{0, 11, 12\}, \{2, 8, 11\}, \{2, 8, 11\}, \{1, 10, 12\}, \{2, 10, 12$  $\{1, 4, 7\}$ 

 $\begin{array}{l} \{2,3,21\}, \ \{5,17,23\}, \ \{0,9,17\}, \ \{0,2,16\}, \ \{3,10,17\}, \ \{0,10,22\}, \ \{1,16,21\}, \\ \{6,9,14\}, \ \{8,13,17\}, \ \{3,5,6\}, \ \{2,9,20\}, \ \{1,17,24\}, \ \{8,9,23\}, \ \{6,18,20\}, \\ \{6,10,13\}, \ \{1,3,8\}, \ \{7,9,13\}, \ \{7,17,22\}, \ \{10,15,16\}, \ \{4,11,14\}, \ \{9,11,21\}, \\ \{14,16,24\}, \ \{13,15,20\}, \ \{2,19,22\}, \ \{7,11,23\}, \ \{4,17,20\}, \ \{1,11,13\}, \\ \{14,15,17\}, \ \{3,13,19\}, \ \{6,19,24\}, \ \{7,10,24\}, \ \{6,7,15\}, \ \{5,10,21\}, \ \{0,7,21\}, \\ \end{array}$ 

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\{4, 22, 24\}, \{9, 18, 24\}, \{10, 18, 19\}, \{11, 15, 22\}, \{7, 16, 18\}, \{8, 12, 22\}, \{11, 12, 22\}, \{11, 12, 22\}, \{12, 22\}, \{12, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 22\}, \{13, 2
    \{15, 21, 23\}, \{2, 13, 24\}, \{1, 2, 14\}, \{8, 16, 20\}, \{20, 23, 24\}, \{14, 18, 21\},\
    \{5, 7, 20\}, \{2, 6, 17\}, \{1, 15, 18\}, \{1, 9, 19\}, \{2, 4, 18\}, \{12, 14, 19\}, \{2, 10, 23\},
    \{6, 21, 22\}, \{10, 11, 20\}, \{7, 8, 19\}, \{19, 20, 21\}, \{13, 22, 23\}, \{3, 12, 20\}, 
    \{9, 16, 22\}, \{0, 6, 8\}, \{5, 11, 19\}, \{0, 13, 18\}, \{12, 17, 21\}, \{0, 15, 19\}, \{8, 21, 24\}, 
    \{6, 11, 16\}, \{0, 14, 23\}, \{14, 20, 22\}, \{12, 18, 23\}, \{5, 13, 14\}, \{4, 19, 23\}, 
    \{11, 17, 18\}, \{4, 5, 16\}, \{1, 5, 22\}, \{4, 13, 21\}, \{3, 7, 14\}, \{3, 18, 22\}
intersection 7:
  \{4, 6, 12\}, \{1, 6, 8\}, \{6, 7, 9\}, \{0, 7, 8\}, \{1, 9, 11\}, \{5, 8, 10\}, \{2, 6, 10\}
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    \{0, 13, 14\}, \{15, 21, 24\}, \{8, 13, 24\}, \{3, 13, 20\}, \{8, 10, 21\}, \{9, 19, 24\}, 
    \{0, 22, 23\}, \{5, 11, 21\}, \{14, 17, 24\}, \{4, 6, 14\}, \{1, 3, 7\}, \{0, 15, 17\}, \{0, 5, 8\},
    \{7, 14, 20\}, \{5, 17, 19\}, \{11, 13, 18\}, \{15, 18, 19\}, \{0, 4, 18\}, \{7, 8, 18\}, \{3, 9, 18\}
intersection 5:
\{4, 8, 9\}, \{2, 4, 5\}, \{5, 9, 12\}, \{3, 7, 10\}, \{2, 8, 11\}
```

 $\{9, 10, 11\}, \{12, 21, 22\}, \{0, 11, 17\}, \{4, 15, 17\}, \{8, 17, 20\}, \{6, 11, 23\}, \{9, 10, 11\}, \{12, 21, 22\}, \{1, 12, 21\}, \{1, 12, 21\}, \{1, 12, 21\}, \{1, 12, 21\}, \{2, 12, 22\}, \{2, 12, 22\}, \{2, 12, 22\}, \{2, 12, 22\}, \{2, 12, 22\}, \{2, 12, 22\}, \{3, 12, 22\}, \{4, 12, 12\}, \{$  $\{1, 12, 23\}, \{3, 19, 20\}, \{0, 1, 7\}, \{11, 13, 15\}, \{1, 8, 14\}, \{8, 13, 19\}, \{0, 4, 22\},$  $\{4, 14, 20\}, \{6, 20, 24\}, \{4, 6, 21\}, \{1, 6, 22\}, \{7, 8, 24\}, \{7, 20, 22\}, \{5, 8, 21\},$  $\{3, 5, 24\}, \{1, 9, 17\}, \{5, 15, 18\}, \{11, 16, 20\}, \{9, 14, 23\}, \{4, 7, 23\}, \{9, 15, 16\},$  $\{9, 18, 20\}, \{0, 20, 21\}, \{11, 22, 24\}, \{1, 5, 11\}, \{14, 16, 19\}, \{2, 10, 16\},$  $\{7, 13, 21\}, \{3, 11, 21\}, \{1, 4, 16\}, \{18, 19, 21\}, \{6, 7, 12\}, \{1, 3, 18\}, \{9, 13, 22\}, \{1, 3, 18\}, \{1, 3, 18\}, \{1, 3, 18\}, \{1, 3, 18\}, \{1, 3, 18\}, \{2, 13, 21\}, \{3, 11, 21\}, \{1, 3, 18\}, \{2, 13, 21\}, \{3, 11, 21\}, \{3, 11, 21\}, \{1, 3, 18\}, \{3, 11, 21\}, \{1, 3, 18\}, \{3, 11, 21\}, \{1, 3, 18\}, \{3, 11, 21\}, \{1, 3, 18\}, \{3, 11, 21\}, \{1, 3, 18\}, \{3, 11, 21\}, \{1, 3, 18\}, \{3, 11, 21\}, \{1, 3, 18\}, \{3, 11, 21\}, \{1, 3, 18\}, \{3, 11, 21\}, \{1, 3, 18\}, \{3, 11, 21\}, \{3, 11,$  $\{4, 10, 19\}, \{15, 20, 23\}, \{5, 7, 17\}, \{11, 12, 14\}, \{0, 2, 12\}, \{0, 8, 16\},$  $\{17, 23, 24\}, \{2, 14, 18\}, \{5, 10, 20\}, \{7, 16, 18\}, \{4, 11, 18\}, \{0, 10, 23\}, \{17, 16, 18\}, \{17, 18\}, \{18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{18, 18\}, \{18, 18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{18, 18\}, \{17, 18\}, \{18, 18\}, \{17, 18\}, \{17, 18\}, \{17, 18\}, \{18,$  $\{3, 13, 16\}, \{6, 8, 15\}, \{7, 14, 15\}, \{2, 19, 22\}, \{2, 7, 9\}, \{0, 15, 19\}, \{13, 17, 18\}, \{13, 17,$  $\{4, 13, 24\}, \{0, 14, 24\}, \{3, 15, 22\}, \{16, 21, 23\}, \{2, 17, 21\}, \{18, 22, 23\}, \{2, 17, 21\}, \{18, 22, 23\}, \{12, 23\}, \{13, 22$  $\{1, 15, 21\}, \{12, 17, 19\}, \{16, 17, 22\}, \{0, 6, 18\}, \{1, 10, 13\}, \{10, 12, 15\},$  $\{3, 14, 17\}, \{12, 16, 24\}, \{6, 10, 17\}, \{8, 12, 18\}, \{2, 15, 24\}, \{3, 4, 12\},$  $\{12, 13, 20\}, \{5, 6, 16\}, \{1, 2, 20\}, \{3, 8, 23\}, \{6, 13, 14\}, \{10, 14, 21\}, \{2, 13, 23\},$  $\{10, 18, 24\}, \{8, 10, 22\}, \{5, 14, 22\}, \{0, 5, 13\}, \{7, 11, 19\}, \{1, 19, 24\}, \{2, 3, 6\},$  $\{6, 9, 19\}, \{5, 19, 23\}, \{9, 21, 24\}, \{0, 3, 9\}$ intersection 4:  $\{1, 6, 8\}, \{5, 7, 11\}, \{2, 7, 12\}, \{0, 7, 8\}$  $\{12, 16, 17\}, \{1, 5, 10\}, \{6, 10, 21\}, \{1, 7, 9\}, \{14, 16, 20\}, \{5, 16, 23\}, \{4, 8, 17\},$  $\{1, 2, 3\}, \{2, 16, 21\}, \{8, 14, 21\}, \{4, 6, 7\}, \{1, 20, 21\}, \{10, 17, 22\}, \{4, 9, 15\},$  $\{1, 12, 22\}, \{1, 14, 18\}, \{3, 9, 11\}, \{8, 11, 15\}, \{8, 18, 23\}, \{2, 11, 22\},$  $\{11, 19, 21\}, \{0, 5, 21\}, \{15, 17, 21\}, \{5, 6, 14\}, \{5, 15, 20\}, \{0, 12, 15\}, \{11, 19, 21\}, \{12, 12, 12\}, \{13, 17, 21\}, \{14, 19, 21\}, \{14, 19, 21\}, \{14, 19, 21\}, \{15, 17, 21\}, \{15, 17, 21\}, \{14, 19, 21\}, \{15, 1$  $\{10, 13, 23\}, \{7, 14, 17\}, \{7, 20, 23\}, \{0, 3, 10\}, \{4, 11, 13\}, \{9, 17, 18\},$  $\{10, 18, 19\}, \{8, 12, 13\}, \{3, 7, 16\}, \{2, 13, 14\}, \{2, 9, 23\}, \{0, 9, 22\}, \{3, 15, 19\},$  $\{14, 15, 22\}, \{6, 9, 16\}, \{2, 6, 20\}, \{4, 21, 24\}, \{6, 11, 12\}, \{6, 15, 23\}, \{3, 6, 17\}, \{6, 12, 24\}, \{1, 24\}, \{2, 2$  $\{1, 11, 16\}, \{2, 8, 10\}, \{3, 8, 20\}, \{4, 18, 20\}, \{1, 17, 24\}, \{0, 1, 4\}, \{0, 20, 24\}, \{1, 17, 24\}, \{1, 17, 24\}, \{2, 20, 24\}, \{1, 17, 24\}, \{2, 20, 24\}, \{2, 20, 24\}, \{2, 20, 24\}, \{3, 20, 24\}, \{4, 20, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 20\}, \{4, 20, 20, 2$  $\{13, 17, 20\}, \{3, 4, 14\}, \{3, 5, 13\}, \{0, 2, 17\}, \{12, 14, 19\}, \{2, 5, 18\}, \{3, 21, 22\},$  $\{4, 22, 23\}, \{15, 16, 18\}, \{5, 17, 19\}, \{6, 18, 22\}, \{4, 5, 12\}, \{7, 22, 24\},$  $\{9, 13, 21\}, \{8, 16, 24\}, \{6, 19, 24\}, \{11, 17, 23\}, \{9, 10, 14\}, \{19, 20, 22\},$  $\{5, 9, 24\}, \{11, 14, 24\}, \{13, 18, 24\}, \{7, 10, 15\}, \{3, 12, 18\}, \{0, 11, 18\},$  $\{1, 19, 23\}, \{12, 21, 23\}, \{0, 14, 23\}, \{3, 23, 24\}, \{0, 16, 19\}, \{5, 8, 22\},$  $\{10, 12, 24\}, \{2, 4, 19\}, \{10, 11, 20\}, \{9, 12, 20\}, \{2, 15, 24\}, \{1, 13, 15\},$  $\{7, 13, 19\}, \{7, 18, 21\}, \{8, 9, 19\}, \{4, 10, 16\}, \{13, 16, 22\}, \{0, 6, 13\}$ intersection 3:  $\{5, 8, 10\}, \{5, 9, 12\}, \{3, 7, 10\}$  $\{14, 17, 19\}, \{3, 12, 18\}, \{2, 15, 23\}, \{7, 8, 14\}, \{1, 15, 20\}, \{6, 20, 23\}, \{1, 15, 20\}, \{2, 23\}, \{2, 23\}, \{2, 23\}, \{2, 23\}, \{2, 23\}, \{3, 22\},$  $\{7, 19, 24\}, \{3, 4, 13\}, \{6, 11, 19\}, \{22, 23, 24\}, \{3, 14, 20\}, \{8, 18, 19\},$  $\{5, 17, 20\}, \{1, 18, 23\}, \{2, 13, 22\}, \{3, 8, 16\}, \{7, 9, 20\}, \{8, 17, 23\}, \{1, 8, 11\},$  $\{14, 21, 23\}, \{9, 10, 19\}, \{10, 11, 23\}, \{8, 9, 21\}, \{0, 6, 17\}, \{3, 17, 24\}, \{2, 3, 6\},$  $\{9, 13, 23\}, \{16, 19, 20\}, \{10, 12, 21\}, \{6, 21, 22\}, \{1, 13, 17\}, \{1, 6, 9\},$ 

 $\{4, 10, 20\}, \{0, 5, 19\}, \{13, 15, 19\}, \{12, 20, 24\}, \{2, 11, 21\}, \{0, 1, 7\}, \{1, 3, 21\}, \{0, 8, 15\}, \{6, 10, 13\}, \{4, 14, 15\}, \{0, 2, 12\}, \{3, 11, 15\}, \{15, 16, 21\}, \{4, 5, 11\}, \{1, 5,$ 

- $\{0, 3, 9\}, \{2, 9, 14\}, \{17, 18, 21\}, \{1, 2, 19\}, \{18, 20, 22\}, \{9, 16, 24\}, \{7, 17, 22\}, \{1, 2, 19\}, \{18, 20, 22\}, \{9, 16, 24\}, \{7, 17, 22\}, \{1, 2, 19\}, \{1, 2,$
- $\{4,9,18\}, \{7,11,12\}, \{2,8,20\}, \{6,14,24\}, \{5,21,24\}, \{11,16,17\}, \{4,19,21\},$
- $\{2, 18, 24\}, \{11, 13, 20\}, \{5, 13, 14\}, \{9, 11, 22\}, \{0, 4, 22\}, \{0, 10, 14\},$

 $\begin{array}{l} \{9,15,17\}, \ \{3,19,22\}, \ \{11,14,18\}, \ \{0,16,23\}, \ \{0,20,21\}, \ \{12,19,23\}, \\ \{1,5,16\}, \ \{8,13,24\}, \ \{4,6,8\}, \ \{1,10,22\}, \ \{10,15,24\}, \ \{2,5,7\}, \ \{1,12,14\}, \\ \{7,13,21\}, \ \{2,4,16\}, \ \{12,13,16\}, \ \{4,12,17\}, \ \{7,15,18\}, \ \{8,12,22\}, \ \{3,5,23\}, \\ \{4,7,23\}, \ \{5,15,22\}, \ \{1,4,24\}, \ \{6,12,15\}, \ \{6,7,16\}, \ \{5,6,18\}, \ \{2,10,17\}, \\ \{10,16,18\}, \ \{0,13,18\}, \ \{0,11,24\}, \ \{14,16,22\} \\ \text{intersection 2:} \\ \{1,3,5\}, \ \{5,8,10\} \end{array}$ 

 $\{6, 10, 18\}, \{13, 15, 21\}, \{7, 10, 19\}, \{0, 3, 20\}, \{6, 13, 16\}, \{3, 11, 18\},$  $\{16, 22, 23\}, \{1, 14, 15\}, \{9, 10, 13\}, \{15, 18, 24\}, \{0, 2, 22\}, \{5, 15, 17\},$  $\{3, 8, 19\}, \{5, 16, 19\}, \{8, 12, 16\}, \{0, 6, 12\}, \{13, 19, 20\}, \{4, 14, 21\}, \{6, 8, 21\}, \{8, 12, 16\}, \{9, 12\}, \{13, 19, 20\}, \{$  $\{5, 7, 23\}, \{7, 12, 15\}, \{4, 12, 19\}, \{0, 11, 23\}, \{1, 4, 23\}, \{6, 17, 20\}, \{6, 15, 23\}, \{6, 1$  $\{0, 13, 14\}, \{11, 16, 20\}, \{0, 1, 10\}, \{1, 13, 22\}, \{8, 9, 11\}, \{18, 21, 22\}, \{4, 7, 20\}, \{1, 13, 22\}, \{1, 13, 22\}, \{1, 13, 22\}, \{2, 13, 22\}, \{2, 13, 22\}, \{3, 13, 22\}, \{4, 23, 22\}, \{4,$  $\{5, 14, 22\}, \{3, 10, 23\}, \{3, 4, 15\}, \{9, 19, 23\}, \{10, 15, 16\}, \{3, 12, 17\},$  $\{21, 23, 24\}, \{1, 8, 24\}, \{15, 19, 22\}, \{0, 7, 17\}, \{2, 8, 17\}, \{4, 10, 24\}, \{5, 12, 13\}, \{4, 10, 24\}, \{5, 12, 13\}, \{4, 10, 24\}, \{5, 12, 13\}, \{4, 10, 24\}, \{5, 12, 13\}, \{4, 10, 24\}, \{5, 12, 13\}, \{4, 10, 24\}, \{5, 12, 13\}, \{4, 10, 24\}, \{5, 12, 13\}, \{4, 10, 24\}, \{5, 12, 13\}, \{5, 12, 12\}, \{5, 12, 12\}, \{5, 12, 12\}, \{5, 12, 12\}, \{5, 12, 12\}, \{5, 12, 12\}, \{5, 12, 12\}, \{5, 12, 12\}, \{5,$  $\{5, 20, 24\}, \{13, 17, 23\}, \{6, 11, 19\}, \{0, 9, 15\}, \{0, 19, 24\}, \{8, 15, 20\}, \{1, 9, 12\}$  $\{2, 5, 6\}, \{14, 18, 19\}, \{2, 10, 12\}, \{7, 9, 21\}, \{10, 20, 21\}, \{3, 9, 16\}, \{1, 16, 21\}, \{2, 5, 6\}, \{1, 16, 21\}, \{2, 10, 12\}, \{2, 10, 12\}, \{2, 10, 12\}, \{2, 10, 12\}, \{3, 9, 16\}, \{1, 16, 21\}, \{1, 16, 21\}, \{2, 10, 12\}, \{2, 10, 12\}, \{2, 10, 12\}, \{3, 10, 12\}, \{3, 10, 12\}, \{3, 10, 12\}, \{1, 10, 12\}, \{2, 10, 12\}, \{3, 10, 12\}, \{3, 10, 12\}, \{1, 10, 12\}, \{2, 10, 12\}, \{3, 10, 12\}, \{3, 10, 12\}, \{1, 10, 12\}, \{2, 10, 12\}, \{3, 10,$  $\{6, 9, 24\}, \{2, 11, 15\}, \{4, 8, 13\}, \{12, 20, 22\}, \{3, 22, 24\}, \{5, 9, 18\}, \{11, 13, 24\},$  $\{4, 6, 22\}, \{4, 5, 11\}, \{17, 19, 21\}, \{8, 14, 23\}, \{0, 5, 21\}, \{11, 12, 21\}, \{7, 11, 14\},$  $\{7, 16, 18\}, \{2, 20, 23\}, \{2, 4, 9\}, \{2, 7, 24\}, \{2, 13, 18\}, \{12, 14, 24\}, \{1, 18, 20\},$  $\{1, 11, 17\}, \{12, 18, 23\}, \{3, 6, 14\}, \{4, 17, 18\}, \{1, 6, 7\}, \{9, 14, 20\}, \{10, 11, 22\},$  $\{3, 7, 13\}, \{1, 2, 19\}, \{7, 8, 22\}, \{0, 8, 18\}$ intersection 1:  $\{2, 3, 9\}$  $\{4, 9, 16\}, \{11, 15, 17\}, \{1, 2, 19\}, \{2, 6, 23\}, \{5, 9, 22\}, \{5, 6, 24\}, \{1, 3, 4\},$  $\{1, 13, 17\}, \{3, 12, 14\}, \{8, 13, 14\}, \{2, 14, 17\}, \{0, 5, 14\}, \{1, 5, 7\}, \{6, 16, 17\}, \{1, 13, 17\}, \{1, 13, 17\}, \{1, 13, 17\}, \{2, 14, 17\}, \{2, 14, 17\}, \{2, 14, 17\}, \{3, 12, 14\}, \{1, 13, 17\}, \{2, 14, 17\}, \{2, 14, 17\}, \{3, 12, 14\}, \{4, 13, 14\}, \{4, 14$  $\{3, 10, 18\}, \{6, 11, 21\}, \{10, 14, 22\}, \{8, 18, 22\}, \{1, 6, 12\}, \{8, 16, 20\}, \{1, 9, 10\}$  $\{8, 15, 19\}, \{19, 22, 23\}, \{4, 8, 17\}, \{9, 12, 15\}, \{4, 14, 19\}, \{7, 15, 24\},$  $\{1, 14, 15\}, \{2, 5, 15\}, \{0, 2, 18\}, \{9, 11, 18\}, \{0, 23, 24\}, \{3, 16, 22\}, \{3, 15, 23\}, \{3, 1$  $\{5, 8, 12\}, \{7, 9, 23\}, \{2, 20, 24\}, \{7, 10, 16\}, \{1, 8, 24\}, \{3, 11, 24\}, \{9, 19, 24\}, \{5, 8, 12\}, \{1, 8, 24\}, \{2, 20, 24\}, \{2, 20, 24\}, \{3, 11, 24\}, \{3, 11, 24\}, \{4, 10,$  $\{0, 7, 22\}, \{16, 21, 23\}, \{6, 15, 22\}, \{13, 16, 19\}, \{12, 18, 24\}, \{11, 12, 13\}, \{12, 13, 24\}, \{11, 12, 13\}, \{12, 13, 24\}, \{13, 12, 13\}, \{13, 12, 12\}, \{13$  $\{6, 9, 13\}, \{7, 13, 20\}, \{0, 9, 17\}, \{0, 12, 20\}, \{4, 13, 15\}, \{1, 11, 22\}, \{0, 4, 6\},$ 

 $\{3, 5, 13\}, \{3, 17, 20\}, \{14, 16, 24\}, \{7, 17, 18\}, \{13, 18, 23\}, \{2, 12, 16\},$ 

 $\{12, 21, 22\}, \{13, 21, 24\}, \{17, 19, 21\}, \{1, 16, 18\}, \{5, 11, 16\}, \{10, 15, 21\},$ 

 $\{0,3,19\}, \{11,19,20\}, \{4,5,18\}, \{5,20,21\}, \{8,9,21\}, \{4,12,23\}, \{15,18,20\},$ 

 $\{3, 6, 8\}, \{5, 10, 19\}, \{2, 10, 11\}, \{6, 7, 14\}, \{0, 8, 11\}, \{0, 15, 16\}, \{4, 20, 22\},$ 

 $\{6, 18, 19\}, \{0, 10, 13\}, \{2, 4, 21\}, \{7, 12, 19\}, \{10, 12, 17\}, \{9, 14, 20\}, \{12, 20, 20\}, \{12, 20, 20\}, \{2, 4, 21\}, \{2, 4,$ 

 $\{1, 20, 23\}, \{6, 10, 20\}, \{0, 1, 21\}, \{11, 14, 23\}, \{17, 22, 24\}, \{5, 17, 23\}, \{2, 7, 8\}, \{2, 13, 22\}, \{3, 7, 21\}, \{14, 18, 21\}, \{8, 10, 23\}, \{4, 10, 24\}, \{4, 7, 11\}$ 

intersection 0:

 $<sup>\</sup>begin{array}{l} \{7,10,12\}, \ \{9,20,23\}, \ \{1,8,15\}, \ \{2,5,14\}, \ \{2,4,9\}, \ \{6,12,15\}, \ \{9,15,24\}, \\ \{1,16,24\}, \ \{12,13,24\}, \ \{1,9,21\}, \ \{18,20,24\}, \ \{4,8,14\}, \ \{1,2,7\}, \ \{6,7,19\}, \\ \{5,8,24\}, \ \{4,15,16\}, \ \{13,16,22\}, \ \{6,14,21\}, \ \{2,13,21\}, \ \{2,10,24\}, \ \{5,9,13\}, \end{array}$ 

**B(b)** I(15, 27) = [0, 27]

### Consider the following STS(15):

 $\{0, 1, 2\}, \{1, 12, 14\}, \{4, 7, 13\}, \{0, 3, 4\}, \{2, 3, 7\}, \{4, 9, 11\}, \{0, 5, 6\}, \{2, 4, 8\}, \\ \{4, 10, 12\}, \{0, 7, 8\}, \{2, 5, 11\}, \{5, 7, 10\}, \{0, 9, 10\}, \{2, 6, 14\}, \{5, 8, 12\}, \{0, 11, 12\}, \\ \{2, 9, 12\}, \{5, 9, 13\}, \{0, 13, 14\}, \{2, 10, 13\}, \{6, 7, 12\}, \{1, 3, 5\}, \{3, 6, 9\}, \{6, 8, 13\}, \\ \{1, 4, 6\}, \{3, 8, 11\}, \{6, 10, 11\}, \{1, 7, 9\}, \{3, 10, 14\}, \{7, 11, 14\}, \{1, 8, 10\}, \{3, 12, 13\}, \\ \{8, 9, 14\}, \{1, 11, 13\}, \{4, 5, 14\}$ 

The STS(27) given below intersect this system in the indicated number of blocks.

intersection 27:

 $\begin{array}{l} \{0,1,2\}, \ \{1,12,14\}, \ \{3,12,13\}, \ \{0,3,4\}, \ \{2,3,7\}, \ \{4,9,11\}, \ \{0,5,6\}, \\ \{1,8,10\}, \ \{8,9,14\}, \ \{0,7,8\}, \ \{2,5,11\}, \ \{5,7,10\}, \ \{0,9,10\}, \ \{3,10,14\}, \\ \{5,8,12\}, \ \{1,7,9\}, \ \{4,5,14\}, \ \{5,9,13\}, \ \{0,13,14\}, \ \{2,10,13\}, \ \{6,7,12\}, \\ \{1,3,5\}, \ \{3,6,9\}, \ \{6,8,13\}, \ \{1,4,6\}, \ \{3,8,11\}, \ \{6,10,11\} \end{array}$ 

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\{14, 16, 20\}, \{1, 13, 16\}, \{7, 18, 19\}, \{7, 14, 21\}, \{9, 16, 25\}, \{3, 18, 23\}, 
   \{4, 13, 18\}, \{2, 8, 19\}, \{13, 22, 26\}, \{7, 11, 15\}, \{11, 20, 23\}, \{5, 17, 24\}, 
 \{7, 22, 25\}, \{11, 13, 17\}, \{1, 15, 21\}, \{3, 16, 24\}, \{11, 16, 21\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14, 19, 25\}, \{14
   \{1, 17, 18\}, \{7, 20, 24\}, \{5, 16, 26\}, \{8, 16, 17\}, \{1, 11, 26\}, \{8, 22, 23\}, \{4, 7, 16\},
   \{8, 21, 26\}, \{1, 24, 25\}, \{0, 16, 18\}, \{10, 12, 21\}, \{13, 21, 24\}, \{14, 18, 26\}, 
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   \{7, 20, 26\}, \{10, 18, 22\}, \{4, 23, 26\}, \{3, 9, 20\}, \{5, 12, 15\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 24, 26\}, \{13, 
   \{0, 19, 22\}, \{5, 14, 25\}, \{1, 16, 18\}, \{11, 15, 16\}, \{1, 19, 26\}, \{11, 22, 24\}, 
   \{2, 11, 26\}, \{10, 19, 25\}, \{17, 18, 25\}, \{0, 25, 26\}, \{0, 5, 17\}, \{3, 19, 24\}, 
   \{10, 21, 24\}, \{2, 22, 25\}, \{14, 16, 23\}, \{7, 15, 19\}, \{7, 18, 24\}, \{8, 9, 26\}, 
   \{4, 16, 22\}, \{4, 14, 19\}, \{3, 17, 23\}, \{11, 17, 20\}, \{7, 12, 21\}, \{2, 14, 15\},
   \{2, 5, 16\}, \{2, 8, 24\}, \{13, 19, 23\}, \{6, 14, 26\}, \{12, 20, 22\}, \{6, 16, 24\}, 
   \{1, 20, 25\}, \{13, 18, 20\}, \{12, 23, 24\}, \{13, 16, 21\}, \{8, 16, 19\}, \{3, 13, 15\}, 
   \{0, 16, 20\}, \{1, 15, 23\}, \{14, 20, 24\}, \{14, 17, 21\}, \{0, 6, 18\}, \{5, 18, 26\}, \{5, 8, 23\}
intersection 24:
 \{0, 1, 2\}, \{6, 10, 11\}, \{4, 7, 13\}, \{0, 3, 4\}, \{2, 3, 7\}, \{4, 9, 11\}, \{0, 5, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4, 6\}, \{1, 4
 \{4, 10, 12\}, \{0, 7, 8\}, \{2, 5, 11\}, \{5, 7, 10\}, \{0, 9, 10\}, \{1, 11, 13\}, \{5, 8, 12\},
 \{0, 11, 12\}, \{2, 9, 12\}, \{5, 9, 13\}, \{3, 12, 13\}, \{2, 10, 13\}, \{6, 7, 12\}, \{3, 8, 11\}, \{3, 12, 13\}, \{2, 10, 13\}, \{3, 12, 12\}, \{3, 12, 13\}, \{3, 12, 13\}, \{3, 12, 13\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}, \{4, 12\}
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 $\{7, 11, 14\}, \{3, 10, 14\}$ 

 $\{8, 24, 26\}, \{9, 15, 19\}, \{3, 21, 22\}, \{10, 18, 25\}, \{12, 16, 24\}, \{2, 21, 26\},$  $\{7, 9, 26\}, \{1, 5, 26\}, \{6, 9, 16\}, \{3, 6, 17\}, \{2, 8, 19\}, \{1, 9, 24\}, \{1, 8, 18\},$  $\{4, 14, 16\}, \{7, 20, 22\}, \{4, 15, 24\}, \{1, 10, 20\}, \{4, 5, 23\}, \{12, 15, 22\}, \{12, 15, 22\}, \{12, 15, 22\}, \{13, 10, 20\}, \{13,$  $\{5, 15, 17\}, \{9, 23, 25\}, \{11, 16, 20\}, \{1, 22, 25\}, \{4, 20, 25\}, \{14, 19, 26\},$  $\{0, 16, 25\}, \{6, 21, 23\}, \{11, 22, 24\}, \{3, 9, 20\}, \{2, 16, 23\}, \{14, 17, 20\},$  $\{5, 14, 22\}, \{1, 7, 16\}, \{18, 20, 23\}, \{11, 21, 25\}, \{7, 18, 24\}, \{1, 3, 19\},$  $\{12, 19, 25\}, \{7, 15, 21\}, \{3, 23, 24\}, \{2, 14, 24\}, \{11, 15, 18\}, \{2, 6, 25\}, \{2, 6, 25\}, \{2, 6, 25\}, \{2, 6, 25\}, \{2, 6, 25\}, \{2, 14, 24\}, \{2, 14$  $\{11, 23, 26\}, \{2, 17, 18\}, \{6, 19, 24\}, \{9, 14, 18\}, \{12, 14, 23\}, \{7, 19, 23\},$  $\{1, 14, 21\}, \{5, 20, 21\}, \{0, 13, 21\}, \{12, 20, 26\}, \{0, 18, 19\}, \{1, 15, 23\},$  $\{11, 17, 19\}, \{10, 21, 24\}, \{8, 13, 23\}, \{6, 8, 20\}, \{2, 4, 22\}, \{8, 10, 15\}, \{3, 5, 18\},$  $\{5, 16, 19\}, \{10, 16, 26\}, \{5, 24, 25\}, \{16, 17, 21\}, \{13, 19, 20\}, \{12, 18, 21\},$  $\{8, 9, 21\}, \{8, 14, 25\}, \{13, 15, 25\}, \{13, 17, 24\}, \{8, 16, 22\}, \{6, 18, 22\},$  $\{0, 22, 23\}, \{0, 17, 26\}, \{3, 25, 26\}, \{0, 14, 15\}, \{2, 15, 20\}, \{9, 17, 22\},$  $\{3, 15, 16\}, \{10, 17, 23\}, \{10, 19, 22\}, \{4, 18, 26\}, \{13, 22, 26\}, \{13, 16, 18\}$ intersection 23:  $\{1,7,9\}, \{1,12,14\}, \{4,7,13\}, \{0,3,4\}, \{1,4,6\}, \{4,9,11\}, \{0,5,6\},$  $\{6, 10, 11\}, \{4, 10, 12\}, \{0, 7, 8\}, \{2, 5, 11\}, \{5, 7, 10\}, \{1, 8, 10\}, \{2, 6, 14\},$  $\{6, 8, 13\}, \{1, 11, 13\}, \{2, 9, 12\}, \{5, 9, 13\}, \{7, 11, 14\}, \{2, 10, 13\}, \{6, 7, 12\}, \{$  $\{1, 3, 5\}, \{4, 5, 14\}$  $\{5, 24, 26\}, \{13, 16, 23\}, \{7, 19, 21\}, \{10, 18, 23\}, \{5, 8, 20\}, \{0, 18, 22\}, \{13, 16, 23\}, \{13, 16, 23\}, \{2, 19, 21\}, \{2, 10, 18, 23\}, \{2, 10, 18, 22\}, \{2, 21\},$  $\{7, 25, 26\}, \{1, 19, 25\}, \{12, 22, 23\}, \{11, 19, 20\}, \{4, 15, 24\}, \{5, 15, 22\},$  $\{3, 19, 24\}, \{0, 10, 17\}, \{11, 12, 15\}, \{2, 4, 21\}, \{6, 19, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{0, 14, 23\}, \{11, 12, 15\}, \{11, 12, 15\}, \{2, 4, 21\}, \{2, 12\}, \{2, 13\}, \{2, 13\}, \{2, 13\}, \{2, 13\}, \{2, 13\}, \{2, 13\}, \{2, 13\}, \{2, 13\}, \{2, 13\}, \{3, 13\}, \{2, 13\}, \{3, 13\}, \{$  $\{1, 17, 26\}, \{2, 7, 22\}, \{8, 16, 21\}, \{12, 20, 21\}, \{2, 15, 17\}, \{0, 12, 19\},$  $\{8, 14, 18\}, \{21, 23, 24\}, \{2, 18, 20\}, \{9, 10, 19\}, \{8, 12, 25\}, \{3, 7, 16\},$  $\{7, 17, 18\}, \{6, 17, 24\}, \{14, 21, 25\}, \{8, 11, 24\}, \{1, 15, 21\}, \{5, 18, 19\},$  $\{2, 24, 25\}, \{5, 12, 16\}, \{10, 22, 24\}, \{14, 17, 22\}, \{6, 9, 18\}, \{13, 18, 21\}, \{13,$  $\{10, 21, 26\}, \{12, 13, 26\}, \{2, 3, 8\}, \{14, 19, 26\}, \{0, 13, 20\}, \{4, 17, 20\},$  $\{3, 12, 17\}, \{4, 18, 26\}, \{3, 6, 21\}, \{0, 2, 26\}, \{8, 17, 19\}, \{3, 20, 23\}, \{3, 9, 26\},$  $\{3, 11, 18\}, \{1, 2, 23\}, \{5, 17, 21\}, \{6, 15, 26\}, \{0, 11, 21\}, \{10, 15, 20\},$  $\{13, 17, 25\}, \{9, 14, 20\}, \{12, 18, 24\}, \{9, 17, 23\}, \{15, 18, 25\}, \{8, 9, 15\},$  $\{1, 20, 22\}, \{6, 16, 22\}, \{11, 22, 25\}, \{13, 15, 19\}, \{4, 19, 22\}, \{3, 13, 22\},$  $\{9, 21, 22\}, \{2, 16, 19\}, \{3, 10, 25\}, \{7, 20, 24\}, \{1, 16, 18\}, \{7, 15, 23\},$  $\{11, 23, 26\}, \{0, 15, 16\}$ intersection 22:  $\{0, 1, 2\}, \{1, 8, 10\}, \{3, 12, 13\}, \{3, 6, 9\}, \{2, 3, 7\}, \{4, 9, 11\}, \{4, 5, 14\},$  $\{7, 11, 14\}, \{4, 10, 12\}, \{0, 7, 8\}, \{2, 5, 11\}, \{5, 7, 10\}, \{0, 9, 10\}, \{6, 8, 13\}, \{6, 8, 13\}, \{6, 8, 13\}, \{6, 8, 13\}, \{6, 8, 13\}, \{6, 8, 13\}, \{6, 8, 13\}, \{6, 8, 13\}, \{6, 8, 13\}, \{6, 8, 13\}, \{7, 11, 14\}, \{1, 10, 12\}, \{1, 1$  $\{5, 8, 12\}, \{0, 11, 12\}, \{3, 10, 14\}, \{8, 9, 14\}, \{0, 13, 14\}, \{1, 11, 13\}, \{6, 7, 12\}, \{1, 11, 13\}, \{1, 11$  $\{1, 3, 5\}$ 

 $\{3, 8, 18\}, \{5, 6, 25\}, \{1, 4, 18\}, \{10, 13, 24\}, \{0, 6, 15\}, \{1, 20, 21\}, \{3, 4, 19\}, \{0, 21, 24\}, \{16, 18, 25\}, \{1, 12, 22\}, \{9, 18, 26\}, \{2, 15, 25\}, \{3, 20, 24\},$ 

 $\{2, 23, 26\}, \{2, 14, 19\}, \{5, 18, 23\}, \{7, 16, 26\}, \{1, 7, 23\}, \{5, 9, 21\}, \{10, 11, 19\},$  $\{15, 19, 21\}, \{7, 17, 21\}, \{4, 20, 26\}, \{2, 6, 21\}, \{10, 20, 23\}, \{3, 17, 23\},$  $\{0, 4, 16\}, \{19, 24, 25\}, \{2, 4, 24\}, \{11, 15, 23\}, \{8, 11, 25\}, \{2, 12, 20\}, \{2, 12, 20\}, \{2, 12, 20\}, \{2, 12, 20\}, \{2, 12, 20\}, \{3,$  $\{10, 21, 25\}, \{5, 15, 20\}, \{12, 19, 26\}, \{1, 9, 16\}, \{6, 14, 26\}, \{8, 16, 23\},$  $\{14, 18, 21\}, \{7, 9, 19\}, \{8, 17, 24\}, \{9, 20, 25\}, \{2, 9, 17\}, \{13, 25, 26\},$  $\{12, 14, 23\}, \{8, 15, 26\}, \{2, 13, 18\}, \{1, 17, 26\}, \{0, 19, 23\}, \{14, 22, 24\},$  $\{5, 16, 24\}, \{4, 7, 15\}, \{10, 22, 26\}, \{12, 17, 25\}, \{13, 16, 22\}, \{0, 20, 22\}, \{13, 16, 2$  $\{6, 16, 20\}, \{9, 12, 24\}, \{4, 8, 21\}, \{11, 21, 22\}, \{11, 18, 20\}, \{12, 16, 21\},$  $\{0, 3, 25\}, \{1, 14, 25\}, \{7, 18, 24\}, \{12, 15, 18\}, \{1, 6, 19\}, \{4, 13, 17\},$  $\{10, 15, 17\}, \{3, 15, 22\}, \{9, 13, 15\}, \{7, 13, 20\}, \{5, 13, 19\}, \{2, 10, 16\},$  $\{4, 6, 22\}, \{4, 23, 25\}, \{3, 21, 26\}, \{5, 17, 22\}, \{13, 21, 23\}, \{0, 17, 18\},$  $\{6, 23, 24\}, \{1, 15, 24\}, \{7, 22, 25\}, \{0, 5, 26\}, \{3, 11, 16\}, \{18, 19, 22\},\$  $\{11, 24, 26\}, \{9, 22, 23\}, \{6, 11, 17\}$ intersection 21:  $\{0, 1, 2\}, \{1, 12, 14\}, \{4, 7, 13\}, \{8, 9, 14\}, \{1, 8, 10\}, \{3, 6, 9\}, \{0, 5, 6\},$  $\{1, 11, 13\}, \{4, 10, 12\}, \{0, 7, 8\}, \{2, 5, 11\}, \{7, 11, 14\}, \{0, 9, 10\}, \{2, 6, 14\},$  $\{1,7,9\}, \{0,11,12\}, \{2,9,12\}, \{5,9,13\}, \{0,13,14\}, \{3,12,13\}, \{6,7,12\}$  $\{6, 10, 24\}, \{9, 11, 20\}, \{3, 14, 25\}, \{8, 22, 23\}, \{2, 20, 24\}, \{7, 10, 19\},$  $\{8, 11, 16\}, \{9, 15, 21\}, \{11, 19, 24\}, \{2, 15, 23\}, \{2, 10, 25\}, \{4, 14, 22\},$  $\{8, 21, 25\}, \{14, 16, 24\}, \{0, 3, 20\}, \{18, 21, 24\}, \{1, 16, 26\}, \{10, 16, 17\},$  $\{13, 22, 26\}, \{3, 15, 24\}, \{11, 15, 22\}, \{5, 10, 14\}, \{1, 21, 23\}, \{12, 18, 22\}, \{13, 22, 26\}, \{12, 18, 22\}, \{13, 22, 26\}, \{13, 22, 26\}, \{23, 22\}, \{23$  $\{0, 19, 21\}, \{1, 4, 15\}, \{8, 12, 19\}, \{4, 11, 25\}, \{6, 8, 26\}, \{12, 16, 21\}, \{6, 17, 18\},$  $\{1, 17, 24\}, \{8, 13, 24\}, \{12, 24, 25\}, \{10, 21, 26\}, \{10, 11, 18\}, \{9, 23, 25\},$  $\{0, 17, 26\}, \{16, 19, 25\}, \{9, 22, 24\}, \{3, 7, 17\}, \{3, 11, 26\}, \{13, 18, 19\},$  $\{4, 23, 26\}, \{5, 12, 26\}, \{4, 5, 18\}, \{14, 15, 18\}, \{5, 7, 21\}, \{2, 3, 16\}, \{4, 9, 17\}, \{4, 17\}, \{4,$  $\{1, 5, 25\}, \{2, 13, 21\}, \{12, 20, 23\}, \{10, 20, 22\}, \{6, 11, 21\}, \{1, 19, 20\},$  $\{0, 4, 24\}, \{7, 15, 20\}, \{14, 19, 23\}, \{13, 16, 20\}, \{3, 21, 22\}, \{6, 15, 19\},$  $\{4, 6, 16\}, \{17, 19, 22\}, \{2, 4, 19\}, \{10, 13, 15\}, \{13, 17, 25\}, \{1, 6, 22\},$  $\{5, 17, 20\}, \{2, 7, 22\}, \{4, 20, 21\}, \{3, 10, 23\}, \{0, 18, 23\}, \{7, 24, 26\}, \{5, 23, 24\}, \{5, 24, 24\}, \{5,$  $\{11, 17, 23\}, \{8, 18, 20\}, \{2, 8, 17\}, \{7, 18, 25\}, \{3, 4, 8\}, \{9, 19, 26\}, \{3, 5, 19\},$  $\{0, 15, 16\}, \{6, 20, 25\}, \{7, 16, 23\}, \{6, 13, 23\}, \{9, 16, 18\}, \{12, 15, 17\},$  $\{1, 3, 18\}, \{2, 18, 26\}, \{14, 17, 21\}, \{5, 16, 22\}, \{0, 22, 25\}, \{5, 8, 15\},$  $\{15, 25, 26\}, \{14, 20, 26\}$ intersection 20:  $\{1,7,9\}, \{1,12,14\}, \{8,9,14\}, \{3,12,13\}, \{2,3,7\}, \{4,9,11\}, \{3,10,14\},$  $\{2,4,8\}, \{6,7,12\}, \{0,7,8\}, \{2,5,11\}, \{6,10,11\}, \{0,9,10\}, \{2,6,14\},$  $\{5, 8, 12\}, \{0, 11, 12\}, \{1, 8, 10\}, \{3, 8, 11\}, \{1, 11, 13\}, \{1, 3, 5\}$  $\{8, 22, 23\}, \{4, 12, 19\}, \{10, 23, 26\}, \{5, 16, 21\}, \{7, 13, 26\}, \{12, 15, 16\},$  $\{2, 19, 23\}, \{2, 13, 24\}, \{7, 14, 21\}, \{2, 9, 15\}, \{1, 23, 25\}, \{4, 10, 20\}, \{0, 15, 20\}, \{2, 19, 23\}, \{2, 13, 24\}, \{3, 14, 21\}, \{2, 9, 15\}, \{1, 23, 25\}, \{4, 10, 20\}, \{1, 23, 25\}, \{2, 13, 24\}, \{2, 13, 24\}, \{2, 13, 24\}, \{2, 13, 24\}, \{2, 13, 24\}, \{2, 13, 24\}, \{3, 14, 21\}, \{2, 13, 24\}, \{4, 10, 20\}, \{4, 1$  $\{5, 9, 23\}, \{13, 17, 21\}, \{9, 22, 26\}, \{0, 5, 17\}, \{2, 22, 25\}, \{10, 15, 17\},$  $\{7, 10, 22\}, \{4, 17, 23\}, \{6, 20, 22\}, \{0, 19, 24\}, \{13, 15, 22\}, \{7, 15, 24\},$  $\{5, 18, 24\}, \{11, 22, 24\}, \{3, 17, 18\}, \{14, 20, 24\}, \{9, 18, 25\}, \{8, 19, 20\},$  $\{14, 17, 22\}, \{3, 19, 22\}, \{5, 7, 20\}, \{6, 8, 25\}, \{0, 4, 13\}, \{9, 13, 19\}, \{1, 17, 19\}, \{1, 1$ 

 $\{12, 24, 25\}, \{7, 16, 23\}, \{0, 18, 22\}, \{12, 21, 22\}, \{4, 5, 22\}, \{10, 16, 24\},$  $\{7, 11, 17\}, \{4, 7, 18\}, \{2, 10, 12\}, \{2, 17, 20\}, \{1, 2, 18\}, \{11, 18, 20\}, \{8, 18, 26\},$  $\{0, 25, 26\}, \{8, 13, 16\}, \{1, 20, 21\}, \{6, 19, 21\}, \{4, 14, 25\}, \{0, 3, 16\}, \{1, 20, 21\}, \{2, 19, 21\}, \{4, 14, 25\}, \{2, 3, 16\}, \{3, 10\}, \{3, 10\}, \{4, 14, 25\},$  $\{11, 21, 25\}, \{0, 2, 21\}, \{1, 15, 26\}, \{2, 16, 26\}, \{16, 18, 19\}, \{9, 12, 17\},$  $\{3, 6, 23\}, \{1, 4, 24\}, \{16, 17, 25\}, \{11, 19, 26\}, \{11, 14, 16\}, \{13, 14, 18\},$  $\{3, 9, 21\}, \{6, 17, 26\}, \{6, 9, 24\}, \{5, 6, 13\}, \{14, 15, 19\}, \{21, 23, 24\}, \{7, 19, 25\},$  $\{10, 18, 21\}, \{9, 16, 20\}, \{3, 24, 26\}, \{13, 20, 23\}, \{6, 15, 18\}, \{8, 15, 21\},$  $\{0, 14, 23\}, \{3, 20, 25\}, \{12, 18, 23\}, \{8, 17, 24\}, \{1, 16, 22\}, \{11, 15, 23\},$  $\{3, 4, 15\}, \{12, 20, 26\}, \{5, 15, 25\}, \{10, 13, 25\}, \{5, 14, 26\}, \{5, 10, 19\},$  $\{4, 21, 26\}, \{4, 6, 16\}, \{0, 1, 6\}$ intersection 19:  $\{7, 11, 14\}, \{1, 12, 14\}, \{4, 7, 13\}, \{0, 3, 4\}, \{1, 3, 5\}, \{3, 8, 11\}, \{0, 5, 6\},$  $\{2,4,8\}, \{6,10,11\}, \{0,7,8\}, \{2,5,11\}, \{5,7,10\}, \{1,4,6\}, \{3,10,14\},$  $\{5, 8, 12\}, \{1, 8, 10\}, \{2, 9, 12\}, \{2, 10, 13\}, \{0, 13, 14\}$  $\{5, 20, 23\}, \{7, 19, 23\}, \{5, 9, 25\}, \{3, 22, 23\}, \{15, 22, 26\}, \{11, 23, 26\},$  $\{0, 2, 18\}, \{8, 17, 19\}, \{3, 24, 26\}, \{19, 21, 24\}, \{2, 6, 23\}, \{2, 16, 24\}, \{4, 11, 25\},$  $\{2, 17, 20\}, \{4, 14, 26\}, \{1, 9, 22\}, \{7, 9, 15\}, \{8, 13, 23\}, \{10, 19, 25\}, \{2, 7, 21\}, \{2, 7, 21\}, \{2, 7, 21\}, \{2, 7, 21\}, \{2, 7, 21\}, \{3, 13, 23\}, \{1, 13, 23\}, \{2, 13, 23\}, \{2, 13, 23\}, \{2, 13, 23\}, \{2, 13, 23\}, \{3, 13, 2$  $\{13, 18, 25\}, \{6, 15, 21\}, \{14, 18, 19\}, \{10, 12, 17\}, \{8, 22, 25\}, \{10, 22, 24\},$  $\{3, 12, 15\}, \{6, 13, 22\}, \{1, 11, 21\}, \{7, 20, 24\}, \{10, 20, 26\}, \{0, 15, 19\},$  $\{5, 18, 24\}, \{23, 24, 25\}, \{9, 13, 20\}, \{17, 21, 25\}, \{0, 16, 22\}, \{16, 21, 26\},$  $\{9, 10, 21\}, \{4, 5, 15\}, \{11, 12, 20\}, \{5, 13, 21\}, \{2, 3, 25\}, \{5, 19, 26\}, \{1, 16, 18\},$  $\{4, 10, 16\}, \{10, 15, 18\}, \{6, 8, 16\}, \{0, 9, 11\}, \{7, 12, 16\}, \{8, 18, 20\}, \{3, 9, 17\}, \{4, 10, 16\}, \{10, 15, 18\}, \{10, 15, 18\}, \{10, 15, 18\}, \{10, 16\},$  $\{13, 15, 16\}, \{8, 9, 26\}, \{15, 20, 25\}, \{11, 16, 19\}, \{8, 15, 24\}, \{4, 21, 23\},$  $\{14, 16, 25\}, \{0, 12, 25\}, \{6, 12, 19\}, \{6, 17, 24\}, \{1, 7, 25\}, \{3, 16, 20\}, \{1, 1, 25\}, \{2, 16, 20\}, \{2, 16, 20\}, \{3, 16, 20\}, \{3, 16, 20\}, \{3, 16, 20\}, \{3, 16, 20\}, \{3, 16, 20\}, \{3, 16, 20\}, \{4, 16, 25\}, \{4, 16, 20\}, \{4,$  $\{0, 17, 26\}, \{1, 15, 23\}, \{9, 16, 23\}, \{2, 14, 15\}, \{3, 6, 7\}, \{12, 18, 23\}, \{4, 17, 18\}, \{12, 18, 23\}, \{4, 17, 18\}, \{12, 18, 23\}, \{4, 17, 18\}, \{12, 18, 23\}, \{13, 23\}, \{13, 23\}, \{2, 23\}, \{2, 23\}, \{2, 23\}, \{3, 23\}, \{3, 23\}, \{4,$  $\{1, 2, 26\}, \{6, 25, 26\}, \{2, 19, 22\}, \{0, 1, 24\}, \{6, 14, 20\}, \{0, 20, 21\}, \{9, 14, 24\}, \{1, 2, 26\}, \{2, 26\}, \{2, 19, 22$  $\{4, 12, 24\}, \{12, 13, 26\}, \{1, 19, 20\}, \{4, 20, 22\}, \{1, 13, 17\}, \{3, 18, 21\},$  $\{4, 9, 19\}, \{5, 14, 22\}, \{12, 21, 22\}, \{6, 9, 18\}, \{7, 17, 22\}, \{11, 18, 22\},$  $\{11, 13, 24\}, \{0, 10, 23\}, \{11, 15, 17\}, \{7, 18, 26\}, \{5, 16, 17\}, \{3, 13, 19\},$  $\{8, 14, 21\}, \{14, 17, 23\}$ intersection 18:  $\{0, 1, 2\}, \{1, 12, 14\}, \{1, 4, 6\}, \{0, 3, 4\}, \{8, 9, 14\}, \{4, 9, 11\}, \{0, 5, 6\}, \{3, 8, 11\},$  $\{4, 10, 12\}, \{0, 7, 8\}, \{2, 5, 11\}, \{5, 7, 10\}, \{1, 8, 10\}, \{2, 6, 14\}, \{7, 11, 14\},$  $\{6, 7, 12\}, \{2, 9, 12\}, \{0, 13, 14\}$  $\{2, 8, 19\}, \{1, 13, 15\}, \{3, 10, 13\}, \{0, 15, 16\}, \{5, 15, 22\}, \{3, 12, 17\}, \{4, 13, 26\}, \{5, 15, 22\}, \{5, 12, 17\}, \{4, 13, 26\}, \{1, 13, 16\}, \{1, 13, 16\}, \{2, 13, 16\}, \{2, 13, 16\}, \{3, 10, 13\}, \{2, 13, 16\}, \{3, 10, 13\}, \{3, 10, 13\}, \{4, 13, 26\}, \{4,$  $\{10, 22, 23\}, \{7, 15, 19\}, \{5, 12, 18\}, \{20, 21, 24\}, \{1, 5, 24\}, \{4, 16, 19\},$  $\{0, 22, 24\}, \{12, 21, 26\}, \{11, 15, 21\}, \{1, 11, 25\}, \{5, 17, 20\}, \{14, 19, 25\},$  $\{5, 14, 16\}, \{14, 15, 24\}, \{10, 11, 16\}, \{0, 20, 23\}, \{4, 14, 23\}, \{13, 17, 25\},$  $\{2, 20, 25\}, \{1, 23, 26\}, \{2, 3, 21\}, \{9, 22, 25\}, \{5, 19, 26\}, \{6, 9, 15\}, \{12, 16, 20\}, \{12, 16, 20\}, \{12, 16, 20\}, \{13, 2$  $\{11, 23, 24\}, \{0, 17, 19\}, \{3, 5, 25\}, \{2, 7, 23\}, \{5, 8, 13\}, \{1, 3, 22\}, \{1, 9, 17\},$  $\{9, 16, 26\}, \{4, 15, 20\}, \{4, 8, 25\}, \{14, 18, 21\}, \{17, 18, 24\}, \{21, 23, 25\},$  $\{2, 16, 17\}, \{8, 17, 26\}, \{8, 18, 23\}, \{0, 9, 21\}, \{15, 17, 23\}, \{3, 7, 9\}, \{1, 18, 20\}, \{2, 16, 17\}, \{3, 7, 9\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{2, 16, 17\}, \{2, 16, 17\}, \{2, 16, 17\}, \{2, 16, 17\}, \{2, 16, 17\}, \{3, 17, 20\}, \{1, 18, 20\}, \{1, 18, 20\}, \{2, 16, 17\}, \{3, 17, 20\}, \{1, 18,$  $\{3, 15, 18\}, \{8, 21, 22\}, \{6, 11, 17\}, \{6, 13, 23\}, \{12, 13, 24\}, \{4, 17, 22\}, \{6, 13, 24\}, \{4, 17, 22\}, \{12, 13, 24\}, \{12, 13, 24\}, \{13, 24\}, \{13, 24\}, \{13, 24\}, \{13, 24\}, \{23, 24\}, \{$  $\{7, 13, 18\}, \{8, 12, 15\}, \{14, 22, 26\}, \{9, 10, 18\}, \{6, 10, 21\}, \{2, 10, 24\}, \{2, 10, 24\}, \{2, 10, 24\}, \{3, 10, 10\}, \{4$ 

 $\{16, 18, 25\}, \{11, 20, 26\}, \{6, 24, 25\}, \{12, 19, 23\}, \{1, 7, 16\}, \{6, 16, 22\}, \{12, 19, 23\}, \{1, 7, 16\}, \{1, 10, 20\}, \{$  $\{4, 7, 24\}, \{8, 16, 24\}, \{0, 11, 18\}, \{5, 9, 23\}, \{3, 16, 23\}, \{1, 19, 21\}, \{10, 15, 25\},$  $\{4, 5, 21\}, \{3, 6, 19\}, \{11, 13, 19\}, \{10, 19, 20\}, \{2, 4, 18\}, \{2, 15, 26\}, \{7, 17, 21\},$  $\{6, 8, 20\}, \{18, 19, 22\}, \{7, 25, 26\}, \{3, 14, 20\}, \{11, 12, 22\}, \{0, 12, 25\},$  $\{9, 13, 20\}, \{10, 14, 17\}, \{6, 18, 26\}, \{0, 10, 26\}, \{7, 20, 22\}, \{2, 13, 22\}, \{2, 13, 22\}, \{2, 13, 22\}, \{3, 13, 20\}, \{1, 10, 14, 17\}, \{2, 13, 20\}, \{2, 13, 20\}, \{2, 13, 20\}, \{3, 10, 10, 10\}, \{4, 10, 10\}, \{4,$  $\{13, 16, 21\}, \{3, 24, 26\}, \{9, 19, 24\}$ intersection 17:  $\{1, 8, 10\}, \{1, 12, 14\}, \{3, 10, 14\}, \{1, 7, 9\}, \{2, 3, 7\}, \{1, 11, 13\}, \{0, 5, 6\},$  $\{4, 5, 14\}, \{4, 10, 12\}, \{0, 7, 8\}, \{2, 5, 11\}, \{5, 7, 10\}, \{1, 3, 5\}, \{2, 6, 14\},$  $\{3, 8, 11\}, \{8, 9, 14\}, \{2, 9, 12\}$  $\{5, 12, 21\}, \{10, 15, 18\}, \{2, 24, 26\}, \{8, 12, 16\}, \{6, 13, 16\}, \{6, 7, 22\},$  $\{9, 11, 26\}, \{12, 17, 22\}, \{2, 19, 20\}, \{15, 22, 23\}, \{2, 4, 22\}, \{0, 4, 11\},$  $\{0, 14, 15\}, \{14, 18, 23\}, \{16, 22, 25\}, \{4, 7, 17\}, \{5, 9, 16\}, \{14, 20, 22\}, \{14,$  $\{17, 24, 25\}, \{10, 23, 26\}, \{3, 13, 18\}, \{0, 1, 20\}, \{6, 9, 10\}, \{10, 22, 24\},$  $\{7, 11, 15\}, \{12, 15, 19\}, \{7, 16, 26\}, \{4, 16, 23\}, \{6, 8, 17\}, \{4, 9, 24\}, \{1, 19, 23\}, \{4, 9, 24\}, \{1, 19, 23\}, \{4, 9, 24\}, \{1, 19, 23\}, \{1, 19, 23\}, \{1, 19, 23\}, \{1, 19, 23\}, \{2, 10, 10\}, \{2, 10, 10\}, \{2, 10, 10\}, \{2, 10, 10\}, \{2, 10, 10\}, \{3, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4, 10, 10\}, \{4,$  $\{10, 20, 25\}, \{5, 18, 22\}, \{6, 15, 21\}, \{8, 18, 25\}, \{11, 12, 25\}, \{0, 3, 25\},$  $\{9, 18, 21\}, \{2, 8, 15\}, \{8, 19, 24\}, \{1, 6, 24\}, \{10, 13, 19\}, \{3, 17, 23\},$  $\{11, 19, 22\}, \{4, 6, 25\}, \{12, 13, 24\}, \{2, 10, 21\}, \{11, 21, 23\}, \{0, 2, 16\},$  $\{1, 17, 21\}, \{8, 20, 21\}, \{4, 18, 20\}, \{5, 25, 26\}, \{5, 8, 23\}, \{0, 18, 24\}, \{9, 13, 17\},$  $\{5, 13, 20\}, \{3, 21, 24\}, \{1, 4, 15\}, \{15, 17, 26\}, \{1, 16, 18\}, \{11, 17, 20\},$  $\{5, 15, 24\}, \{1, 22, 26\}, \{16, 19, 21\}, \{13, 15, 25\}, \{2, 17, 18\}, \{5, 17, 19\}, \{$  $\{9, 15, 20\}, \{16, 20, 24\}, \{10, 11, 16\}, \{6, 19, 26\}, \{7, 13, 14\}, \{7, 23, 24\},$  $\{14, 16, 17\}, \{14, 21, 26\}, \{9, 23, 25\}, \{0, 9, 19\}, \{14, 19, 25\}, \{3, 6, 12\}, \{14, 19, 25\}, \{3, 6, 12\}, \{14, 19, 25\}, \{2, 6, 12\}, \{3, 12\}, \{3, 12\}, \{3, 12\}, \{3, 12\}, \{3, 12\}, \{3, 12\},$  $\{4, 13, 21\}, \{0, 13, 26\}, \{8, 13, 22\}, \{4, 8, 26\}, \{0, 10, 17\}, \{3, 4, 19\}, \{1, 2, 25\}, \{1, 2, 25\}, \{1, 2, 25\}, \{1, 2, 25\}, \{2, 3, 2, 2\}, \{3, 4, 2, 2\}, \{4, 3, 26\}, \{4, 3, 2$  $\{0, 12, 23\}, \{3, 9, 22\}, \{2, 13, 23\}, \{3, 15, 16\}, \{7, 21, 25\}, \{6, 11, 18\}, \{3, 20, 26\}, \{6, 12, 12\}, \{1, 12\}, \{2, 13, 23\}, \{2, 13, 23\}, \{3, 15, 16\}, \{2, 12, 25\}, \{2, 13, 23\}, \{3, 15, 16\}, \{3, 20, 26\}, \{3, 20, 26\}, \{3, 20, 26\}, \{3, 20, 26\}, \{4, 20,$  $\{11, 14, 24\}, \{0, 21, 22\}, \{12, 18, 26\}, \{6, 20, 23\}, \{7, 18, 19\}, \{7, 12, 20\}$ intersection 16:  $\{4, 5, 14\}, \{3, 10, 14\}, \{4, 7, 13\}, \{0, 3, 4\}, \{2, 3, 7\}, \{3, 8, 11\}, \{0, 5, 6\},$  $\{7, 11, 14\}, \{6, 8, 13\}, \{1, 3, 5\}, \{2, 5, 11\}, \{3, 6, 9\}, \{0, 9, 10\}, \{0, 13, 14\},$  $\{2, 10, 13\}, \{1, 11, 13\}$  $\{0, 2, 20\}, \{13, 17, 21\}, \{7, 9, 23\}, \{5, 8, 21\}, \{11, 20, 21\}, \{10, 18, 21\},$  $\{3, 12, 20\}, \{7, 8, 18\}, \{7, 20, 25\}, \{11, 18, 25\}, \{2, 12, 17\}, \{18, 23, 26\},$  $\{9, 19, 20\}, \{4, 9, 12\}, \{8, 16, 26\}, \{8, 24, 25\}, \{14, 22, 25\}, \{20, 23, 24\},$  $\{8, 9, 17\}, \{13, 18, 19\}, \{4, 20, 26\}, \{13, 16, 22\}, \{10, 15, 25\}, \{1, 6, 24\},$  $\{0, 17, 19\}, \{0, 15, 24\}, \{9, 13, 24\}, \{12, 13, 23\}, \{4, 18, 24\}, \{5, 13, 25\},$  $\{9, 11, 15\}, \{0, 21, 25\}, \{2, 8, 19\}, \{6, 19, 26\}, \{3, 18, 22\}, \{6, 20, 22\}, \{6,$  $\{12, 14, 24\}, \{1, 4, 21\}, \{3, 16, 17\}, \{7, 10, 19\}, \{10, 16, 20\}, \{8, 10, 12\},$  $\{1, 14, 19\}, \{2, 16, 24\}, \{1, 10, 22\}, \{6, 7, 21\}, \{3, 13, 26\}, \{5, 15, 18\}, \{6, 16, 18\},$  $\{5, 7, 12\}, \{3, 15, 23\}, \{3, 19, 25\}, \{2, 4, 22\}, \{5, 10, 23\}, \{0, 7, 22\}, \{12, 25, 26\}, \{12, 25, 26\}, \{12, 25, 26\}, \{13, 23\}, \{2, 4, 22\}, \{2, 4, 22\}, \{3, 10, 23\}, \{2, 4, 22\}, \{3, 10, 23\}, \{3, 10, 23\}, \{3, 10, 25\}, \{3, 10, 23\}, \{3, 10, 23\}, \{4, 22\}, \{5, 10, 23\}, \{4, 22\},$  $\{5, 9, 16\}, \{2, 9, 18\}, \{1, 7, 17\}, \{6, 11, 12\}, \{8, 14, 20\}, \{2, 21, 26\}, \{4, 11, 17\},$  $\{5, 19, 24\}, \{14, 17, 18\}, \{10, 17, 26\}, \{12, 15, 21\}, \{7, 15, 16\}, \{6, 15, 17\}, \{7, 15, 16\}, \{6, 15, 17\}, \{7, 16\}, \{1, 17, 18\}, \{1,$  $\{2, 14, 15\}, \{5, 22, 26\}, \{8, 15, 22\}, \{4, 6, 10\}, \{12, 19, 22\}, \{9, 21, 22\}, \{9,$  $\{17, 22, 24\}, \{1, 15, 26\}, \{7, 24, 26\}, \{0, 16, 23\}, \{4, 15, 19\}, \{10, 11, 24\},$  $\{1, 9, 25\}, \{19, 21, 23\}, \{4, 16, 25\}, \{2, 6, 25\}, \{14, 16, 21\}, \{1, 2, 23\}, \{0, 12, 18\}, \{1, 2, 23\}, \{1, 2, 23\}, \{2,$   $\begin{array}{l} \{1, 12, 16\}, \ \{9, 14, 26\}, \ \{4, 8, 23\}, \ \{6, 14, 23\}, \ \{0, 11, 26\}, \ \{11, 22, 23\}, \ \{1, 18, 20\}, \\ \{0, 1, 8\}, \ \{13, 15, 20\}, \ \{11, 16, 19\}, \ \{3, 21, 24\}, \ \{5, 17, 20\}, \ \{17, 23, 25\} \\ \text{intersection 15:} \\ \{0, 1, 2\}, \ \{1, 12, 14\}, \ \{2, 10, 13\}, \ \{3, 6, 9\}, \ \{1, 11, 13\}, \ \{4, 9, 11\}, \ \{3, 10, 14\}, \\ \{0, 11, 12\}, \ \{4, 10, 12\}, \ \{7, 11, 14\}, \ \{6, 7, 12\}, \ \{2, 9, 12\}, \ \{8, 9, 14\}, \ \{5, 9, 13\}, \\ \{5, 8, 12\} \end{array}$ 

 $\{9, 17, 24\}, \{3, 16, 22\}, \{9, 18, 20\}, \{12, 21, 23\}, \{2, 6, 16\}, \{11, 19, 26\},$  $\{15, 17, 22\}, \{0, 3, 7\}, \{11, 18, 23\}, \{2, 14, 24\}, \{13, 17, 21\}, \{7, 10, 19\},$  $\{16, 19, 21\}, \{2, 3, 15\}, \{9, 21, 26\}, \{2, 11, 22\}, \{23, 24, 26\}, \{2, 18, 26\},$  $\{2, 4, 19\}, \{1, 20, 22\}, \{0, 18, 21\}, \{2, 17, 25\}, \{16, 20, 23\}, \{3, 8, 13\}, \{1, 4, 23\}, \{2, 4, 19\}, \{1, 20, 21\}, \{2, 17, 25\}, \{1, 20, 23\}, \{2, 17, 25\}, \{2, 17, 25\}, \{2, 17, 25\}, \{2, 17, 25\}, \{2, 17, 25\}, \{3, 1, 2, 2, 2\}, \{1, 2, 2, 2\}, \{2, 17, 25\}, \{2, 17, 25\}, \{2, 17, 25\}, \{2, 17, 25\}, \{3, 2, 2, 2\}, \{2, 17, 25\}, \{3, 2, 2, 2\}, \{1, 2, 2, 2\}, \{2, 2, 2, 2\}, \{3, 2, 2, 2\}, \{1, 2, 2, 2\}, \{2, 2, 2, 2\}, \{2, 2, 2, 2\}, \{3, 2, 2, 2\}, \{2, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 2, 2, 2\}, \{3, 3, 2\}, \{3, 3, 3\}, \{3, 3, 3\}, \{3, 3, 3\}, \{3, 3, 3, 3\}, \{3, 3, 3, 3\}, \{3, 3, 3, 3\}, \{3, 3, 3, 3\}, \{3, 3, 3, 3\}, \{3, 3, 3, 3\}, \{3, 3, 3, 3\}, \{3, 3, 3, 3\}, \{3, 3, 3, 3\}, \{3, 3, 3, 3\}, \{3, 3, 3, 3\},$  $\{3, 4, 20\}, \{6, 8, 22\}, \{12, 13, 25\}, \{3, 12, 19\}, \{3, 18, 25\}, \{8, 11, 21\},$  $\{12, 18, 22\}, \{14, 17, 18\}, \{1, 19, 24\}, \{15, 18, 19\}, \{5, 25, 26\}, \{2, 5, 23\},$  $\{7, 21, 25\}, \{0, 4, 17\}, \{2, 7, 8\}, \{6, 14, 19\}, \{0, 8, 26\}, \{8, 19, 25\}, \{12, 20, 24\}, \{12, 20, 24\}, \{12, 20, 24\}, \{13, 20, 2$  $\{14, 15, 26\}, \{4, 8, 18\}, \{7, 13, 24\}, \{0, 14, 20\}, \{4, 6, 26\}, \{1, 9, 25\}, \{9, 10, 22\}, \{1, 9, 25\}, \{1, 9, 25\}, \{2, 10, 22\}, \{2, 10, 22\}, \{3, 10, 22\}, \{4, 10,$  $\{13, 14, 23\}, \{6, 13, 18\}, \{7, 9, 16\}, \{4, 7, 22\}, \{3, 11, 24\}, \{5, 11, 15\}, \{4, 13, 15\},$  $\{9, 19, 23\}, \{4, 5, 16\}, \{7, 20, 26\}, \{15, 20, 25\}, \{13, 19, 20\}, \{1, 3, 26\},$  $\{0, 10, 25\}, \{0, 9, 15\}, \{11, 16, 17\}, \{1, 16, 18\}, \{1, 7, 17\}, \{7, 15, 23\}, \{1, 5, 10\}, \{1, 10, 10\}, \{1, 1$  $\{10, 15, 21\}, \{2, 20, 21\}, \{10, 16, 26\}, \{1, 6, 21\}, \{14, 16, 25\}, \{5, 7, 18\},$  $\{6, 15, 24\}, \{22, 23, 25\}, \{10, 11, 20\}, \{12, 17, 26\}, \{0, 5, 24\}, \{0, 13, 16\},$  $\{6, 11, 25\}, \{6, 10, 17\}, \{0, 6, 23\}, \{10, 18, 24\}, \{5, 14, 22\}, \{21, 22, 24\}, \{22, 24\}, \{23, 22, 24\}, \{23,$  $\{3, 5, 21\}, \{8, 17, 20\}, \{1, 8, 15\}, \{5, 6, 20\}, \{12, 15, 16\}, \{3, 17, 23\}, \{4, 14, 21\},$  $\{5, 17, 19\}, \{8, 16, 24\}, \{4, 24, 25\}, \{8, 10, 23\}, \{0, 19, 22\}, \{13, 22, 26\}$ intersection 14:  $\{1, 7, 9\}, \{1, 12, 14\}, \{4, 7, 13\}, \{1, 3, 5\}, \{5, 8, 12\}, \{7, 11, 14\}, \{6, 8, 13\}, \{1, 3, 5\}, \{5, 8, 12\}, \{7, 11, 14\}, \{6, 8, 13\}, \{1, 3, 5\}, \{1, 3, 5\}, \{2, 3, 12\}, \{3, 12\}, \{4, 7, 13\}, \{1, 3, 5\}, \{2, 3, 12\}, \{3, 12\}, \{4, 13\}$  $\{2,4,8\}, \{6,10,11\}, \{0,7,8\}, \{0,11,12\}, \{2,10,13\}, \{3,10,14\}, \{2,6,14\}$  $\{15, 19, 24\}, \{0, 9, 19\}, \{5, 11, 17\}, \{1, 2, 11\}, \{6, 19, 23\}, \{1, 10, 17\},$ 

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\{15, 22, 25\}, \{3, 23, 25\}, \{10, 15, 23\}, \{2, 3, 21\}, \{3, 6, 12\}, \{0, 10, 26\}, \{0, 1, 15\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10, 26\}, \{10, 10,
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    \{9, 12, 24\}, \{1, 6, 21\}, \{4, 10, 21\}, \{7, 10, 16\}, \{6, 24, 25\}, \{14, 20, 22\}, 
    \{0, 13, 23\}, \{8, 15, 20\}, \{17, 21, 23\}, \{3, 7, 19\}, \{1, 23, 24\}, \{0, 3, 22\}, \{0, 5, 24\}, \{0, 5, 24\}, \{1, 23, 24\}, \{1, 23, 24\}, \{1, 23, 24\}, \{1, 23, 24\}, \{2, 3, 22\}, \{2, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 24\}, \{3, 3, 
    \{11, 19, 25\}, \{5, 10, 20\}, \{3, 8, 18\}, \{22, 23, 26\}, \{5, 14, 25\}, \{0, 2, 16\}, \{11, 19, 25\}, \{11, 25\}, \{22, 23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}, \{23, 26\}
    \{10, 12, 19\}, \{9, 11, 13\}, \{5, 13, 18\}, \{4, 9, 14\}, \{4, 11, 24\}, \{13, 14, 26\},
    \{0, 4, 25\}, \{3, 17, 20\}, \{12, 13, 25\}, \{14, 15, 18\}, \{18, 19, 20\}, \{3, 9, 16\},
    \{8, 14, 24\}, \{4, 17, 18\}, \{10, 18, 24\}, \{1, 16, 25\}, \{21, 25, 26\}, \{3, 11, 15\},
    \{0, 14, 17\}, \{12, 16, 26\}, \{2, 17, 25\}, \{1, 4, 19\}, \{6, 9, 17\}, \{6, 7, 18\}, \{6, 15, 16\}
intersection 13:
    \{0, 1, 2\}, \{3, 10, 14\}, \{1, 4, 6\}, \{5, 8, 12\}, \{2, 3, 7\}, \{1, 7, 9\}, \{0, 5, 6\}, \{2, 4, 8\},
```

 $\{4, 10, 12\}, \{0, 7, 8\}, \{2, 5, 11\}, \{5, 7, 10\}, \{5, 9, 13\}$ 

 $\{9, 12, 23\}, \{15, 17, 25\}, \{3, 15, 16\}, \{11, 23, 24\}, \{1, 14, 26\}, \{0, 3, 25\},$  $\{4, 7, 25\}, \{3, 5, 17\}, \{7, 13, 26\}, \{6, 10, 25\}, \{4, 13, 17\}, \{1, 3, 13\}, \{7, 15, 22\}, \{1, 3, 13\}, \{7, 15, 22\}, \{1, 3, 13\}, \{7, 15, 22\}, \{1, 3, 13\}$  $\{8, 10, 13\}, \{9, 14, 15\}, \{3, 8, 9\}, \{0, 4, 9\}, \{2, 12, 13\}, \{16, 18, 22\}, \{13, 20, 21\}, \{13, 20,$  $\{9, 19, 24\}, \{21, 23, 26\}, \{6, 21, 24\}, \{14, 19, 25\}, \{7, 16, 23\}, \{2, 6, 15\},$  $\{1, 17, 24\}, \{2, 9, 26\}, \{8, 15, 18\}, \{1, 16, 25\}, \{8, 11, 19\}, \{5, 16, 26\}, \{5, 14, 23\}, \{1, 16, 25\}, \{2, 10, 26\}, \{2, 10, 26\}, \{3, 12, 23\}, \{3, 12, 23\}, \{3, 12, 23\}, \{3, 12, 23\}, \{3, 12, 23\}, \{3, 12, 23\}, \{3, 12, 23\}, \{3, 12, 23\}, \{4,$  $\{10, 19, 22\}, \{3, 11, 26\}, \{0, 12, 24\}, \{9, 10, 20\}, \{4, 11, 15\}, \{2, 21, 25\},$  $\{9, 16, 17\}, \{9, 22, 25\}, \{12, 15, 20\}, \{6, 13, 19\}, \{7, 11, 21\}, \{18, 19, 23\},$  $\{4, 20, 26\}, \{6, 7, 18\}, \{1, 15, 19\}, \{2, 10, 16\}, \{3, 6, 20\}, \{1, 8, 23\}, \{13, 14, 16\}, \{4, 20, 26\}, \{1, 2, 20\}, \{1, 2, 20\}, \{1, 2, 20\}, \{3, 20\}, \{3, 20\}, \{4, 20\}$  $\{2, 14, 24\}, \{4, 21, 22\}, \{6, 9, 11\}, \{3, 19, 21\}, \{13, 23, 25\}, \{1, 10, 11\},$  $\{0, 14, 21\}, \{12, 17, 22\}, \{6, 8, 14\}, \{3, 4, 23\}, \{7, 20, 24\}, \{0, 20, 23\}, \{4, 16, 24\},$  $\{10, 24, 26\}, \{10, 15, 23\}, \{2, 19, 20\}, \{5, 18, 24\}, \{0, 11, 17\}, \{0, 15, 26\},$  $\{6, 17, 23\}, \{6, 22, 26\}, \{8, 17, 26\}, \{1, 5, 22\}, \{1, 18, 20\}, \{8, 16, 21\}, \{0, 10, 18\}, \{1, 12, 20\}, \{1, 12, 20\}, \{2, 10, 10, 10, 10\}, \{1, 12, 20\}, \{2, 10, 10, 10\}, \{1, 12, 20\}, \{2, 10, 10\}, \{2, 10, 10\}, \{2, 10, 10\}, \{3, 10, 10\}, \{4, 10\}, \{4, 10\},$  $\{3, 22, 24\}, \{3, 12, 18\}, \{9, 18, 21\}, \{8, 24, 25\}, \{18, 25, 26\}, \{8, 20, 22\}, \{18, 25, 26\}, \{18, 20, 22\}, \{18,$  $\{10, 17, 21\}, \{4, 5, 19\}, \{5, 15, 21\}, \{1, 12, 21\}, \{4, 14, 18\}, \{11, 12, 25\},$  $\{5, 20, 25\}, \{14, 17, 20\}$ intersection 12:  $\{0, 1, 2\}, \{3, 8, 11\}, \{3, 10, 14\}, \{0, 11, 12\}, \{2, 3, 7\}, \{1, 3, 5\}, \{1, 11, 13\},$  $\{2, 4, 8\}, \{4, 10, 12\}, \{3, 12, 13\}, \{1, 8, 10\}, \{2, 10, 13\}$  $\{4, 16, 25\}, \{13, 20, 24\}, \{1, 7, 23\}, \{13, 19, 21\}, \{2, 16, 18\}, \{0, 14, 25\}, \{13, 19, 21\}, \{2, 16, 18\}, \{1, 25\}, \{1, 25\}, \{1, 25\}, \{2,$  $\{9, 18, 26\}, \{4, 20, 22\}, \{4, 6, 9\}, \{2, 20, 26\}, \{4, 23, 24\}, \{1, 24, 26\}, \{7, 11, 20\}, \{1, 24, 26\}, \{2, 20, 26\}, \{4, 23, 24\}, \{1, 24, 26\}, \{2, 20, 26\}, \{3, 26\}, \{4, 23, 24\}, \{4, 26\}, \{4, 2$  $\{15, 16, 19\}, \{14, 21, 23\}, \{2, 5, 14\}, \{2, 12, 19\}, \{3, 18, 24\}, \{6, 18, 22\},$  $\{6, 10, 21\}, \{9, 23, 25\}, \{1, 18, 19\}, \{0, 21, 22\}, \{3, 19, 20\}, \{14, 15, 24\},$  $\{5, 6, 15\}, \{1, 15, 21\}, \{4, 11, 19\}, \{3, 17, 22\}, \{3, 15, 23\}, \{5, 16, 24\}, \{5, 19, 26\},$  $\{2, 21, 25\}, \{19, 22, 24\}, \{6, 7, 25\}, \{8, 23, 26\}, \{17, 21, 26\}, \{9, 11, 14\},$  $\{1, 16, 22\}, \{6, 14, 20\}, \{5, 7, 8\}, \{6, 11, 24\}, \{0, 3, 6\}, \{1, 6, 12\}, \{0, 9, 15\},$  $\{4, 17, 18\}, \{7, 9, 19\}, \{11, 18, 25\}, \{13, 22, 23\}, \{8, 9, 21\}, \{8, 22, 25\},\$  $\{7, 16, 17\}, \{11, 15, 26\}, \{0, 10, 24\}, \{5, 10, 23\}, \{9, 10, 22\}, \{4, 5, 13\}, \{1, 4, 14\},$  $\{3, 9, 16\}, \{4, 7, 15\}, \{8, 13, 18\}, \{0, 5, 17\}, \{12, 14, 18\}, \{3, 4, 21\}, \{10, 15, 18\}, \{3, 4, 21\}, \{10, 15, 18$  $\{2, 6, 17\}, \{5, 20, 25\}, \{9, 13, 17\}, \{5, 9, 12\}, \{6, 8, 19\}, \{6, 16, 23\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 22\}, \{18, 20, 20\}, \{18, 20, 20\}, \{18, 20, 20\}, \{18, 20, 20\}, \{18, 20, 20\}, \{18, 20, 20\}, \{18, 20, 20\}, \{18, 20,$  $\{13, 15, 25\}, \{12, 20, 21\}, \{8, 14, 16\}, \{8, 12, 15\}, \{14, 17, 19\}, \{0, 8, 20\},$  $\{1, 9, 20\}, \{7, 10, 26\}, \{10, 19, 25\}, \{0, 4, 26\}, \{5, 11, 22\}, \{1, 17, 25\}, \{0, 13, 16\},$  $\{12, 16, 26\}, \{10, 11, 17\}, \{7, 12, 22\}, \{0, 19, 23\}, \{12, 24, 25\}, \{10, 16, 20\},$  $\{15, 17, 20\}, \{2, 9, 24\}, \{12, 17, 23\}, \{7, 21, 24\}, \{11, 16, 21\}, \{6, 13, 26\},$  $\{0, 7, 18\}, \{5, 18, 21\}, \{3, 25, 26\}, \{8, 17, 24\}, \{2, 11, 23\}, \{7, 13, 14\}, \{2, 15, 22\},$  $\{14, 22, 26\}$ intersection 11:  $\{0, 1, 2\}, \{3, 6, 9\}, \{1, 11, 13\}, \{0, 3, 4\}, \{2, 3, 7\}, \{4, 9, 11\}, \{0, 5, 6\}, \{2, 4, 8\},$  $\{1, 8, 10\}, \{0, 11, 12\}, \{2, 5, 11\}$  $\{7, 15, 25\}, \{6, 10, 12\}, \{15, 19, 21\}, \{10, 16, 25\}, \{1, 14, 22\}, \{0, 14, 19\}, \{10, 16, 25\}, \{1, 14, 22\}, \{1, 14, 22\}, \{1, 14, 22\}, \{1, 14, 22\}, \{1, 14, 22\}, \{1, 14, 22\}, \{2, 14, 19\}, \{1, 14, 22\}, \{2, 14, 19\}, \{1, 14, 22\}, \{2, 14, 19\}, \{1, 14, 22\}, \{2, 14, 19\}, \{1, 14, 22\}, \{2, 14, 19\}, \{1, 14, 22\}, \{2, 14, 19\}, \{1, 14, 22\}, \{2, 14, 19\}, \{1, 14, 22\}, \{2, 14, 19\}, \{1, 14, 22\}, \{2, 14, 19\}, \{1, 14, 22\}, \{2, 14, 19\}, \{1, 14, 19\},$ 

 $\{5,9,16\}, \{3,10,26\}, \{15,18,24\}, \{11,15,26\}, \{3,11,19\}, \{7,8,12\}, \{6,8,17\}, \{7,10,14\}, \{1,18,25\}, \{1,7,21\}, \{0,22,24\}, \{9,17,23\}, \{18,19,22\}, \{11,12,12\}, \{11,12$ 

 $\{7, 19, 24\}, \{16, 17, 22\}, \{11, 20, 24\}, \{2, 22, 26\}, \{5, 10, 15\}, \{9, 13, 21\},$  $\{4, 10, 22\}, \{14, 16, 23\}, \{1, 4, 5\}, \{8, 20, 26\}, \{14, 17, 26\}, \{7, 16, 26\},$  $\{8, 24, 25\}, \{3, 5, 25\}, \{5, 7, 18\}, \{21, 22, 23\}, \{16, 19, 20\}, \{6, 13, 19\},$  $\{3, 17, 21\}, \{9, 18, 26\}, \{1, 6, 15\}, \{5, 24, 26\}, \{11, 17, 25\}, \{4, 19, 26\},$  $\{4, 23, 25\}, \{5, 12, 14\}, \{1, 9, 24\}, \{1, 3, 16\}, \{11, 16, 21\}, \{7, 13, 20\}, \{2, 13, 16\},$  $\{0, 8, 23\}, \{2, 15, 23\}, \{9, 14, 25\}, \{4, 7, 17\}, \{2, 14, 20\}, \{6, 21, 26\}, \{6, 11, 14\},$  $\{5, 20, 22\}, \{12, 25, 26\}, \{1, 17, 20\}, \{4, 12, 13\}, \{3, 12, 22\}, \{0, 21, 25\}, \{1, 17, 20\}, \{4, 12, 13\}, \{3, 12, 22\}, \{1, 21, 25\}, \{1, 21, 25\}, \{2, 21, 25\}, \{2, 21, 25\}, \{2, 21, 25\}, \{3, 21, 25\}, \{3, 21, 25\}, \{4, 22\},$  $\{13, 22, 25\}, \{2, 9, 10\}, \{10, 20, 21\}, \{3, 14, 24\}, \{2, 6, 18\}, \{13, 17, 18\},$  $\{5, 13, 23\}, \{0, 7, 9\}, \{1, 23, 26\}, \{0, 16, 18\}, \{8, 9, 19\}, \{8, 15, 16\}, \{4, 14, 15\},$  $\{12, 16, 24\}, \{3, 13, 15\}, \{7, 11, 23\}, \{2, 17, 24\}, \{3, 8, 18\}, \{4, 6, 16\}, \{6, 7, 22\}, \{12, 16, 24\}, \{3, 13, 15\}, \{4, 6, 16\}, \{6, 7, 22\}, \{12, 16, 24\}, \{13, 16\},$  $\{5, 17, 19\}, \{3, 20, 23\}, \{0, 10, 17\}, \{6, 23, 24\}, \{1, 12, 19\}, \{10, 11, 18\},$  $\{8, 13, 14\}, \{4, 21, 24\}, \{2, 12, 21\}, \{10, 13, 24\}, \{5, 8, 21\}, \{14, 18, 21\},$  $\{9, 12, 20\}, \{10, 19, 23\}, \{0, 13, 26\}, \{8, 11, 22\}, \{0, 15, 20\}, \{6, 20, 25\},$  $\{2, 19, 25\}, \{4, 18, 20\}, \{9, 15, 22\}, \{12, 18, 23\}, \{12, 15, 17\}$ intersection 10:  $\{0, 1, 2\}, \{1, 12, 14\}, \{5, 7, 10\}, \{0, 3, 4\}, \{5, 8, 12\}, \{4, 9, 11\}, \{2, 9, 12\},$  $\{2, 6, 14\}, \{4, 10, 12\}, \{0, 13, 14\}$  $\{0, 9, 25\}, \{10, 17, 20\}, \{11, 13, 18\}, \{3, 11, 17\}, \{4, 24, 26\}, \{5, 19, 24\},$  $\{2, 3, 22\}, \{10, 14, 24\}, \{12, 15, 18\}, \{21, 22, 24\}, \{4, 8, 14\}, \{3, 10, 13\}, \{21, 22, 24\}, \{4, 8, 14\}, \{3, 10, 13\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3, 10, 10\}, \{3$  $\{17, 18, 19\}, \{13, 23, 26\}, \{4, 15, 23\}, \{11, 14, 21\}, \{12, 21, 25\}, \{4, 6, 18\},$  $\{0, 18, 22\}, \{6, 8, 22\}, \{10, 19, 21\}, \{14, 16, 18\}, \{0, 8, 17\}, \{0, 21, 26\},$  $\{2, 13, 19\}, \{9, 16, 23\}, \{2, 10, 25\}, \{5, 16, 21\}, \{7, 13, 16\}, \{3, 14, 23\}, \{1, 6, 7\},$  $\{2, 7, 15\}, \{12, 16, 24\}, \{5, 22, 23\}, \{8, 11, 15\}, \{2, 11, 24\}, \{11, 16, 26\},$  $\{1, 3, 26\}, \{2, 8, 20\}, \{1, 4, 22\}, \{14, 20, 22\}, \{0, 6, 24\}, \{2, 4, 16\}, \{8, 10, 23\}, \{2, 4, 16\}, \{1, 4, 22\}, \{14, 20, 22\}, \{$ 

 $\{1, 5, 20\}, \{2, 6, 20\}, \{1, 4, 22\}, \{14, 20, 22\}, \{0, 0, 24\}, \{2, 4, 10\}, \{8, 10, 23\}, \\ \{5, 14, 25\}, \{9, 15, 26\}, \{2, 5, 26\}, \{1, 5, 17\}, \{5, 6, 15\}, \{0, 10, 16\}, \{0, 5, 11\}, \\ \{6, 13, 17\}, \{12, 17, 23\}, \{12, 22, 26\}, \{8, 18, 24\}, \{2, 18, 23\}, \{3, 19, 20\}, \\ \{13, 22, 25\}, \{1, 9, 20\}, \{3, 7, 18\}, \{1, 8, 19\}, \{16, 17, 22\}, \{11, 12, 19\}, \\ \{7, 23, 25\}, \{10, 18, 26\}, \{3, 24, 25\}, \{0, 19, 23\}, \{9, 19, 22\}, \{7, 19, 26\}, \\ \{11, 20, 23\}, \{2, 17, 21\}, \{12, 13, 20\}, \{9, 17, 24\}, \{3, 8, 16\}, \{15, 17, 25\}, \\ \{7, 9, 14\}, \{16, 20, 25\}, \{3, 15, 21\}, \{1, 13, 21\}, \{3, 6, 12\}, \{0, 15, 20\}, \\ \{14, 15, 19\}, \{3, 5, 9\}, \{1, 15, 16\}, \{7, 20, 24\}, \{9, 18, 21\}, \{4, 5, 13\}, \{1, 10, 11\}, \\ \{1, 23, 24\}, \{7, 11, 22\}, \{4, 7, 17\}, \{6, 9, 10\}, \{8, 9, 13\}, \{14, 17, 26\}, \{5, 18, 20\}, \\ \{10, 15, 22\}, \{0, 7, 12\}, \{4, 19, 25\}, \{6, 16, 19\}, \{6, 20, 26\}, \{6, 21, 23\}, \\ \{13, 15, 24\}, \{7, 8, 21\}, \{4, 20, 21\}, \{6, 11, 25\}, \{8, 25, 26\}, \{1, 18, 25\} \\ intersection 9: \\ \{0, 13, 14\}, \{5, 8, 12\}, \{1, 11, 13\}, \{8, 9, 14\}, \{1, 3, 5\}, \{2, 6, 14\}, \{0, 5, 6\}, \\ \{1, 4, 6\}, \{5, 7, 10\} \\ \end{cases}$ 

<u>\_\_\_</u>

 $\{0, 11, 24\}, \{1, 9, 18\}, \{2, 4, 15\}, \{9, 21, 23\}, \{0, 1, 16\}, \{8, 18, 25\}, \{14, 17, 20\}, \\ \{2, 5, 23\}, \{8, 20, 23\}, \{6, 18, 22\}, \{4, 9, 20\}, \{14, 18, 26\}, \{0, 4, 21\}, \{6, 9, 19\}, \\ \{1, 21, 22\}, \{6, 13, 26\}, \{6, 8, 10\}, \{12, 22, 26\}, \{12, 14, 25\}, \{10, 16, 25\}, \\ \{5, 18, 21\}, \{0, 9, 26\}, \{15, 18, 19\}, \{3, 19, 25\}, \{1, 12, 15\}, \{5, 11, 17\}, \{0, 2, 7\}, \\ \{3, 17, 21\}, \{10, 19, 21\}, \{4, 7, 12\}, \{4, 17, 24\}, \{2, 12, 13\}, \{0, 19, 20\}, \\ \{13, 18, 20\}, \{0, 10, 23\}, \{2, 8, 19\}, \{13, 23, 25\}, \{0, 15, 25\}, \{6, 11, 12\}, \\ \{14, 15, 21\}, \{9, 15, 22\}, \{0, 12, 18\}, \{24, 25, 26\}, \{1, 19, 24\}, \{2, 16, 24\}, \\ \$ 

 $\{4, 11, 23\}, \{3, 18, 23\}, \{11, 16, 18\}, \{4, 10, 18\}, \{1, 8, 26\}, \{2, 20, 21\},$  $\{3, 10, 15\}, \{8, 11, 22\}, \{5, 13, 22\}, \{3, 4, 13\}, \{11, 15, 20\}, \{10, 14, 24\},$  $\{0, 3, 22\}, \{13, 15, 24\}, \{15, 17, 26\}, \{4, 14, 22\}, \{4, 5, 25\}, \{16, 21, 26\}, \{16, 22\}, \{16, 21, 26\}, \{16, 22\}, \{16,$  $\{22, 23, 24\}, \{9, 10, 13\}, \{2, 17, 18\}, \{10, 11, 26\}, \{7, 8, 15\}, \{10, 20, 22\}, \{22, 23, 24\}, \{10, 20, 22\}, \{10, 20, 21\}, \{10, 20, 22\}, \{10, 20, 21\}, \{10, 20, 21\}, \{10, 20, 21\}, \{10, 21, 20\}, \{10,$  $\{13, 17, 19\}, \{6, 20, 24\}, \{2, 3, 26\}, \{3, 11, 14\}, \{1, 2, 10\}, \{5, 15, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 6, 16\}, \{3, 10, 10\}, \{4,$  $\{11, 21, 25\}, \{7, 11, 19\}, \{1, 17, 23\}, \{3, 9, 12\}, \{7, 17, 22\}, \{3, 7, 20\},$  $\{12, 21, 24\}, \{2, 9, 11\}, \{12, 16, 20\}, \{4, 19, 26\}, \{5, 20, 26\}, \{5, 14, 19\},$  $\{7, 9, 25\}, \{9, 16, 17\}, \{7, 23, 26\}, \{0, 8, 17\}, \{6, 17, 25\}, \{6, 15, 23\}, \{16, 19, 22\}, \{16, 19,$  $\{1, 20, 25\}, \{2, 22, 25\}, \{3, 8, 24\}, \{8, 13, 21\}, \{1, 7, 14\}, \{5, 9, 24\}, \{6, 7, 21\},$  $\{10, 12, 17\}, \{4, 8, 16\}, \{7, 13, 16\}, \{12, 19, 23\}, \{7, 18, 24\}, \{14, 16, 23\}$ intersection 8:  $\{7, 11, 14\}, \{4, 5, 14\}, \{0, 11, 12\}, \{5, 8, 12\}, \{2, 3, 7\}, \{5, 7, 10\}, \{2, 9, 12\}, \{2, 9, 12\}, \{3, 7\}, \{4, 5, 14\}, \{4, 5,$  $\{5, 9, 13\}$  $\{18, 19, 23\}, \{12, 15, 25\}, \{11, 16, 25\}, \{1, 14, 26\}, \{4, 9, 19\}, \{2, 8, 22\}, \{11, 16, 25\}, \{1, 14, 26\}, \{4, 9, 19\}, \{2, 8, 22\}, \{11, 16, 25\}, \{11, 16, 25\}, \{11, 16, 25\}, \{11, 16, 25\}, \{12, 12, 12, 12\}, \{2, 12\}, \{2, 12\},$  $\{10, 15, 24\}, \{2, 17, 19\}, \{12, 23, 24\}, \{1, 13, 16\}, \{4, 21, 22\}, \{3, 23, 25\},$  $\{12, 21, 26\}, \{1, 3, 4\}, \{3, 11, 17\}, \{8, 15, 21\}, \{7, 8, 26\}, \{3, 9, 26\}, \{8, 9, 16\}, \{1, 2, 21\}, \{2, 21\}, \{2, 21\}, \{3, 21\}, \{$  $\{10, 13, 20\}, \{8, 17, 18\}, \{7, 17, 24\}, \{6, 10, 19\}, \{11, 23, 26\}, \{0, 13, 15\},$  $\{0, 19, 21\}, \{9, 14, 24\}, \{10, 18, 26\}, \{1, 5, 11\}, \{2, 11, 21\}, \{13, 18, 21\},$  $\{0, 10, 17\}, \{4, 8, 24\}, \{1, 19, 22\}, \{0, 3, 20\}, \{11, 15, 20\}, \{13, 17, 26\}, \{2, 13, 23\}, \{13, 17, 26\}, \{2, 13, 23\}, \{13, 17, 26\}, \{2, 13, 23\}, \{13, 17, 26\}, \{2, 13, 23\}, \{2, 13, 23\}, \{2, 13, 23\}, \{2, 13, 23\}, \{3, 12, 23\},$  $\{4, 10, 25\}, \{1, 24, 25\}, \{20, 25, 26\}, \{17, 22, 23\}, \{2, 6, 25\}, \{9, 20, 21\},$  $\{5, 22, 26\}, \{3, 10, 16\}, \{2, 5, 16\}, \{10, 21, 23\}, \{5, 6, 17\}, \{0, 7, 22\}, \{14, 20, 22\},$  $\{9, 10, 22\}, \{7, 9, 15\}, \{14, 15, 17\}, \{1, 6, 9\}, \{5, 21, 24\}, \{8, 14, 23\}, \{6, 13, 14\},$  $\{1, 12, 18\}, \{4, 12, 17\}, \{0, 4, 26\}, \{15, 16, 18\}, \{6, 11, 22\}, \{12, 19, 20\},$  $\{2, 15, 26\}, \{9, 17, 25\}, \{1, 15, 23\}, \{6, 16, 21\}, \{1, 17, 21\}, \{12, 13, 22\}, \{0, 1, 8\}, \{1, 17, 21\}, \{12, 13, 22\}, \{1, 18\}, \{$  $\{7, 12, 16\}, \{3, 6, 12\}, \{2, 4, 20\}, \{4, 6, 15\}, \{9, 11, 18\}, \{8, 13, 25\}, \{18, 22,$  $\{3, 15, 22\}, \{6, 7, 23\}, \{8, 10, 11\}, \{4, 16, 23\}, \{16, 17, 20\}, \{0, 14, 16\}, \{0, 2, 24\}, \{16, 17, 20\}, \{1, 16\}, \{1, 20\}, \{1, 20\}, \{1, 20\}, \{1, 20\}, \{2, 20\}, \{2, 20\}, \{2, 20\}, \{3, 20\}, \{2, 20\}, \{3, 20\}, \{3, 20\}, \{3, 20\}, \{4, 2$  $\{6, 24, 26\}, \{14, 19, 25\}, \{7, 13, 19\}, \{3, 13, 24\}, \{18, 20, 24\}, \{1, 2, 10$  $\{3, 14, 21\}, \{5, 20, 23\}, \{16, 19, 26\}, \{11, 19, 24\}$ intersection 7:  $\{6, 8, 13\}, \{1, 12, 14\}, \{2, 4, 8\}, \{1, 4, 6\}, \{2, 3, 7\}, \{0, 13, 14\}, \{8, 9, 14\}$  $\{13, 19, 21\}, \{3, 16, 24\}, \{6, 10, 18\}, \{0, 24, 26\}, \{9, 16, 23\}, \{10, 17, 21\},$  $\{1, 8, 25\}, \{5, 10, 26\}, \{2, 11, 14\}, \{5, 17, 24\}, \{2, 10, 20\}, \{4, 12, 17\}, \{0, 15, 16\},$  $\{9, 21, 26\}, \{10, 12, 22\}, \{6, 14, 26\}, \{7, 12, 25\}, \{6, 7, 11\}, \{7, 14, 21\}, \{6, 7, 11\}, \{7, 14, 21\}, \{7,$  $\{7, 15, 17\}, \{12, 15, 18\}, \{2, 15, 26\}, \{7, 20, 22\}, \{12, 21, 23\}, \{5, 14, 25\},$  $\{17, 18, 23\}, \{4, 15, 25\}, \{7, 19, 26\}, \{3, 10, 19\}, \{5, 6, 9\}, \{9, 12, 24\}, \{1, 7, 24\},$  $\{1, 19, 22\}, \{1, 15, 23\}, \{0, 3, 23\}, \{0, 11, 22\}, \{1, 11, 17\}, \{8, 10, 15\},$  $\{14, 18, 19\}, \{11, 18, 21\}, \{9, 17, 22\}, \{11, 23, 26\}, \{3, 5, 21\}, \{16, 19, 25\},$  $\{18, 22, 26\}, \{3, 8, 26\}, \{17, 25, 26\}, \{8, 11, 24\}, \{0, 8, 12\}, \{0, 20, 25\},$  $\{9, 11, 15\}, \{14, 22, 23\}, \{3, 4, 22\}, \{1, 20, 26\}, \{4, 14, 16\}, \{7, 13, 23\},$  $\{5, 12, 20\}, \{5, 16, 18\}, \{3, 11, 20\}, \{6, 15, 24\}, \{15, 21, 22\}, \{13, 15, 20\},$  $\{0, 5, 7\}, \{21, 24, 25\}, \{0, 4, 21\}, \{4, 13, 26\}, \{2, 16, 17\}, \{6, 19, 23\}, \{11, 13, 16\},$  $\{3, 6, 12\}, \{4, 7, 9\}, \{2, 19, 24\}, \{4, 10, 23\}, \{9, 18, 20\}, \{1, 16, 21\}, \{0, 2, 18\}, \{1, 16, 21\}, \{1, 16, 21\}, \{2, 19, 24\}, \{2, 19, 24\}, \{2, 19, 24\}, \{3, 6, 12\}, \{4, 10, 23\}, \{4, 10,$ 

 $\{0, 5, 6\}, \{1, 8, 10\}, \{4, 7, 13\}, \{2, 5, 11\}, \{3, 12, 13\}, \{1, 3, 5\}$ 

 $\{5, 9, 15\}, \{8, 11, 21\}, \{4, 11, 20\}, \{1, 20, 25\}, \{0, 4, 9\}, \{6, 7, 11\}, \{7, 22, 24\},$  $\{7, 8, 23\}, \{12, 17, 22\}, \{4, 12, 26\}, \{3, 10, 20\}, \{3, 6, 18\}, \{5, 16, 23\}, \{5, 14, 24\}, \{5, 16, 23\}, \{5, 14, 24\}, \{5, 16, 23\}, \{5, 14, 24\}, \{5, 16, 23\}, \{5, 14, 24\}, \{5, 16, 23\}, \{5, 14, 24\}, \{5, 16, 23\}, \{5, 16, 23\}, \{5, 14, 24\}, \{5, 16, 23\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5, 16, 22\}, \{5,$  $\{2, 20, 23\}, \{0, 15, 22\}, \{23, 24, 26\}, \{7, 25, 26\}, \{5, 13, 25\}, \{6, 8, 15\}, \{7, 10, 18\}, \{7,$  $\{0, 14, 23\}, \{9, 17, 26\}, \{2, 17, 18\}, \{0, 13, 21\}, \{1, 2, 12\}, \{2, 6, 24\}, \{4, 5, 22\},$  $\{3, 4, 14\}, \{5, 10, 12\}, \{5, 7, 17\}, \{3, 15, 23\}, \{11, 16, 26\}, \{11, 15, 17\}, \{2, 4, 21\},$  $\{13, 15, 20\}, \{10, 11, 13\}, \{13, 18, 24\}, \{8, 12, 19\}, \{8, 14, 20\}, \{9, 21, 25\},$  $\{8, 17, 25\}, \{2, 8, 22\}, \{9, 12, 18\}, \{0, 2, 3\}, \{3, 11, 25\}, \{1, 6, 9\}, \{12, 14, 15\},$  $\{2, 9, 13\}, \{18, 21, 26\}, \{9, 10, 16\}, \{6, 13, 19\}, \{6, 12, 21\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5, 20, 20\}, \{5,$  $\{3, 17, 24\}, \{4, 16, 19\}, \{11, 12, 23\}, \{15, 16, 18\}, \{15, 19, 26\}, \{11, 14, 18\},$  $\{17, 19, 20\}, \{1, 18, 23\}, \{13, 22, 23\}, \{9, 11, 24\}, \{6, 23, 25\}, \{10, 19, 24\},$  $\{0, 11, 19\}, \{4, 8, 24\}, \{16, 22, 25\}, \{9, 19, 23\}, \{3, 8, 9\}, \{2, 10, 26\}, \{19, 21, 22\}, \{19, 22\}, \{19,$  $\{1, 14, 19\}, \{6, 10, 22\}, \{7, 9, 20\}, \{15, 24, 25\}, \{3, 16, 21\}, \{2, 19, 25\}, \{4, 6, 17\}, \{4, 17\}, \{4,$  $\{1, 4, 15\}, \{1, 11, 22\}, \{10, 15, 21\}, \{5, 18, 19\}, \{0, 1, 7\}, \{4, 10, 23\}, \{10, 14, 25\},$  $\{0, 10, 17\}, \{6, 14, 26\}, \{4, 18, 25\}, \{0, 8, 18\}, \{7, 12, 16\}, \{2, 14, 16\}, \{0, 16, 24\}, \{0, 16, 24\}, \{1, 16$  $\{1, 16, 17\}, \{2, 7, 15\}, \{0, 20, 26\}, \{8, 13, 16\}, \{3, 22, 26\}, \{12, 20, 24\},\$  $\{13, 14, 17\}, \{5, 8, 26\}, \{9, 14, 22\}, \{0, 12, 25\}, \{6, 16, 20\}, \{1, 13, 26\},$  $\{7, 14, 21\}, \{3, 7, 19\}, \{1, 21, 24\}, \{17, 21, 23\}, \{18, 20, 22\}$ intersection 5:  $\{0, 5, 6\}, \{4, 5, 14\}, \{8, 9, 14\}, \{2, 9, 12\}, \{6, 8, 13\}$ 

 $\{7, 19, 23\}, \{11, 13, 19\}, \{1, 2, 5\}, \{13, 23, 25\}, \{2, 13, 24\}, \{5, 7, 16\}, \{1, 4, 10\}, \{1, 4, 10\}, \{1, 2, 5\}, \{1, 2, 5\}, \{1, 2, 5\}, \{2, 13, 24\}, \{2, 13, 24\}, \{3, 7, 16\}, \{1, 4, 10\}, \{1, 2, 5\}, \{1, 2, 5\}, \{1, 2, 5\}, \{2, 13, 24\}, \{2, 13, 24\}, \{3, 7, 16\}, \{1, 4, 10\}, \{1, 2, 5\}, \{1, 2, 5\}, \{1, 2, 5\}, \{2, 13, 24\}, \{2, 13, 24\}, \{3, 7, 16\}, \{1, 4, 10\}, \{1, 2, 5\}, \{1, 2, 5\}, \{1, 2, 5\}, \{2, 13, 24\}, \{2, 13, 24\}, \{3, 7, 16\}, \{1, 4, 10\}, \{1, 2, 5\}, \{2, 13, 24\}, \{3, 7, 16\}, \{1, 4, 10\}, \{1, 2, 5\}, \{1, 2, 5\}, \{1, 2, 5\}, \{1, 2, 5\}, \{2, 13, 24\}, \{3, 7, 16\}, \{1, 4, 10\}, \{1, 2, 5\}, \{1, 2, 5\}, \{1, 2, 5\}, \{2, 13, 24\}, \{3, 7, 16\}, \{1, 4, 10\}, \{1, 2, 5\}, \{1, 2, 5\}, \{2, 13, 24\}, \{3, 7, 16\}, \{1, 4, 10\}, \{1, 2, 5\}, \{1, 2, 5\}, \{1, 2, 5\}, \{1, 2, 5\}, \{2, 13, 24\}, \{3, 7, 16\}, \{1, 4, 10\}, \{1, 2, 5\}, \{2, 2, 5\}, \{2, 2, 5\}, \{2, 2, 5\}, \{2, 2, 5\}, \{2, 2, 5\}, \{2, 2, 5\}, \{2, 2, 5\}, \{2, 2, 5\}, \{2, 2, 5\}, \{2, 2, 5\}, \{3, 3, 5\}, \{3, 5\}, \{3,$  $\{12, 16, 23\}, \{1, 21, 23\}, \{3, 15, 19\}, \{1, 15, 22\}, \{4, 16, 19\}, \{6, 12, 24\},$  $\{9, 11, 25\}, \{6, 14, 19\}, \{2, 3, 10\}, \{9, 19, 20\}, \{10, 15, 25\}, \{2, 7, 25\}, \{7, 9, 10\},$  $\{6, 9, 16\}, \{5, 22, 25\}, \{7, 13, 15\}, \{2, 14, 18\}, \{6, 17, 25\}, \{4, 11, 22\},$  $\{14, 16, 17\}, \{1, 12, 18\}, \{13, 17, 20\}, \{5, 10, 18\}, \{5, 8, 23\}, \{5, 19, 21\}, \{5, 10, 18\}, \{5, 10, 12\}, \{5, 10, 18\}, \{5, 10, 12\}, \{5$  $\{6, 18, 21\}, \{10, 13, 16\}, \{7, 14, 24\}, \{2, 8, 19\}, \{4, 13, 18\}, \{1, 6, 11\}, \{8, 20, 25\},$  $\{15, 18, 20\}, \{1, 3, 7\}, \{0, 19, 24\}, \{2, 4, 26\}, \{5, 12, 15\}, \{3, 14, 25\}, \{1, 17, 19\},$  $\{3, 5, 11\}, \{2, 21, 22\}, \{0, 3, 9\}, \{19, 25, 26\}, \{10, 17, 24\}, \{11, 17, 23\}, \{4, 6, 15\},$  $\{18, 19, 22\}, \{6, 7, 22\}, \{8, 11, 15\}, \{9, 18, 24\}, \{0, 12, 13\}, \{12, 14, 26\},$  $\{10, 11, 26\}, \{0, 7, 26\}, \{3, 4, 17\}, \{10, 14, 23\}, \{16, 18, 25\}, \{0, 10, 22\},$  $\{1, 9, 13\}, \{3, 13, 21\}, \{2, 6, 23\}, \{3, 18, 23\}, \{3, 16, 20\}, \{5, 9, 17\}, \{1, 24, 25\},$  $\{20, 22, 26\}, \{5, 13, 26\}, \{17, 21, 26\}, \{0, 2, 20\}, \{12, 21, 25\}, \{0, 15, 23\}, \{12, 21, 25\}, \{0, 15, 23\}, \{12, 21, 25\}, \{12, 21, 25\}, \{12, 21, 25\}, \{12, 21, 25\}, \{13, 26\}, \{$  $\{4, 7, 12\}, \{8, 16, 22\}, \{23, 24, 26\}, \{0, 16, 21\}, \{6, 10, 20\}, \{1, 14, 20\}, \{0, 4, 25\}, \{0, 16, 21\}, \{1, 14, 20\}, \{1, 14, 20\}, \{1, 14, 20\}, \{1, 14, 20\}, \{1, 14, 20\}, \{1, 14, 20\}, \{1, 14, 20\}, \{1, 14, 20\}, \{1, 14, 20\}, \{2, 14, 21\}, \{2, 14, 20\}, \{2, 14, 21\}, \{2, 14, 20\}, \{2, 14, 21\}, \{2, 14, 20\}, \{2, 14, 21\}, \{2, 14, 20\}, \{2, 14, 21\}, \{2, 14, 20\}, \{2, 14, 21\}, \{2, 14, 20\}, \{2, 14, 21\}, \{2, 14, 20\}, \{2, 14, 21\}, \{2, 14, 20\}, \{2, 14, 21\}, \{2, 14, 20\}, \{2, 14, 20\}, \{2, 14, 21\}, \{2, 14, 20\}, \{2,$  $\{11, 12, 20\}, \{3, 8, 12\}, \{7, 20, 21\}, \{7, 11, 18\}, \{0, 11, 14\}, \{0, 17, 18\}, \{4, 8, 24\},$  $\{11, 21, 24\}, \{2, 11, 16\}, \{8, 10, 21\}, \{1, 16, 26\}, \{14, 15, 21\}, \{4, 9, 21\},$  $\{12, 17, 22\}, \{13, 14, 22\}, \{7, 8, 17\}, \{9, 15, 26\}, \{10, 12, 19\}, \{3, 6, 26\}, \{10, 12, 19\}, \{3, 6, 26\}, \{10, 12, 19\}, \{2, 12, 12\}, \{2, 12, 12\}, \{2, 12, 12\}, \{2, 12, 12\}, \{3, 12, 12\}, \{3, 12, 12\}, \{3, 12, 12\}, \{3, 12, 12\}, \{3, 12, 12\}, \{3, 12, 12\}, \{3, 12, 12\}, \{3, 12, 12\}, \{3, 12, 12\}, \{3, 12, 12\}, \{12$  $\{3, 22, 24\}$ 

intersection 4:  $\{2,3,7\}, \{0,7,8\}, \{3,8,11\}, \{2,5,11\}$ 

 $\{4, 20, 24\}, \{1, 13, 16\}, \{6, 14, 17\}, \{0, 14, 19\}, \{7, 13, 21\}, \{8, 12, 21\}, \{1, 13, 16\}, \{1, 12, 12\}, \{1, 13, 16\}, \{1, 12, 12\}, \{1, 13, 16\}, \{1,$  $\{0, 10, 13\}, \{0, 2, 26\}, \{3, 5, 17\}, \{0, 4, 6\}, \{6, 10, 12\}, \{6, 19, 20\}, \{1, 3, 21\},$  $\{12, 19, 26\}, \{3, 4, 25\}, \{11, 20, 21\}, \{6, 7, 18\}, \{3, 14, 26\}, \{1, 6, 22\}, \{7, 9, 10\}, \{12, 19, 26\}, \{1, 6, 22\}, \{2, 9, 10\}, \{2, 19, 26\}, \{3, 4, 25\}, \{13, 20, 21\}, \{2, 19, 26\}, \{3, 14, 26\}, \{13, 20, 21\}, \{2, 19, 26\}, \{3, 14, 26\}, \{13, 20, 21\}, \{2, 19, 26\}, \{3, 14, 26\}, \{13, 20, 21\}, \{2, 19, 26\}, \{3, 14, 26\}, \{13, 20, 21\}, \{2, 19, 26\}, \{3, 14, 26\}, \{3, 14, 26\}, \{4, 19, 22\}, \{4, 19, 20\}, \{4$  $\{8, 13, 22\}, \{5, 24, 25\}, \{1, 5, 18\}, \{6, 8, 23\}, \{10, 11, 14\}, \{0, 12, 18\},$  $\{11, 16, 26\}, \{3, 13, 24\}, \{0, 11, 17\}, \{4, 5, 10\}, \{8, 9, 17\}, \{9, 22, 25\}, \{8, 14, 16\},$  $\{10, 17, 21\}, \{9, 18, 21\}, \{8, 10, 26\}, \{1, 2, 10\}, \{0, 5, 9\}, \{0, 23, 25\}, \{12, 17, 25\},$  $\{4, 11, 15\}, \{2, 14, 23\}, \{2, 15, 21\}, \{13, 19, 25\}, \{4, 13, 26\}, \{4, 21, 22\},$  $\{11, 18, 23\}, \{15, 17, 19\}, \{2, 6, 9\}, \{2, 17, 24\}, \{9, 11, 24\}, \{19, 21, 24\},$  $\{9, 13, 14\}, \{10, 20, 25\}, \{14, 18, 25\}, \{7, 12, 22\}, \{1, 8, 24\}, \{3, 10, 22\},$  $\{2, 16, 25\}, \{4, 9, 16\}, \{7, 17, 26\}, \{1, 11, 12\}, \{3, 9, 12\}, \{18, 24, 26\}, \{1, 11, 12\}, \{13, 9, 12\}, \{13, 24, 26\}, \{1, 11, 12\}, \{13, 9, 12\}, \{13, 24, 26\}, \{1, 11, 12\}, \{13, 9, 12\}, \{13, 24, 26\}, \{1, 11, 12\}, \{13, 9, 12\}, \{13, 24, 26\}, \{1, 11, 12\}, \{13, 9, 12\}, \{13, 24, 26\}, \{13$  $\{13, 15, 23\}, \{7, 14, 24\}, \{7, 16, 20\}, \{5, 7, 15\}, \{15, 18, 20\}, \{14, 15, 22\},$  $\{4, 17, 23\}, \{4, 7, 19\}, \{10, 19, 23\}, \{6, 11, 13\}, \{5, 12, 13\}, \{0, 1, 15\}, \{5, 16, 19\},$  $\{12, 15, 16\}, \{3, 6, 15\}, \{6, 21, 25\}, \{9, 20, 23\}, \{1, 17, 20\}, \{10, 16, 18\},$  $\{5, 22, 23\}, \{3, 18, 19\}, \{13, 17, 18\}, \{1, 9, 19\}, \{7, 11, 25\}, \{5, 6, 26\}, \{0, 22, 24\}, \{1, 9, 19\}, \{1, 9, 19\}, \{2, 11, 25\}, \{2, 12, 24\}, \{3, 12, 19\}, \{1, 12, 19\}, \{2, 12, 24\}, \{3, 12, 19\}, \{1, 12, 19\}, \{2, 12, 24\}, \{3, 12, 19\}, \{1, 12, 19\}, \{2, 12, 24\}, \{3, 12, 19\}, \{1, 12, 19\}, \{2, 12, 24\}, \{3, 12, 19\}, \{1, 12, 19\}, \{1, 12, 19\}, \{2, 12, 19\}, \{2, 12, 19\}, \{3, 12, 19\}, \{4, 12, 19\}, \{4, 12, 19\}, \{5, 12, 12\}, \{5, 12, 19\}, \{5, 12$  $\{5, 14, 21\}, \{2, 18, 22\}, \{10, 15, 24\}, \{2, 4, 12\}, \{12, 14, 20\}, \{2, 8, 19\},$  $\{0, 16, 21\}, \{21, 23, 26\}, \{1, 7, 23\}, \{6, 16, 24\}, \{16, 17, 22\}, \{11, 19, 22\},$  $\{20, 22, 26\}, \{12, 23, 24\}, \{1, 25, 26\}, \{8, 15, 25\}$ intersection 3:  $\{6, 7, 12\}, \{0, 3, 4\}, \{3, 6, 9\}$ 

 $\{9, 13, 20\}, \{7, 15, 23\}, \{6, 10, 25\}, \{2, 3, 23\}, \{0, 14, 18\}, \{1, 22, 23\}, \{11, 14, 21\}, \{1, 22, 23\}, \{11, 14, 21\}, \{1, 22, 23\}, \{11, 14, 21\}, \{1, 22, 23\}, \{11, 22, 23\}, \{2, 3, 23\}, \{2, 3, 23\}, \{2, 3, 23\}, \{2, 3, 23\}, \{2, 3, 23\}, \{2, 3, 23\}, \{3, 23\},$  $\{8, 9, 16\}, \{9, 18, 25\}, \{4, 8, 24\}, \{0, 12, 20\}, \{11, 16, 24\}, \{4, 7, 25\}, \{7, 13, 18\},$  $\{11, 17, 23\}, \{2, 6, 24\}, \{2, 7, 26\}, \{0, 1, 15\}, \{1, 16, 20\}, \{2, 18, 21\}, \{1, 12, 17\},$  $\{3, 17, 21\}, \{3, 16, 19\}, \{1, 4, 9\}, \{0, 17, 26\}, \{10, 17, 24\}, \{8, 12, 25\}, \{1, 3, 24\}, \{1, 3, 24\}, \{1, 3, 24\}, \{1, 3, 24\}, \{1, 3, 24\}, \{1, 3, 24\}, \{1, 3, 24\}, \{2, 12\}, \{2, 12\}, \{2, 12\}, \{2, 12\}, \{2, 12\}, \{3, 12\}, \{3, 12\}, \{3, 12\}, \{4$  $\{5, 9, 24\}, \{4, 20, 23\}, \{8, 13, 26\}, \{3, 8, 14\}, \{11, 19, 25\}, \{2, 10, 20\}, \{1, 21, 26\}, \{2, 10, 20\}, \{1, 21, 26\}, \{2, 10, 20\}, \{1, 21, 26\}, \{2, 10, 20\}, \{3, 20\},$  $\{2, 12, 19\}, \{4, 14, 15\}, \{10, 12, 15\}, \{8, 10, 23\}, \{1, 6, 19\}, \{17, 18, 20\},$  $\{2, 4, 17\}, \{7, 9, 19\}, \{1, 7, 10\}, \{9, 12, 23\}, \{0, 5, 19\}, \{11, 20, 26\}, \{7, 16, 17\},$  $\{9, 10, 21\}, \{12, 13, 21\}, \{10, 19, 22\}, \{10, 13, 16\}, \{18, 19, 23\}, \{6, 11, 22\},$  $\{13, 14, 19\}, \{5, 16, 18\}, \{17, 22, 25\}, \{8, 19, 21\}, \{1, 8, 18\}, \{0, 10, 11\},$  $\{5, 7, 14\}, \{0, 21, 23\}, \{6, 15, 16\}, \{9, 11, 15\}, \{4, 5, 10\}, \{4, 6, 18\}, \{5, 20, 25\},$  $\{18, 22, 24\}, \{3, 7, 11\}, \{3, 10, 18\}, \{10, 14, 26\}, \{6, 20, 21\}, \{5, 8, 17\},$  $\{19, 20, 24\}, \{3, 15, 20\}, \{7, 21, 22\}, \{2, 5, 22\}, \{3, 5, 12\}, \{0, 13, 25\}, \{2, 15, 25\},$  $\{11, 12, 18\}, \{23, 24, 26\}, \{6, 14, 23\}, \{21, 24, 25\}, \{13, 15, 24\}, \{1, 14, 25\},$  $\{0, 16, 22\}, \{5, 15, 21\}, \{0, 2, 9\}, \{9, 14, 17\}, \{12, 14, 24\}, \{6, 13, 17\}, \{2, 14, 16\},$  $\{2, 8, 11\}, \{5, 6, 26\}, \{7, 8, 20\}, \{4, 12, 22\}, \{4, 16, 21\}, \{5, 13, 23\}, \{15, 18, 26\},$  $\{3, 25, 26\}, \{15, 17, 19\}, \{16, 23, 25\}, \{0, 6, 8\}, \{0, 7, 24\}, \{4, 19, 26\}, \{9, 22, 26\}, \{15, 17, 19\}, \{16, 23, 25\}, \{1, 2, 26\}, \{1, 2, 26\}, \{1, 2, 26\}, \{1, 2, 26\}, \{1, 2, 26\}, \{2, 26\}, \{2, 26\}, \{2, 26\}, \{2, 26\}, \{2, 26\}, \{2, 26\}, \{2, 26\}, \{2, 26\}, \{2, 26\}, \{2, 26\}, \{2, 26\}, \{3, 26\}, \{2, 26\}, \{3, 26\}, \{2, 26\}, \{3, 26\}, \{4, 26\}, \{2, 26\}, \{3, 26\}, \{4, 26\}, \{2, 26\}, \{3, 26\}, \{3, 26\}, \{4,$  $\{12, 16, 26\}, \{14, 20, 22\}, \{4, 11, 13\}, \{1, 5, 11\}, \{8, 15, 22\}, \{3, 13, 22\}, \{1, 2, 13\}$ intersection 2:

 $\{0, 11, 12\}, \{6, 8, 13\}$ 

 $\{4, 9, 15\}, \{2, 4, 6\}, \{2, 16, 21\}, \{4, 7, 8\}, \{0, 7, 15\}, \{3, 5, 7\}, \{4, 10, 26\},$  $\{1, 13, 15\}, \{8, 14, 18\}, \{3, 17, 22\}, \{0, 1, 21\}, \{6, 7, 10\}, \{12, 16, 17\},$ 

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\{11, 15, 20\}, \{19, 23, 25\}, \{1, 22, 25\}, \{10, 13, 18\}, \{8, 15, 16\}, \{0, 2, 8\}, \{11, 12, 20\}, \{12, 23, 25\}, \{13, 22, 25\}, \{13, 23, 25\}, \{13, 22, 25\}, \{13, 23, 25\}, \{13, 22, 25\}, \{13, 23, 25\}, \{13, 22, 25\}, \{13, 23, 25\}, \{13, 22, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 23, 25\}, \{13, 25, 25\}, \{13, 25, 25\}, \{13, 25, 25\}, \{13, 25, 25\}, \{13, 
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   \{5, 8, 17\}, \{14, 19, 26\}, \{8, 20, 25\}, \{8, 23, 26\}, \{8, 21, 24\}, \{5, 15, 26\}, \{5, 9, 22\}, 
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   \{1, 5, 24\}, \{2, 7, 26\}, \{5, 11, 18\}, \{2, 3, 20\}, \{0, 3, 26\}, \{4, 13, 24\}, \{6, 16, 24\}, 
   \{1, 2, 18\}, \{0, 16, 22\}, \{0, 9, 20\}, \{7, 20, 24\}, \{2, 10, 17\}, \{1, 16, 20\}, \{4, 16, 18\}, 
   \{2, 15, 22\}, \{4, 12, 23\}, \{1, 17, 26\}, \{3, 6, 18\}, \{7, 14, 16\}, \{6, 14, 15\}, \{1, 3, 8\}, \{1, 3, 8\}, \{1, 3, 8\}, \{2, 15, 22\}, \{4, 12, 23\}, \{1, 17, 26\}, \{3, 6, 18\}, \{1, 16\}, \{2, 16\}, \{2, 16\}, \{3, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1, 16\}, \{1
   \{0, 23, 24\}, \{11, 17, 19\}, \{17, 18, 23\}, \{1, 10, 12\}, \{6, 12, 26\}, \{5, 6, 21\}, \{1, 10, 12\}, \{1, 10, 12\}, \{2, 12, 26\}, \{2, 12, 26\}, \{3, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4, 12, 26\}, \{4
   \{0, 6, 19\}, \{12, 14, 24\}, \{12, 18, 20\}, \{24, 25, 26\}, \{7, 12, 22\}, \{2, 12, 19\},
   \{3, 15, 19\}, \{11, 21, 22\}, \{10, 16, 25\}, \{0, 5, 10\}, \{2, 11, 24\}, \{3, 9, 25\}, \{2, 11, 24\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25\}, \{3, 9, 25
   \{8, 19, 22\}, \{6, 22, 23\}, \{7, 9, 17\}, \{6, 11, 25\}, \{14, 21, 23\}, \{0, 18, 25\}, \{0, 4, 14\}, 
   \{3, 10, 24\}, \{9, 13, 16\}, \{11, 16, 26\}, \{5, 16, 19\}, \{8, 10, 11\}, \{2, 9, 14\}, 
   \{4, 17, 21\}, \{1, 4, 19\}, \{15, 18, 21\}, \{2, 13, 25\}, \{18, 22, 24\}, \{13, 20, 23\}, 
   \{13, 19, 21\}, \{15, 17, 24\}, \{3, 13, 14\}, \{1, 11, 14\}, \{5, 14, 20\}
intersection 1:
```

 $\{7, 11, 14\}$ 

 $\{19, 23, 26\}, \{8, 12, 21\}, \{1, 7, 23\}, \{2, 12, 15\}, \{0, 11, 15\}, \{2, 4, 10\},$  $\{13, 16, 22\}, \{3, 17, 19\}, \{5, 15, 17\}, \{4, 5, 13\}, \{10, 14, 20\}, \{8, 10, 23\}, \{10, 14, 20\}, \{10,$  $\{14, 17, 21\}, \{3, 7, 25\}, \{7, 13, 26\}, \{5, 14, 23\}, \{4, 7, 17\}, \{9, 13, 21\}, \{0, 2, 23\}, \{14, 17, 21\}, \{14, 17,$  $\{1, 11, 26\}, \{15, 18, 26\}, \{1, 6, 12\}, \{11, 12, 24\}, \{0, 8, 13\}, \{12, 14, 26\},$  $\{0, 9, 26\}, \{3, 4, 21\}, \{2, 6, 21\}, \{2, 18, 22\}, \{3, 14, 15\}, \{14, 22, 24\}, \{17, 22, 23\}, \{17, 22,$  $\{3, 6, 16\}, \{12, 13, 20\}, \{5, 9, 10\}, \{5, 6, 11\}, \{11, 18, 21\}, \{1, 14, 16\},$  $\{11, 19, 25\}, \{10, 21, 22\}, \{4, 18, 20\}, \{16, 21, 26\}, \{16, 18, 19\}, \{10, 12, 25\},$  $\{0, 3, 12\}, \{5, 8, 16\}, \{17, 25, 26\}, \{6, 23, 25\}, \{1, 3, 20\}, \{20, 22, 26\}, \{0, 14, 18\},$  $\{0, 1, 21\}, \{0, 5, 20\}, \{2, 14, 19\}, \{6, 9, 15\}, \{5, 24, 26\}, \{8, 17, 24\}, \{2, 7, 16\},$  $\{2, 13, 25\}, \{6, 8, 18\}, \{9, 12, 19\}, \{7, 15, 21\}, \{7, 8, 19\}, \{9, 11, 22\}, \{8, 14, 25\}, \{9, 11, 22\}, \{8, 14, 25\}, \{9, 12, 19\}, \{9, 12, 12\}, \{9, 12, 19\}, \{9, 12, 12\}, \{9, 12, 12\}, \{9, 12, 12\}, \{9, 12, 12\}, \{9, 12, 12\}, \{9, 12, 12\}, \{9, 12, 12\}, \{9, 12, 12\}, \{9, 1$  $\{3, 13, 24\}, \{5, 19, 21\}, \{1, 2, 5\}, \{1, 10, 17\}, \{3, 18, 23\}, \{4, 11, 23\}, \{6, 13, 14\},$  $\{12, 16, 23\}, \{1, 18, 24\}, \{0, 10, 16\}, \{8, 15, 20\}, \{1, 4, 15\}, \{13, 15, 23\},$  $\{4, 12, 22\}, \{10, 13, 18\}, \{2, 17, 20\}, \{9, 16, 17\}, \{1, 9, 25\}, \{5, 7, 12\}, \{1, 8, 22\}, \{1, 8, 22\}, \{1, 8, 22\}, \{1, 8, 22\}, \{1, 8, 22\}, \{1, 8, 22\}, \{1, 8, 22\}, \{1, 8, 22\}, \{1, 8, 22\}, \{2, 17, 20\}, \{2, 17, 20\}, \{2, 17, 20\}, \{2, 17, 20\}, \{2, 17, 20\}, \{3, 10, 10\}, \{1, 9, 25\}, \{4, 12, 20\}, \{1, 10, 10\}, \{$  $\{6, 10, 26\}, \{15, 22, 25\}, \{3, 5, 22\}, \{0, 24, 25\}, \{20, 21, 25\}, \{19, 20, 24\},$  $\{5, 18, 25\}, \{11, 16, 20\}, \{4, 6, 24\}, \{7, 10, 24\}, \{1, 13, 19\}, \{3, 10, 11\}, \{0, 6, 17\},$  $\{4, 9, 14\}, \{0, 7, 22\}, \{2, 8, 11\}, \{7, 9, 18\}, \{4, 8, 26\}, \{10, 15, 19\}, \{4, 16, 25\}, \{4, 16,$  $\{21, 23, 24\}, \{0, 4, 19\}, \{6, 19, 22\}, \{12, 17, 18\}, \{11, 13, 17\}, \{2, 3, 26\}, \{3, 8, 9\}, \{12, 17, 18\}, \{11, 13, 17\}, \{2, 3, 26\}, \{3, 8, 9\}, \{12, 17, 18\}, \{13, 17\}, \{2, 3, 26\}, \{3, 8, 9\}, \{13, 12, 12, 12, 12\}, \{14, 12, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14, 12, 12\}, \{14,$  $\{9, 20, 23\}, \{6, 7, 20\}, \{15, 16, 24\}, \{2, 9, 24\}$ intersection 0:

 $\{0, 2, 15\}, \{9, 11, 26\}, \{11, 15, 22\}, \{13, 23, 25\}, \{3, 10, 21\}, \{15, 16, 19\}, \\ \{3, 5, 12\}, \{1, 15, 21\}, \{7, 21, 22\}, \{5, 15, 23\}, \{12, 17, 22\}, \{1, 2, 24\}, \{4, 7, 8\}, \\ \{11, 17, 21\}, \{15, 18, 24\}, \{4, 5, 10\}, \{5, 7, 18\}, \{6, 8, 21\}, \{12, 14, 19\}, \\ \{0, 20, 25\}, \{0, 4, 18\}, \{2, 10, 17\}, \{5, 24, 26\}, \{8, 18, 23\}, \{14, 18, 22\}, \\ \{0, 10, 12\}, \{5, 8, 25\}, \{2, 4, 16\}, \{4, 14, 25\}, \{9, 17, 19\}, \{4, 20, 21\}, \{4, 11, 24\}, \\ \{10, 18, 25\}, \{2, 22, 25\}, \{14, 16, 24\}, \{0, 13, 19\}, \{3, 24, 25\}, \{10, 19, 22\}, \\ \{7, 9, 25\}, \{12, 20, 23\}, \{3, 7, 26\}, \{4, 9, 15\}, \{11, 16, 18\}, \{2, 21, 23\}, \{2, 13, 18\}, \\$ 

 $\{5, 13, 22\}, \{20, 22, 24\}, \{6, 7, 19\}, \{3, 4, 19\}, \{0, 17, 23\}, \{4, 13, 17\}, \{0, 1, 16\}, \\ \{6, 14, 20\}, \{3, 13, 15\}, \{12, 16, 26\}, \{10, 11, 23\}, \{0, 5, 9\}, \{8, 13, 16\}, \\ \{3, 14, 17\}, \{0, 8, 14\}, \{18, 19, 20\}, \{1, 4, 12\}, \{8, 15, 17\}, \{4, 6, 22\}, \{12, 13, 24\}, \\ \{6, 10, 26\}, \{0, 3, 6\}, \{5, 11, 20\}, \{0, 7, 11\}, \{9, 22, 23\}, \{2, 5, 19\}, \{2, 7, 20\}, \\ \{7, 17, 24\}, \{3, 8, 20\}, \{1, 3, 23\}, \{14, 15, 26\}, \{0, 21, 24\}, \{16, 21, 25\}, \{2, 8, 26\}, \\ \{9, 13, 21\}, \{1, 7, 13\}, \{8, 10, 24\}, \{1, 9, 10\}, \{8, 11, 19\}, \{10, 15, 20\}, \{0, 22, 26\}, \\ \{19, 23, 24\}, \{1, 8, 22\}, \{7, 10, 16\}, \{1, 11, 14\}, \{4, 23, 26\}, \{10, 13, 14\}, \\ \{7, 12, 15\}, \{1, 17, 20\}, \{1, 18, 26\}, \{17, 25, 26\}, \{12, 18, 21\}, \{19, 21, 26\}, \\ \{2, 3, 11\}, \{6, 16, 23\}, \{3, 9, 18\}, \{5, 14, 21\}, \{6, 11, 13\}, \{7, 14, 23\}, \{2, 9, 14\}, \\ \{13, 20, 26\}, \{6, 9, 24\}, \{1, 5, 6\}, \{5, 16, 17\}, \{11, 12, 25\}$ 

### C Cases from Theorem 28:

C(a)  $b-1, b-2, b-3, b-5 \in I(7, 15), I(7, 19), I(7, 21)$ 

 $2, 4, 5, 6 \in I(7, 15)$ 

 $\{2, 3, 6\}$ 

 $\{0, 1, 2\}, \{0, 3, 4\}, \{0, 5, 6\}, \{1, 3, 5\}, \{1, 4, 6\}, \{2, 4, 5\}$ 

 $\begin{array}{l} \{2,9,13\}, \ \{0,13,14\}, \ \{5,8,13\}, \ \{1,8,14\}, \ \{4,7,13\}, \ \{6,8,11\}, \ \{5,7,9\}, \\ \{7,12,14\}, \ \{2,7,8\}, \ \{0,7,11\}, \ \{3,8,12\}, \ \{0,8,9\}, \ \{1,9,11\}, \ \{6,9,14\}, \\ \{5,10,14\}, \ \{0,10,12\}, \ \{1,12,13\}, \ \{1,7,10\}, \ \{3,6,7\}, \ \{5,11,12\}, \ \{3,11,13\}, \\ \{4,8,10\}, \ \{2,6,12\}, \ \{3,9,10\}, \ \{6,10,13\}, \ \{2,3,14\}, \ \{2,10,11\}, \ \{4,11,14\}, \\ \{4,9,12\} \\ \{0,3,4\}, \ \{0,1,2\} \end{array}$ 

 $\{2,3,6\}, \{2,4,5\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}$ 

 $\begin{array}{l} \{5,8,10\}, \ \{0,3,11\}, \ \{1,12,13\}, \ \{0,7,8\}, \ \{4,8,9\}, \ \{1,2,8\}, \ \{7,10,12\}, \\ \{4,11,13\}, \ \{1,7,14\}, \ \{5,13,14\}, \ \{4,10,14\}, \ \{2,10,11\}, \ \{6,10,13\}, \ \{0,9,13\}, \\ \{3,9,10\}, \ \{1,9,11\}, \ \{5,7,9\}, \ \{8,11,14\}, \ \{2,7,13\}, \ \{2,9,12\}, \ \{5,11,12\}, \\ \{3,8,13\}, \ \{3,12,14\}, \ \{6,9,14\}, \ \{6,8,12\}, \ \{3,4,7\}, \ \{6,7,11\}, \ \{0,2,14\}, \\ \{0,1,10\}, \ \{0,4,12\}, \\ \{1,3,5\}, \ \{0,5,6\}, \ \{0,3,4\} \end{array}$ 

 $\{0, 1, 2\}, \{1, 4, 6\}, \{2, 3, 6\}, \{2, 4, 5\}$ 

 $\begin{array}{l} \{1,7,8\}, \ \{6,12,13\}, \ \{5,10,11\}, \ \{0,8,9\}, \ \{0,11,12\}, \ \{5,6,7\}, \ \{9,10,14\}, \\ \{2,8,12\}, \ \{4,8,14\}, \ \{3,4,10\}, \ \{0,4,13\}, \ \{2,7,9\}, \ \{0,3,5\}, \ \{3,9,13\}, \\ \{3,8,11\}, \ \{1,3,14\}, \ \{6,8,10\}, \ \{1,10,12\}, \ \{5,8,13\}, \ \{1,5,9\}, \ \{1,11,13\}, \\ \{6,9,11\}, \ \{2,11,14\}, \ \{0,7,10\}, \ \{3,7,12\}, \ \{4,9,12\}, \ \{2,10,13\}, \ \{0,6,14\}, \\ \{5,12,14\}, \ \{7,13,14\}, \ \{4,7,11\} \\ \{1,3,5\}, \ \{2,4,5\}, \ \{0,5,6\}, \ \{0,1,2\}, \ \{0,3,4\} \end{array}$ 

 $\{2,3,6\}, \{1,4,6\}$ 

 $\{0, 1, 7\}, \{1, 2, 5\}, \{1, 9, 13\}, \{3, 4, 5\}, \{1, 8, 10\}, \{0, 3, 11\}, \{0, 5, 8\}, \\ \{10, 11, 14\}, \{2, 8, 14\}, \{1, 11, 12\}, \{5, 11, 13\}, \{0, 4, 9\}, \{0, 6, 14\}, \{0, 10, 13\}, \\ \{3, 8, 13\}, \{6, 12, 13\}, \{3, 10, 12\}, \{3, 7, 9\}, \{8, 9, 12\}, \{0, 2, 12\}, \{5, 9, 14\}, \\ \{2, 7, 11\}, \{1, 3, 14\}, \{2, 9, 10\}, \{4, 8, 11\}, \{5, 7, 12\}, \{2, 4, 13\}, \{6, 9, 11\}, \\ \{4, 12, 14\}, \{5, 6, 10\}, \{7, 13, 14\}, \{6, 7, 8\}, \{4, 7, 10\}$ 

### $2, 4, 5, 6 \in I(7, 19)$

 $\{0, 3, 4\}$ 

 $\{0, 1, 2\}, \{2, 4, 5\}, \{0, 5, 6\}, \{1, 3, 5\}, \{1, 4, 6\}, \{2, 3, 6\}$ 

 $\{5, 10, 16\}, \{5, 11, 13\}, \{0, 3, 11\}, \{9, 11, 12\}, \{5, 9, 18\}, \{0, 12, 17\}, \{1, 10, 15\}, \\ \{0, 9, 14\}, \{8, 10, 12\}, \{5, 12, 15\}, \{2, 12, 13\}, \{9, 15, 16\}, \{4, 7, 17\}, \{6, 9, 17\}, \\ \{3, 7, 9\}, \{13, 15, 17\}, \{3, 16, 18\}, \{2, 10, 18\}, \{14, 16, 17\}, \{7, 12, 18\}, \\ \{7, 10, 11\}, \{0, 8, 18\}, \{2, 11, 17\}, \{8, 13, 16\}, \{11, 14, 18\}, \{6, 12, 16\}, \{2, 7, 16\}, \\ \{3, 4, 12\}, \{3, 8, 15\}, \{3, 10, 17\}, \{5, 8, 17\}, \{1, 9, 13\}, \{0, 10, 13\}, \{6, 8, 11\}, \\ \{4, 11, 15\}, \{6, 10, 14\}, \{5, 7, 14\}, \{1, 17, 18\}, \{1, 11, 16\}, \{4, 13, 18\}, \{2, 14, 15\}, \\ \{4, 8, 14\}, \{6, 7, 13\}, \{1, 12, 14\}, \{3, 13, 14\}, \{4, 9, 10\}, \{0, 7, 15\}, \{0, 4, 16\}, \\ \{6, 15, 18\}, \{1, 7, 8\}, \{2, 8, 9\} \\ \{0, 3, 4\}, \{2, 4, 5\}$ 

 $\{0, 1, 2\}, \{2, 3, 6\}, \{0, 5, 6\}, \{1, 3, 5\}, \{1, 4, 6\}$ 

 $\{0, 8, 15\}, \{1, 11, 18\}, \{10, 11, 17\}, \{5, 9, 13\}, \{5, 14, 18\}, \{15, 16, 17\}, \{4, 5, 17\}, \\ \{6, 13, 14\}, \{0, 10, 16\}, \{1, 7, 14\}, \{7, 10, 18\}, \{3, 4, 11\}, \{0, 11, 14\}, \{4, 8, 9\}, \\ \{6, 16, 18\}, \{7, 8, 11\}, \{7, 13, 15\}, \{0, 3, 9\}, \{3, 7, 16\}, \{3, 10, 12\}, \{11, 12, 13\}, \\ \{4, 13, 16\}, \{8, 14, 17\}, \{3, 14, 15\}, \{2, 11, 16\}, \{1, 9, 17\}, \{5, 12, 16\}, \{6, 7, 17\}, \\ \{9, 14, 16\}, \{2, 12, 14\}, \{0, 13, 18\}, \{3, 17, 18\}, \{4, 10, 14\}, \{2, 4, 15\}, \{1, 12, 15\}, \\ \{6, 10, 15\}, \{9, 15, 18\}, \{5, 8, 10\}, \{5, 11, 15\}, \{6, 8, 12\}, \{2, 13, 17\}, \{6, 9, 11\}, \\ \{7, 9, 12\}, \{2, 8, 18\}, \{2, 9, 10\}, \{2, 5, 7\}, \{4, 12, 18\}, \{0, 12, 17\}, \{1, 10, 13\}, \\ \{0, 3, 4\}, \{0, 1, 2\}, \{2, 3, 6\}$ 

 $\{1,4,6\}, \{2,4,5\}, \{0,5,6\}, \{1,3,5\}$ 

 $\begin{array}{l} \{3,10,13\}, \ \{0,13,15\}, \ \{8,9,13\}, \ \{12,13,18\}, \ \{4,16,18\}, \ \{3,6,17\}, \ \{0,7,11\}, \\ \{4,8,10\}, \ \{1,17,18\}, \ \{4,7,15\}, \ \{6,13,16\}, \ \{0,10,18\}, \ \{6,8,14\}, \ \{9,14,18\}, \\ \{7,13,14\}, \ \{5,10,17\}, \ \{0,1,16\}, \ \{6,10,11\}, \ \{1,2,13\}, \ \{1,9,10\}, \ \{5,11,13\}, \\ \{5,14,16\}, \ \{5,15,18\}, \ \{6,12,15\}, \ \{9,15,17\}, \ \{3,11,18\}, \ \{7,12,17\}, \ \{0,8,17\}, \\ \{5,7,9\}, \ \{2,8,18\}, \ \{1,14,15\}, \ \{4,13,17\}, \ \{2,3,14\}, \ \{1,11,12\}, \ \{4,9,11\}, \\ \{8,11,16\}, \ \{11,14,17\}, \ \{2,6,9\}, \ \{0,3,9\}, \ \{3,8,15\}, \ \{9,12,16\}, \ \{2,16,17\}, \\ \{3,4,12\}, \ \{0,4,14\}, \ \{3,7,16\}, \ \{1,7,8\}, \ \{6,7,18\}, \ \{10,15,16\}, \ \{0,2,12\}, \end{array}$ 

 $\{5, 8, 12\}, \{2, 11, 15\}, \{10, 12, 14\}, \{2, 7, 10\}$  $\{2, 3, 6\}, \{1, 3, 5\}, \{2, 4, 5\}, \{0, 3, 4\}, \{1, 4, 6\}$ 

 $\{0, 1, 2\}, \{0, 5, 6\}$ 

 $\{0, 4, 12\}, \{1, 6, 12\}, \{4, 6, 11\}, \{0, 11, 18\}, \{2, 4, 16\}, \{2, 8, 15\}, \{4, 14, 15\}, \\ \{13, 15, 18\}, \{2, 7, 18\}, \{6, 7, 13\}, \{0, 7, 14\}, \{1, 8, 14\}, \{5, 8, 16\}, \{8, 12, 13\}, \\ \{0, 3, 15\}, \{6, 8, 17\}, \{14, 17, 18\}, \{2, 9, 12\}, \{7, 9, 16\}, \{7, 10, 17\}, \{3, 4, 5\}, \\ \{3, 8, 18\}, \{12, 16, 17\}, \{1, 15, 17\}, \{2, 6, 14\}, \{4, 7, 8\}, \{11, 14, 16\}, \{3, 6, 16\}, \\ \{1, 16, 18\}, \{5, 12, 18\}, \{10, 12, 14\}, \{0, 13, 16\}, \{6, 9, 15\}, \{4, 13, 17\}, \\ \{10, 15, 16\}, \{5, 11, 17\}, \{1, 7, 11\}, \{6, 10, 18\}, \{3, 10, 11\}, \{2, 5, 10\}, \{1, 4, 10\}, \\ \{3, 7, 12\}, \{0, 9, 17\}, \{2, 11, 13\}, \{8, 9, 11\}, \{4, 9, 18\}, \{1, 5, 13\}, \{5, 7, 15\}, \\ \{2, 3, 17\}, \{0, 8, 10\}, \{1, 3, 9\}, \{11, 12, 15\}, \{5, 9, 14\}, \{3, 13, 14\}, \{9, 10, 13\}$ 

 $2, 4, 5, 6 \in I(7, 21)$ 

 $\{0, 1, 2\}$ 

 $\{2,4,5\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}, \{2,3,6\}$ 

 $\{5,8,11\}, \{6,8,18\}, \{0,1,10\}, \{0,8,20\}, \{8,12,16\}, \{7,18,20\}, \{6,9,14\}, \\ \{6,13,19\}, \{1,7,14\}, \{12,15,18\}, \{0,17,18\}, \{4,8,10\}, \{3,14,15\}, \{9,13,20\}, \\ \{3,19,20\}, \{2,14,20\}, \{6,7,10\}, \{11,16,18\}, \{6,12,17\}, \{3,16,17\}, \\ \{9,15,17\}, \{4,13,16\}, \{3,9,18\}, \{5,15,20\}, \{8,14,17\}, \{1,16,20\}, \{2,7,8\}, \\ \{10,12,20\}, \{4,7,15\}, \{0,2,16\}, \{0,11,15\}, \{5,16,19\}, \{1,11,17\}, \{7,11,19\}, \\ \{1,12,13\}, \{7,9,16\}, \{1,8,15\}, \{4,14,18\}, \{2,13,17\}, \{4,12,19\}, \{5,9,10\}, \\ \{6,11,20\}, \{6,15,16\}, \{10,14,16\}, \{0,7,13\}, \{4,9,11\}, \{5,7,17\}, \{3,10,11\}, \\ \{0,14,19\}, \{10,13,15\}, \{3,8,13\}, \{3,7,12\}, \{2,15,19\}, \{5,13,18\}, \\ \{11,13,14\}, \{10,17,19\}, \{8,9,19\}, \{4,17,20\}, \{0,9,12\}, \{1,18,19\}, \\ \{2,3,6\}, \{0,1,2\}$ 

 $\{2,4,5\}, \{0,3,4\}, \{0,5,6\}, \{1,3,5\}, \{1,4,6\}$ 

 $\{4, 15, 16\}, \{2, 8, 14\}, \{6, 7, 14\}, \{3, 9, 15\}, \{3, 6, 12\}, \{8, 10, 18\}, \{6, 16, 20\}, \\ \{7, 8, 17\}, \{1, 14, 20\}, \{9, 10, 16\}, \{0, 1, 12\}, \{0, 13, 19\}, \{0, 8, 20\}, \{1, 10, 13\}, \\ \{1, 9, 18\}, \{5, 15, 18\}, \{4, 8, 13\}, \{5, 9, 17\}, \{1, 15, 17\}, \{3, 8, 16\}, \{6, 9, 19\}, \\ \{8, 9, 12\}, \{0, 10, 11\}, \{2, 11, 15\}, \{5, 8, 11\}, \{13, 17, 20\}, \{3, 13, 18\}, \\ \{12, 13, 15\}, \{4, 11, 19\}, \{2, 10, 12\}, \{13, 14, 16\}, \{0, 7, 9\}, \{6, 10, 17\}, \\ \{5, 14, 19\}, \{3, 11, 20\}, \{0, 14, 15\}, \{2, 9, 20\}, \{2, 18, 19\}, \{10, 15, 19\}, \\ \{11, 14, 17\}, \{1, 8, 19\}, \{0, 17, 18\}, \{7, 16, 18\}, \{4, 18, 20\}, \{7, 15, 20\}, \{1, 2, 7\}, \\ \{9, 11, 13\}, \{2, 6, 13\}, \{4, 7, 10\}, \{5, 12, 16\}, \{2, 3, 17\}, \{3, 10, 14\}, \{4, 9, 14\}, \\ \{7, 11, 12\}, \{12, 19, 20\}, \{6, 8, 15\}, \{4, 12, 17\}, \{6, 11, 18\}, \{5, 10, 20\}, \\ \{16, 17, 19\}, \{12, 14, 18\}, \{0, 2, 16\}, \{1, 11, 16\}, \{5, 7, 13\}, \{3, 7, 19\}, \\ \{0, 5, 6\}, \{0, 1, 2\}, \{2, 4, 5\}$ 

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 $\{2,3,6\}, \{0,3,4\}, \{1,4,6\}, \{1,3,5\}$ 

 $\{5, 8, 15\}, \{1, 2, 19\}, \{1, 12, 17\}, \{0, 16, 19\}, \{6, 10, 11\}, \{7, 11, 18\}, \{8, 13, 19\}, \\ \{2, 9, 13\}, \{2, 5, 7\}, \{4, 7, 20\}, \{0, 7, 14\}, \{6, 8, 9\}, \{10, 13, 15\}, \{0, 6, 18\}, \\ \{3, 15, 20\}, \{1, 7, 8\}, \{6, 14, 19\}, \{13, 18, 20\}, \{5, 12, 16\}, \{1, 16, 18\}, \{6, 7, 17\}, \\ \{0, 9, 17\}, \{1, 13, 14\}, \{5, 9, 11\}, \{8, 10, 12\}, \{5, 6, 20\}, \{4, 13, 17\}, \{10, 17, 20\}, \\ \{6, 12, 13\}, \{1, 11, 20\}, \{2, 4, 12\}, \{14, 15, 17\}, \{8, 16, 20\}, \{11, 13, 16\}, \\ \{9, 10, 14\}, \{2, 10, 16\}, \{0, 2, 8\}, \{4, 14, 16\}, \{0, 5, 13\}, \{9, 19, 20\}, \{3, 11, 19\}, \\ \{1, 9, 15\}, \{4, 5, 10\}, \{8, 17, 18\}, \{5, 17, 19\}, \{7, 12, 15\}, \{0, 12, 20\}, \{5, 14, 18\}, \\ \{3, 8, 14\}, \{4, 8, 11\}, \{4, 15, 19\}, \{4, 9, 18\}, \{12, 18, 19\}, \{0, 11, 15\}, \{3, 9, 12\}, \\ \{7, 10, 19\}, \{3, 16, 17\}, \{2, 15, 18\}, \{2, 14, 20\}, \{0, 1, 10\}, \{6, 15, 16\}, \{3, 10, 18\}, \\ \{2, 11, 17\}, \{11, 12, 14\}, \{7, 9, 16\}, \{3, 7, 13\}, \\ \{2, 3, 6\}, \{1, 4, 6\}, \{0, 1, 2\}, \{0, 5, 6\}, \{0, 3, 4\}$ 

 $\{2,4,5\}, \{1,3,5\}$ 

 $\{4, 11, 13\}, \{5, 11, 19\}, \{3, 8, 9\}, \{9, 10, 18\}, \{2, 8, 14\}, \{5, 6, 15\}, \{3, 7, 20\}, \\ \{1, 10, 19\}, \{3, 10, 11\}, \{7, 12, 14\}, \{0, 6, 10\}, \{2, 12, 15\}, \{1, 6, 12\}, \{0, 1, 13\}, \\ \{11, 12, 16\}, \{7, 8, 11\}, \{2, 10, 20\}, \{5, 7, 18\}, \{5, 16, 17\}, \{0, 12, 18\}, \{6, 11, 18\}, \\ \{4, 6, 9\}, \{3, 13, 17\}, \{0, 8, 16\}, \{0, 3, 15\}, \{2, 3, 18\}, \{1, 11, 20\}, \{0, 14, 17\}, \\ \{4, 8, 20\}, \{8, 12, 17\}, \{7, 9, 15\}, \{7, 16, 19\}, \{5, 8, 10\}, \{15, 19, 20\}, \{11, 14, 15\}, \\ \{9, 12, 20\}, \{0, 4, 7\}, \{2, 6, 16\}, \{13, 14, 19\}, \{13, 16, 20\}, \{1, 4, 14\}, \{1, 2, 7\}, \\ \{5, 9, 14\}, \{2, 11, 17\}, \{7, 10, 17\}, \{5, 12, 13\}, \{1, 8, 15\}, \{2, 9, 13\}, \{4, 18, 19\}, \\ \{3, 12, 19\}, \{10, 14, 16\}, \{3, 4, 16\}, \{8, 13, 18\}, \{0, 2, 19\}, \{1, 17, 18\}, \{1, 9, 16\}, \\ \{14, 18, 20\}, \{10, 13, 15\}, \{3, 6, 14\}, \{4, 15, 17\}, \{15, 16, 18\}, \{0, 9, 11\}, \\ \{6, 8, 19\}, \{0, 5, 20\}, \{9, 17, 19\}, \{4, 10, 12\}, \{6, 7, 13\}, \{6, 17, 20\}$ 

**C(b)**  $b-1, b-2, b-3, b-4, b-5, b-7 \in I(9, 19), I(9, 21), I(9, 25), I(9, 27)$ 

#### $5, 7, 8, 9, 10, 11 \in I(9, 19)$

 $\{2, 5, 8\}$ 

 $\{0,1,2\}, \{3,4,5\}, \{6,7,8\}, \{0,3,6\}, \{1,4,7\}, \{2,4,6\}, \{0,4,8\}, \{1,5,6\}, \{2,3,7\}, \{0,5,7\}, \{1,3,8\}$ 

 $\begin{array}{l} \{4,10,17\}, \ \{10,15,18\}, \ \{8,9,16\}, \ \{3,11,18\}, \ \{1,12,15\}, \ \{3,9,17\}, \ \{8,10,11\}, \\ \{3,13,16\}, \ \{0,9,13\}, \ \{5,8,18\}, \ \{2,13,14\}, \ \{7,11,14\}, \ \{5,13,15\}, \ \{1,14,16\}, \\ \{2,9,18\}, \ \{2,5,10\}, \ \{2,8,15\}, \ \{3,14,15\}, \ \{0,10,14\}, \ \{4,15,16\}, \ \{2,12,16\}, \\ \{8,13,17\}, \ \{1,9,10\}, \ \{7,13,18\}, \ \{4,12,13\}, \ \{4,9,11\}, \ \{4,14,18\}, \ \{0,16,18\}, \\ \{3,10,12\}, \ \{7,10,16\}, \ \{7,9,15\}, \ \{5,14,17\}, \ \{2,11,17\}, \ \{6,11,15\}, \ \{5,9,12\}, \\ \{6,10,13\}, \ \{7,12,17\}, \ \{6,16,17\}, \ \{0,15,17\}, \ \{6,9,14\}, \ \{5,11,16\}, \ \{1,17,18\}, \\ \{0,11,12\}, \ \{1,11,13\}, \ \{6,12,18\}, \ \{8,12,14\}, \ \{1,5,6\} \end{array}$ 

 $\{0,1,2\}, \{3,4,5\}, \{6,7,8\}, \{0,3,6\}, \{1,4,7\}, \{2,5,8\}, \{0,4,8\}, \{1,3,8\},$ 

 $\{2,3,7\}, \{2,4,6\}$ 

 $\{4, 13, 15\}, \{4, 9, 16\}, \{3, 16, 17\}, \{2, 11, 13\}, \{7, 16, 18\}, \{8, 9, 11\}, \{2, 10, 12\}, \\ \{8, 13, 17\}, \{1, 12, 17\}, \{6, 17, 18\}, \{6, 9, 13\}, \{4, 10, 17\}, \{4, 11, 14\}, \{1, 5, 9\}, \\ \{0, 5, 17\}, \{5, 6, 12\}, \{7, 10, 15\}, \{3, 10, 13\}, \{2, 9, 18\}, \{1, 11, 16\}, \{8, 10, 18\}, \\ \{0, 11, 12\}, \{0, 15, 18\}, \{0, 13, 16\}, \{8, 14, 15\}, \{7, 9, 12\}, \{2, 14, 17\}, \{3, 12, 15\}, \\ \{7, 11, 17\}, \{3, 11, 18\}, \{1, 13, 18\}, \{3, 9, 14\}, \{8, 12, 16\}, \{9, 15, 17\}, \{4, 12, 18\}, \\ \{6, 10, 11\}, \{2, 15, 16\}, \{0, 9, 10\}, \{1, 6, 15\}, \{5, 7, 13\}, \{5, 11, 15\}, \{5, 10, 16\}, \\ \{1, 10, 14\}, \{0, 7, 14\}, \{6, 14, 16\}, \{5, 14, 18\}, \{12, 13, 14\} \\ \{2, 5, 8\}, \{2, 3, 7\}, \{2, 4, 6\}$ 

 $\{0, 1, 2\}, \{3, 4, 5\}, \{6, 7, 8\}, \{0, 3, 6\}, \{1, 4, 7\}, \{0, 5, 7\}, \{0, 4, 8\}, \{1, 5, 6\}, \{1, 3, 8\}$ 

 $\begin{array}{l} \{2,5,11\}, \ \{1,10,15\}, \ \{6,11,13\}, \ \{5,9,13\}, \ \{2,13,17\}, \ \{2,4,14\}, \ \{6,12,15\}, \\ \{8,9,17\}, \ \{0,14,16\}, \ \{1,9,11\}, \ \{3,15,17\}, \ \{7,11,18\}, \ \{7,12,13\}, \ \{2,8,12\}, \\ \{4,11,16\}, \ \{1,12,17\}, \ \{4,6,17\}, \ \{5,8,14\}, \ \{4,9,18\}, \ \{9,12,16\}, \ \{3,10,11\}, \\ \{8,10,16\}, \ \{2,6,16\}, \ \{0,10,13\}, \ \{7,10,14\}, \ \{8,13,18\}, \ \{4,10,12\}, \ \{3,12,14\}, \\ \{3,7,9\}, \ \{2,7,15\}, \ \{3,13,16\}, \ \{1,13,14\}, \ \{6,10,18\}, \ \{14,15,18\}, \ \{6,9,14\}, \\ \{1,16,18\}, \ \{0,9,15\}, \ \{8,11,15\}, \ \{0,17,18\}, \ \{7,16,17\}, \ \{2,3,18\}, \ \{4,13,15\}, \\ \{5,12,18\}, \ \{5,15,16\}, \ \{0,11,12\}, \ \{5,10,17\}, \ \{11,14,17\}, \ \{2,9,10\}, \ \{2,3,7\}, \ \{0,3,6\}, \ \{3,4,5\}, \ \{2,5,8\} \end{array}$ 

 $\{0, 1, 2\}, \{0, 5, 7\}, \{6, 7, 8\}, \{1, 3, 8\}, \{1, 4, 7\}, \{2, 4, 6\}, \{0, 4, 8\}, \{1, 5, 6\}$ 

 $\{7,9,15\}, \{7,12,17\}, \{13,14,18\}, \{0,10,12\}, \{2,13,15\}, \{1,12,14\}, \\ \{11,13,17\}, \{3,12,18\}, \{0,11,16\}, \{3,7,13\}, \{3,4,15\}, \{1,9,13\}, \{2,3,10\}, \\ \{0,3,9\}, \{6,14,16\}, \{9,10,17\}, \{0,6,13\}, \{5,9,14\}, \{1,15,18\}, \{6,9,18\}, \\ \{8,12,13\}, \{3,5,16\}, \{0,14,15\}, \{0,17,18\}, \{7,10,16\}, \{3,11,14\}, \{6,10,15\}, \\ \{6,11,12\}, \{5,15,17\}, \{5,8,18\}, \{7,11,18\}, \{3,6,17\}, \{2,7,14\}, \{1,16,17\}, \\ \{2,16,18\}, \{8,10,14\}, \{12,15,16\}, \{2,8,17\}, \{8,9,16\}, \{2,9,11\}, \{4,9,12\}, \\ \{4,10,18\}, \{5,10,13\}, \{4,13,16\}, \{8,11,15\}, \{1,10,11\}, \{2,5,12\}, \{4,5,11\}, \\ \{4,14,17\}$ 

 $\{0,3,6\}, \{3,4,5\}, \{2,3,7\}, \{0,4,8\}, \{2,4,6\}$ 

 $\{0,1,2\}, \{1,3,8\}, \{6,7,8\}, \{1,5,6\}, \{1,4,7\}, \{2,5,8\}, \{0,5,7\}$ 

 $\{0, 8, 15\}, \{3, 11, 17\}, \{4, 5, 11\}, \{8, 13, 17\}, \{13, 15, 16\}, \{6, 9, 13\}, \{7, 10, 17\}, \\ \{6, 12, 17\}, \{2, 12, 15\}, \{4, 8, 9\}, \{5, 9, 18\}, \{0, 4, 10\}, \{2, 17, 18\}, \{5, 13, 14\}, \\ \{0, 3, 13\}, \{6, 11, 14\}, \{8, 11, 16\}, \{7, 12, 13\}, \{7, 14, 15\}, \{0, 14, 16\}, \{1, 11, 13\}, \\ \{9, 11, 15\}, \{1, 12, 14\}, \{9, 12, 16\}, \{7, 11, 18\}, \{8, 10, 12\}, \{4, 14, 17\}, \{4, 6, 16\}, \\ \{3, 4, 15\}, \{5, 15, 17\}, \{2, 10, 11\}, \{2, 7, 16\}, \{6, 10, 15\}, \{3, 10, 14\}, \{8, 14, 18\}, \\ \{2, 9, 14\}, \{1, 16, 17\}, \{1, 9, 10\}, \{0, 11, 12\}, \{0, 9, 17\}, \{5, 10, 16\}, \{2, 3, 6\}, \\ \{2, 4, 13\}, \{3, 7, 9\}, \{0, 6, 18\}, \{3, 5, 12\}, \{10, 13, 18\}, \{1, 15, 18\}, \{4, 12, 18\}, \\ \{3, 16, 18\}, \\ \{0, 5, 7\}, \{0, 1, 2\}, \{6, 7, 8\}, \{1, 3, 8\}, \{3, 4, 5\}, \{2, 3, 7\}, \{1, 5, 6\}$ 

 $\{0,4,8\}, \{2,5,8\}, \{2,4,6\}, \{0,3,6\}, \{1,4,7\}$ 

 $\{2, 12, 16\}, \{9, 11, 17\}, \{1, 5, 17\}, \{10, 13, 15\}, \{0, 14, 17\}, \{8, 14, 16\}, \{5, 9, 12\}, \\ \{1, 9, 14\}, \{1, 11, 15\}, \{3, 13, 14\}, \{3, 10, 12\}, \{4, 10, 18\}, \{1, 8, 13\}, \{6, 13, 17\}, \\ \{6, 14, 15\}, \{6, 9, 10\}, \{3, 5, 7\}, \{5, 6, 11\}, \{1, 2, 10\}, \{7, 10, 17\}, \{4, 16, 17\}, \\ \{4, 11, 14\}, \{3, 4, 9\}, \{2, 3, 15\}, \{6, 7, 18\}, \{2, 7, 14\}, \{0, 1, 12\}, \{4, 12, 13\}, \\ \{12, 14, 18\}, \{7, 13, 16\}, \{2, 17, 18\}, \{9, 13, 18\}, \{4, 5, 15\}, \{6, 8, 12\}, \{3, 11, 16\}, \\ \{12, 15, 17\}, \{5, 10, 14\}, \{0, 11, 18\}, \{7, 11, 12\}, \{1, 3, 18\}, \{2, 11, 13\}, \\ \{5, 16, 18\}, \{3, 8, 17\}, \{7, 8, 9\}, \{0, 7, 15\}, \{0, 5, 13\}, \{8, 10, 11\}, \{0, 2, 9\}, \\ \{8, 15, 18\}, \{0, 10, 16\}, \{9, 15, 16\}, \{1, 6, 16\}$ 

### $5, 7, 8, 9, 10, 11 \in I(9, 21)$

 $\{2, 5, 8\}$ 

 $\{0,1,2\}, \{3,4,5\}, \{6,7,8\}, \{0,3,6\}, \{1,4,7\}, \{2,4,6\}, \{0,4,8\}, \{1,5,6\}, \{2,3,7\}, \{0,5,7\}, \{1,3,8\}$ 

 $\{7, 13, 14\}, \{9, 12, 20\}, \{5, 10, 20\}, \{14, 17, 18\}, \{5, 12, 17\}, \{7, 12, 19\}, \\ \{8, 9, 10\}, \{5, 8, 13\}, \{0, 18, 19\}, \{7, 9, 11\}, \{4, 10, 15\}, \{8, 17, 20\}, \{3, 14, 20\}, \\ \{1, 12, 18\}, \{1, 11, 17\}, \{3, 16, 17\}, \{1, 9, 16\}, \{0, 10, 11\}, \{3, 13, 19\}, \{2, 5, 9\}, \\ \{0, 15, 17\}, \{6, 16, 20\}, \{3, 9, 18\}, \{2, 15, 20\}, \{0, 12, 16\}, \{3, 11, 15\}, \{2, 10, 16\}, \\ \{2, 17, 19\}, \{6, 10, 18\}, \{2, 11, 18\}, \{7, 15, 16\}, \{11, 13, 16\}, \{4, 9, 17\}, \{0, 9, 14\}, \\ \{10, 14, 19\}, \{1, 14, 15\}, \{5, 15, 18\}, \{1, 19, 20\}, \{1, 10, 13\}, \{2, 12, 13\}, \\ \{6, 9, 19\}, \{5, 14, 16\}, \{6, 12, 15\}, \{6, 13, 17\}, \{3, 10, 12\}, \{4, 16, 19\}, \{7, 18, 20\}, \\ \{2, 8, 14\}, \{8, 16, 18\}, \{5, 11, 19\}, \{4, 12, 14\}, \{6, 11, 14\}, \{9, 13, 15\}, \{8, 11, 12\}, \\ \{0, 13, 20\}, \{8, 15, 19\}, \{7, 10, 17\}, \{4, 11, 20\}, \{4, 13, 18\} \\ \{0, 5, 7\}, \{3, 4, 5\}$ 

 $\{0, 1, 2\}, \{1, 3, 8\}, \{6, 7, 8\}, \{0, 3, 6\}, \{1, 4, 7\}, \{2, 5, 8\}, \{0, 4, 8\}, \{1, 5, 6\}, \{2, 3, 7\}, \{2, 4, 6\}$ 

 $\begin{array}{l} \{13,15,16\}, \ \{3,9,20\}, \ \{1,10,13\}, \ \{8,13,17\}, \ \{7,11,14\}, \ \{6,14,17\}, \\ \{5,10,12\}, \ \{8,12,20\}, \ \{0,16,17\}, \ \{8,10,14\}, \ \{14,15,20\}, \ \{2,17,20\}, \\ \{1,18,19\}, \ \{2,12,16\}, \ \{4,5,15\}, \ \{1,9,15\}, \ \{2,13,19\}, \ \{0,10,20\}, \ \{7,10,19\}, \\ \{1,11,17\}, \ \{9,14,16\}, \ \{10,17,18\}, \ \{0,11,12\}, \ \{4,19,20\}, \ \{6,12,13\}, \\ \{5,18,20\}, \ \{6,11,20\}, \ \{0,7,9\}, \ \{4,16,18\}, \ \{9,11,13\}, \ \{0,5,14\}, \ \{5,9,17\}, \\ \{2,14,18\}, \ \{7,15,17\}, \ \{8,9,19\}, \ \{3,10,16\}, \ \{1,12,14\}, \ \{8,15,18\}, \ \{3,12,15\}, \\ \{3,4,17\}, \ \{7,12,18\}, \ \{6,10,15\}, \ \{4,9,12\}, \ \{3,5,13\}, \ \{6,16,19\}, \ \{4,13,14\}, \\ \{0,13,18\}, \ \{0,15,19\}, \ \{5,7,16\}, \ \{2,11,15\}, \ \{3,11,18\}, \ \{12,17,19\}, \ \{2,9,10\}, \\ \{3,14,19\}, \ \{6,9,18\}, \ \{8,11,16\}, \ \{4,10,11\}, \ \{5,11,19\}, \ \{1,16,20\}, \ \{7,13,20\}, \\ \{0,4,8\}, \ \{6,7,8\}, \ \{1,5,6\} \end{array}$ 

 $\{0, 1, 2\}, \{3, 4, 5\}, \{1, 3, 8\}, \{0, 3, 6\}, \{1, 4, 7\}, \{2, 5, 8\}, \{2, 4, 6\}, \{0, 5, 7\}, \{2, 3, 7\}$ 

 $\{4,9,20\}, \{5,18,19\}, \{2,11,14\}, \{8,14,17\}, \{5,16,17\}, \{5,12,15\}, \{8,13,18\}, \\ \{3,12,13\}, \{1,14,19\}, \{3,19,20\}, \{6,7,9\}, \{3,11,16\}, \{1,10,15\}, \{1,6,20\}, \\ \{7,12,17\}, \{10,18,20\}, \{0,8,9\}, \{9,11,15\}, \{2,12,19\}, \{9,17,19\}, \{0,13,14\}, \\ \{3,14,15\}, \{7,10,19\}, \{13,15,20\}, \{1,16,18\}, \{1,9,12\}, \{8,10,12\}, \{6,8,19\}, \\ \{2,10,16\}, \{4,15,19\}, \{0,4,18\}, \{2,17,20\}, \{5,9,10\}, \{6,17,18\}, \{9,14,16\}, \\ \{5,11,20\}, \{2,15,18\}, \{4,13,17\}, \{11,13,19\}, \{4,12,16\}, \{7,14,20\}, \\ \{0,12,20\}, \{7,11,18\}, \{1,5,13\}, \{0,15,17\}, \{7,13,16\}, \{3,10,17\}, \{8,16,20\}, \\ \{5,6,14\}, \{3,9,18\}, \{0,16,19\}, \{1,11,17\}, \{4,8,11\}, \{6,10,13\}, \{4,10,14\}, \\ \{7,8,15\}, \{2,9,13\}, \{6,15,16\}, \{0,10,11\}, \{12,14,18\}, \{6,11,12\}, \\ \{2,3,7\}, \{0,1,2\}, \{1,3,8\}, \{3,4,5\}$ 

 $\{0,5,7\}, \{2,4,6\}, \{6,7,8\}, \{0,3,6\}, \{1,4,7\}, \{2,5,8\}, \{0,4,8\}, \{1,5,6\}$ 

 $\{3, 11, 19\}, \{2, 11, 18\}, \{8, 10, 17\}, \{2, 3, 10\}, \{1, 11, 14\}, \{4, 5, 9\}, \{5, 14, 20\}, \\ \{4, 12, 15\}, \{7, 10, 13\}, \{0, 10, 18\}, \{4, 10, 14\}, \{1, 9, 19\}, \{5, 10, 19\}, \{1, 10, 15\}, \\ \{1, 3, 18\}, \{13, 17, 20\}, \{1, 2, 16\}, \{0, 14, 17\}, \{10, 12, 16\}, \{4, 18, 20\}, \\ \{6, 18, 19\}, \{15, 16, 20\}, \{7, 15, 19\}, \{2, 9, 20\}, \{5, 12, 13\}, \{9, 16, 17\}, \\ \{5, 16, 18\}, \{3, 8, 20\}, \{7, 14, 16\}, \{3, 5, 17\}, \{0, 11, 12\}, \{3, 4, 16\}, \{7, 9, 18\}, \\ \{3, 13, 15\}, \{2, 12, 14\}, \{0, 2, 15\}, \{4, 11, 13\}, \{1, 12, 17\}, \{15, 17, 18\}, \\ \{9, 10, 11\}, \{2, 13, 19\}, \{13, 14, 18\}, \{8, 11, 16\}, \{5, 11, 15\}, \{6, 10, 20\}, \\ \{6, 11, 17\}, \{6, 13, 16\}, \{3, 7, 12\}, \{7, 11, 20\}, \{6, 14, 15\}, \{6, 9, 12\}, \{8, 12, 18\}, \\ \{3, 9, 14\}, \{1, 8, 13\}, \{12, 19, 20\}, \{8, 9, 15\}, \{4, 17, 19\}, \{0, 1, 20\}, \{8, 14, 19\}, \\ \{2, 7, 17\}, \{0, 16, 19\}, \{0, 9, 13\}, \\ \{1, 5, 6\}, \{6, 7, 8\}, \{0, 3, 6\}, \{2, 4, 6\}, \{0, 4, 8\}$ 

 $\{0,1,2\}, \{3,4,5\}, \{1,3,8\}, \{0,5,7\}, \{1,4,7\}, \{2,5,8\}, \{2,3,7\}$ 

 $\{6,9,12\}, \{7,14,20\}, \{0,10,15\}, \{8,9,15\}, \{8,12,20\}, \{7,12,13\}, \{9,11,18\}, \\ \{15,17,18\}, \{10,19,20\}, \{1,11,17\}, \{3,10,17\}, \{2,11,12\}, \{4,9,16\}, \\ \{0,4,13\}, \{8,13,19\}, \{5,17,20\}, \{11,13,20\}, \{3,14,15\}, \{6,8,11\}, \{3,12,18\}, \\ \{0,16,19\}, \{4,10,12\}, \{2,14,17\}, \{8,10,16\}, \{2,9,20\}, \{7,15,16\}, \{2,6,15\}, \\ \{1,15,20\}, \{0,3,11\}, \{0,12,17\}, \{2,10,13\}, \{5,13,15\}, \{10,14,18\}, \{2,4,19\}, \\ \{5,6,16\}, \{5,12,14\}, \{3,16,20\}, \{5,10,11\}, \{3,9,13\}, \{1,5,9\}, \{5,18,19\}, \\ \{0,8,18\}, \{7,9,10\}, \{0,6,20\}, \{13,16,17\}, \{4,11,15\}, \{7,8,17\}, \{4,8,14\}, \\ \{0,9,14\}, \{1,13,18\}, \{1,14,19\}, \{7,11,19\}, \{1,6,10\}, \{9,17,19\}, \{6,7,18\}, \\ \{1,14,16\}, \{6,13,14\}$ 

 $\{1,3,8\}, \{1,4,7\}, \{0,3,6\}, \{0,4,8\}, \{3,4,5\}, \{0,5,7\}, \{2,3,7\}$ 

 $\{0, 1, 2\}, \{1, 5, 6\}, \{6, 7, 8\}, \{2, 5, 8\}, \{2, 4, 6\}$ 

 $\begin{array}{l} \{8,11,18\}, \ \{4,9,13\}, \ \{2,10,11\}, \ \{0,16,20\}, \ \{3,17,18\}, \ \{3,11,15\}, \ \{2,7,14\}, \\ \{9,10,18\}, \ \{5,15,19\}, \ \{6,13,14\}, \ \{14,15,17\}, \ \{4,10,17\}, \ \{5,18,20\}, \\ \{4,7,11\}, \ \{4,5,16\}, \ \{5,12,13\}, \ \{3,6,9\}, \ \{8,9,15\}, \ \{5,7,9\}, \ \{3,7,16\}, \\ \{2,13,16\}, \ \{12,17,19\}, \ \{6,10,15\}, \ \{6,19,20\}, \ \{0,3,4\}, \ \{1,4,18\}, \ \{8,10,16\}, \\ \end{array}$ 

XXXII

 $\begin{array}{l} \{1,10,20\}, \ \{4,8,20\}, \ \{6,12,18\}, \ \{2,15,18\}, \ \{13,15,20\}, \ \{9,16,19\}, \\ \{14,16,18\}, \ \{0,10,13\}, \ \{8,13,17\}, \ \{3,5,10\}, \ \{7,13,18\}, \ \{0,6,11\}, \\ \{11,12,16\}, \ \{3,8,12\}, \ \{1,8,19\}, \ \{1,9,14\}, \ \{7,17,20\}, \ \{5,11,14\}, \ \{9,11,20\}, \\ \{1,15,16\}, \ \{4,12,15\}, \ \{6,16,17\}, \ \{0,8,14\}, \ \{4,14,19\}, \ \{10,12,14\}, \ \{0,7,15\}, \\ \{1,11,17\}, \ \{0,5,17\}, \ \{2,9,17\}, \ \{1,3,13\}, \ \{3,14,20\}, \ \{1,7,12\}, \ \{2,3,19\}, \\ \{0,9,12\}, \ \{2,12,20\}, \ \{0,18,19\}, \ \{7,10,19\}, \ \{11,13,19\} \end{array}$ 

#### $5, 7, 8, 9, 10, 11 \in I(9, 25)$

 $\{0, 4, 8\}$ 

 $\{0, 1, 2\}, \{3, 4, 5\}, \{6, 7, 8\}, \{0, 3, 6\}, \{1, 4, 7\}, \{2, 5, 8\}, \{2, 4, 6\}, \{1, 5, 6\}, \{2, 3, 7\}, \{0, 5, 7\}, \{1, 3, 8\}$ 

 $\{0, 19, 23\}, \{5, 16, 20\}, \{4, 11, 21\}, \{7, 10, 21\}, \{3, 21, 22\}, \{6, 20, 22\}, \{8, 15, 16\}, \\ \{1, 10, 15\}, \{4, 8, 24\}, \{4, 9, 13\}, \{3, 14, 20\}, \{7, 9, 12\}, \{4, 12, 16\}, \{17, 18, 24\}, \\ \{13, 15, 21\}, \{8, 14, 18\}, \{1, 16, 19\}, \{8, 12, 19\}, \{4, 15, 20\}, \{3, 9, 11\}, \\ \{7, 13, 17\}, \{11, 22, 23\}, \{0, 9, 16\}, \{20, 21, 24\}, \{0, 10, 24\}, \{8, 10, 20\}, \\ \{4, 10, 19\}, \{0, 4, 14\}, \{9, 15, 17\}, \{3, 10, 16\}, \{2, 10, 22\}, \{0, 13, 20\}, \{8, 11, 17\}, \\ \{2, 9, 23\}, \{8, 9, 22\}, \{4, 18, 22\}, \{18, 19, 21\}, \{11, 16, 24\}, \{1, 23, 24\}, \\ \{7, 16, 22\}, \{6, 9, 24\}, \{1, 9, 14\}, \{0, 11, 12\}, \{3, 13, 18\}, \{3, 15, 23\}, \{0, 17, 22\}, \\ \{14, 22, 24\}, \{1, 17, 21\}, \{7, 15, 24\}, \{1, 11, 20\}, \{2, 12, 24\}, \{1, 13, 22\}, \\ \{0, 8, 21\}, \{7, 14, 23\}, \{9, 10, 18\}, \{2, 11, 13\}, \{2, 15, 19\}, \{5, 18, 23\}, \{6, 10, 23\}, \\ \{5, 12, 14\}, \{3, 12, 17\}, \{7, 18, 20\}, \{6, 14, 15\}, \{7, 11, 19\}, \{1, 12, 18\}, \\ \{10, 11, 14\}, \{9, 19, 20\}, \{12, 20, 23\}, \{13, 14, 19\}, \{3, 19, 24\}, \{6, 12, 21\}, \\ \{5, 19, 22\}, \{6, 13, 16\}, \{10, 12, 13\}, \{4, 17, 23\}, \{2, 17, 20\}, \{6, 11, 18\}, \\ \{2, 14, 21\}, \{8, 13, 23\}, \{0, 15, 18\}, \{5, 9, 21\}, \{2, 16, 18\}, \{12, 15, 22\}, \\ \{16, 21, 23\}, \{6, 17, 19\}, \{5, 11, 15\}, \{14, 16, 17\}, \{5, 13, 24\}, \{5, 10, 17\}, \\ \{2, 3, 7\}, \{0, 4, 8\}$ 

 $\{0, 1, 2\}, \{3, 4, 5\}, \{6, 7, 8\}, \{0, 3, 6\}, \{1, 4, 7\}, \{2, 5, 8\}, \{1, 3, 8\}, \{1, 5, 6\}, \{2, 4, 6\}, \{0, 5, 7\}$ 

 $\{7, 10, 23\}, \{12, 19, 22\}, \{0, 8, 19\}, \{20, 21, 24\}, \{17, 19, 21\}, \{13, 14, 15\}, \\ \{11, 15, 21\}, \{2, 3, 19\}, \{10, 16, 24\}, \{10, 14, 19\}, \{6, 14, 22\}, \{2, 11, 13\}, \\ \{8, 15, 20\}, \{4, 14, 21\}, \{4, 11, 24\}, \{0, 9, 16\}, \{7, 18, 24\}, \{0, 17, 24\}, \{5, 9, 17\}, \\ \{8, 21, 22\}, \{4, 13, 19\}, \{6, 9, 21\}, \{2, 16, 17\}, \{1, 19, 20\}, \{8, 13, 17\}, \{17, 20, 22\}, \\ \{3, 7, 21\}, \{4, 16, 20\}, \{6, 15, 17\}, \{2, 15, 24\}, \{8, 9, 11\}, \{8, 10, 12\}, \{0, 11, 22\}, \\ \{3, 9, 10\}, \{6, 12, 13\}, \{1, 12, 17\}, \{3, 11, 20\}, \{3, 13, 24\}, \{6, 10, 20\}, \{7, 16, 19\}, \\ \{3, 12, 15\}, \{3, 17, 23\}, \{0, 10, 15\}, \{5, 11, 14\}, \{12, 14, 20\}, \{12, 16, 18\}, \\ \{7, 11, 12\}, \{7, 15, 22\}, \{9, 19, 24\}, \{2, 7, 20\}, \{5, 15, 19\}, \{2, 12, 21\}, \{1, 15, 16\}, \\ \{1, 10, 11\}, \{1, 18, 21\}, \{7, 9, 13\}, \{5, 12, 24\}, \{3, 14, 16\}, \{13, 16, 21\}, \{0, 4, 12\}, \\ \{4, 22, 23\}, \{4, 9, 15\}, \{7, 14, 17\}, \{2, 14, 23\}, \{10, 13, 22\}, \{1, 22, 24\}, \\ \{5, 20, 23\}, \{0, 21, 23\}, \{5, 16, 22\}, \{8, 14, 24\}, \{6, 11, 16\}, \{15, 18, 23\}, \\ \{1, 13, 23\}, \{0, 14, 18\}, \{11, 17, 18\}, \{9, 18, 20\}, \{11, 19, 23\}, \{3, 18, 22\}, \\ \{2, 10, 18\}, \{5, 13, 18\}, \{8, 16, 23\}, \{5, 10, 21\}, \{4, 8, 18\}, \{6, 18, 19\}, \{4, 10, 17\}, \\ \{5, 20, 23\}, \{5, 13, 18\}, \{8, 16, 23\}, \{5, 10, 21\}, \{4, 8, 18\}, \{6, 18, 19\}, \{4, 10, 17\}, \\ \{2, 20, 21\}, \{2, 10, 18\}, \{5, 13, 18\}, \{5, 13, 18\}, \{5, 10, 21\}, \{4, 8, 18\}, \{6, 18, 19\}, \{4, 10, 17\}, \\ \{5, 20, 21\}, \{5, 21\}, \{5, 22\}, \{5, 22\}, \{5, 20, 21\}, \{4, 9, 15\}, \{5, 23\}, \{5, 20, 21\}, \{5, 23\}, \{5, 2$ 

 $\{ 6, 23, 24 \}, \{ 0, 13, 20 \}, \{ 2, 9, 22 \}, \{ 9, 12, 23 \}, \{ 1, 9, 14 \} \\ \{ 0, 4, 8 \}, \{ 0, 1, 2 \}, \{ 6, 7, 8 \}$ 

 $\{1,3,8\}, \{3,4,5\}, \{0,5,7\}, \{0,3,6\}, \{1,4,7\}, \{2,5,8\}, \{2,4,6\}, \{1,5,6\}, \{2,3,7\}$ 

 $\{7, 11, 23\}, \{0, 13, 18\}, \{0, 17, 22\}, \{4, 8, 23\}, \{3, 11, 19\}, \{2, 13, 24\}, \{5, 12, 16\}, \\ \{5, 17, 18\}, \{7, 10, 22\}, \{2, 15, 17\}, \{2, 9, 11\}, \{7, 8, 13\}, \{0, 9, 14\}, \{0, 2, 19\}, \\ \{5, 13, 15\}, \{6, 7, 18\}, \{9, 17, 23\}, \{5, 9, 10\}, \{1, 16, 23\}, \{5, 14, 23\}, \{0, 4, 12\}, \\ \{3, 10, 14\}, \{10, 18, 23\}, \{0, 15, 23\}, \{4, 9, 16\}, \{4, 15, 22\}, \{11, 12, 15\}, \\ \{10, 13, 19\}, \{3, 9, 20\}, \{11, 20, 22\}, \{16, 19, 24\}, \{1, 21, 22\}, \{8, 9, 15\}, \\ \{0, 10, 24\}, \{4, 11, 24\}, \{8, 16, 17\}, \{1, 9, 13\}, \{3, 12, 23\}, \{6, 14, 15\}, \{3, 17, 24\}, \\ \{1, 2, 12\}, \{4, 10, 20\}, \{10, 12, 17\}, \{6, 19, 23\}, \{7, 9, 21\}, \{4, 14, 18\}, \{4, 13, 17\}, \\ \{2, 14, 22\}, \{0, 8, 11\}, \{1, 14, 24\}, \{3, 16, 22\}, \{12, 13, 22\}, \{15, 21, 24\}, \\ \{3, 13, 21\}, \{8, 12, 14\}, \{8, 19, 20\}, \{1, 11, 17\}, \{7, 12, 24\}, \{6, 17, 21\}, \\ \{9, 18, 22\}, \{3, 15, 18\}, \{1, 18, 19\}, \{6, 8, 22\}, \{8, 18, 24\}, \{7, 15, 19\}, \{4, 19, 21\}, \\ \{6, 9, 24\}, \{14, 17, 19\}, \{5, 11, 21\}, \{11, 13, 14\}, \{22, 23, 24\}, \{7, 14, 16\}, \\ \{6, 12, 20\}, \{7, 17, 20\}, \{1, 10, 15\}, \{9, 12, 19\}, \{5, 20, 24\}, \{13, 20, 23\}, \\ \{12, 18, 21\}, \{5, 19, 22\}, \{2, 18, 20\}, \{11, 16, 18\}, \{15, 16, 20\}, \{6, 13, 16\}, \\ \{2, 21, 23\}, \{8, 10, 21\}, \{2, 10, 16\}, \{0, 16, 21\}, \{6, 10, 11\}, \{14, 20, 21\}, \{0, 1, 20\}, \\ \{6, 7, 8\}, \{2, 3, 7\}, \{1, 3, 8\}, \{0, 1, 2\}$ 

 $\{0,5,7\}, \{3,4,5\}, \{2,4,6\}, \{0,3,6\}, \{1,4,7\}, \{2,5,8\}, \{0,4,8\}, \{1,5,6\}$ 

 $\{3,7,24\}, \{7,14,17\}, \{3,14,16\}, \{0,15,20\}, \{7,16,21\}, \{10,13,15\}, \{1,9,10\}, \\ \{6,17,21\}, \{8,20,23\}, \{3,15,18\}, \{3,9,17\}, \{7,15,23\}, \{10,17,19\}, \{4,14,23\}, \\ \{5,13,14\}, \{7,10,20\}, \{2,13,23\}, \{9,15,24\}, \{0,21,22\}, \{11,16,24\}, \\ \{2,7,11\}, \{6,10,23\}, \{14,18,21\}, \{5,11,15\}, \{0,13,18\}, \{1,3,11\}, \{8,11,14\}, \\ \{1,8,19\}, \{6,18,24\}, \{4,10,11\}, \{4,18,20\}, \{0,10,14\}, \{6,7,13\}, \{6,12,22\}, \\ \{9,19,21\}, \{7,9,12\}, \{5,10,21\}, \{11,12,20\}, \{7,18,19\}, \{2,14,19\}, \\ \{9,14,22\}, \{0,12,24\}, \{5,9,20\}, \{8,12,18\}, \{2,10,12\}, \{11,13,17\}, \\ \{5,19,22\}, \{6,8,16\}, \{16,22,23\}, \{3,8,10\}, \{5,12,16\}, \{1,14,24\}, \{4,9,16\}, \\ \{6,14,20\}, \{12,14,15\}, \{10,22,24\}, \{4,12,19\}, \{5,17,18\}, \{2,3,21\}, \\ \{16,17,20\}, \{11,21,23\}, \{3,19,23\}, \{10,16,18\}, \{3,12,13\}, \{6,15,19\}, \\ \{2,17,24\}, \{8,15,17\}, \{0,1,17\}, \{19,20,24\}, \{13,16,19\}, \{1,13,22\}, \\ \{0,11,19\}, \{1,2,20\}, \{8,9,13\}, \{4,17,22\}, \{4,13,24\}, \{0,2,16\}, \{12,17,23\}, \\ \{1,12,21\}, \{2,9,18\}, \{7,8,22\}, \{13,20,21\}, \{3,20,22\}, \{5,23,24\}, \{1,15,16\}, \\ \{2,15,22\}, \{8,21,24\}, \{1,18,23\}, \{0,9,23\}, \{11,18,22\}, \{4,15,21\}, \{6,9,11\}, \\ \{1,5,6\}, \{3,4,5\}, \{0,4,8\}, \{0,3,6\}, \{2,5,8\} \\$ 

 $\{0, 1, 2\}, \{1, 3, 8\}, \{6, 7, 8\}, \{2, 3, 7\}, \{1, 4, 7\}, \{2, 4, 6\}, \{0, 5, 7\}$ 

 $\begin{array}{l} \{10,12,14\}, \ \{6,17,22\}, \ \{12,21,22\}, \ \{0,22,23\}, \ \{3,16,23\}, \ \{1,16,20\}, \\ \{3,13,19\}, \ \{5,16,18\}, \ \{0,3,14\}, \ \{8,11,24\}, \ \{2,13,15\}, \ \{3,17,18\}, \ \{9,14,19\}, \\ \{10,17,20\}, \ \{2,10,11\}, \ \{1,10,19\}, \ \{6,9,11\}, \ \{1,12,13\}, \ \{8,9,20\}, \\ \{12,19,20\}, \ \{4,20,23\}, \ \{2,5,17\}, \ \{7,12,24\}, \ \{3,4,12\}, \ \{2,14,24\}, \ \{4,14,17\}, \end{array}$ 

 $\{2, 8, 21\}, \{4, 19, 21\}, \{7, 9, 15\}, \{0, 10, 13\}, \{7, 11, 14\}, \{8, 18, 23\}, \{0, 9, 12\}, \\ \{9, 13, 18\}, \{5, 8, 19\}, \{2, 12, 18\}, \{0, 4, 11\}, \{6, 14, 20\}, \{0, 6, 19\}, \{11, 16, 22\}, \\ \{11, 17, 23\}, \{5, 12, 23\}, \{14, 15, 16\}, \{11, 13, 20\}, \{2, 20, 22\}, \{15, 21, 23\}, \\ \{4, 16, 24\}, \{5, 20, 24\}, \{0, 8, 16\}, \{7, 10, 23\}, \{14, 18, 21\}, \{7, 13, 22\}, \\ \{6, 13, 23\}, \{1, 5, 15\}, \{17, 19, 24\}, \{3, 15, 20\}, \{3, 10, 24\}, \{13, 16, 17\}, \\ \{1, 11, 21\}, \{6, 12, 16\}, \{1, 6, 18\}, \{9, 23, 24\}, \{10, 18, 22\}, \{15, 19, 22\}, \\ \{3, 6, 21\}, \{4, 15, 18\}, \{6, 15, 24\}, \{5, 9, 21\}, \{2, 9, 16\}, \{4, 8, 22\}, \{11, 18, 19\}, \\ \{7, 17, 21\}, \{1, 9, 17\}, \{7, 16, 19\}, \{10, 16, 21\}, \{0, 20, 21\}, \{5, 6, 10\}, \\ \{11, 12, 15\}, \{3, 9, 22\}, \{7, 18, 20\}, \{1, 14, 23\}, \{0, 18, 24\}, \{5, 14, 22\}, \\ \{2, 19, 23\}, \{4, 5, 13\}, \{13, 21, 24\}, \{8, 10, 15\}, \{4, 9, 10\}, \{1, 22, 24\}, \{8, 13, 14\}, \\ \{3, 5, 11\}, \{8, 12, 17\}, \{0, 15, 17\}, \\ \{0, 1, 2\}, \{2, 3, 7\}, \{1, 3, 8\}, \{1, 4, 7\}, \{0, 5, 7\}, \{6, 7, 8\}, \{2, 4, 6\} \\ \end{cases}$ 

 $\{2, 5, 8\}, \{3, 4, 5\}, \{0, 4, 8\}, \{0, 3, 6\}, \{1, 5, 6\}$ 

 $\{5,7,11\}, \{3,13,24\}, \{5,9,19\}, \{1,13,19\}, \{2,4,24\}, \{4,6,9\}, \{8,20,22\}, \\ \{4,10,15\}, \{0,12,19\}, \{7,12,17\}, \{7,8,9\}, \{5,10,21\}, \{12,15,20\}, \{1,3,7\}, \\ \{8,11,13\}, \{2,13,21\}, \{15,21,23\}, \{1,4,14\}, \{3,9,20\}, \{0,2,7\}, \{10,11,14\}, \\ \{9,14,21\}, \{6,7,22\}, \{2,6,20\}, \{3,8,10\}, \{13,18,20\}, \{8,16,23\}, \{0,5,13\}, \\ \{16,19,20\}, \{3,11,19\}, \{18,19,23\}, \{12,13,16\}, \{11,21,22\}, \{2,3,15\}, \\ \{4,20,21\}, \{3,14,16\}, \{6,10,18\}, \{3,17,21\}, \{3,12,18\}, \{0,11,18\}, \\ \{7,19,24\}, \{0,9,15\}, \{7,18,21\}, \{0,14,23\}, \{0,1,21\}, \{0,10,16\}, \{1,11,20\}, \\ \{0,20,24\}, \{9,10,12\}, \{1,12,22\}, \{5,14,17\}, \{1,2,18\}, \{4,11,12\}, \{9,11,23\}, \\ \{6,8,24\}, \{3,22,23\}, \{16,21,24\}, \{4,17,19\}, \{1,9,24\}, \{8,14,19\}, \{9,13,17\}, \\ \{6,12,14\}, \{2,12,23\}, \{0,17,22\}, \{5,16,22\}, \{13,14,15\}, \{14,18,24\}, \\ \{4,7,23\}, \{7,15,16\}, \{1,10,23\}, \{2,11,17\}, \{10,22,24\}, \{6,19,21\}, \\ \{5,15,18\}, \{1,16,17\}, \{10,17,20\}, \{7,14,20\}, \{9,18,22\}, \{6,15,17\}, \\ \{8,12,21\}, \{7,10,13\}, \{11,15,24\}, \{2,10,19\}, \{4,13,22\}, \{2,9,16\}, \\ \{15,19,22\}, \{6,13,23\}, \{8,17,18\}, \{4,16,18\}, \{5,20,23\}, \{6,11,16\}, \\ \{2,14,22\}, \{1,8,15\}, \{5,12,24\}, \{17,23,24\} \\ \end{tabular}$ 

#### $5, 7, 8, 9, 10, 11 \in I(9, 25)$

 $\{0, 3, 6\}$ 

 $\{0, 1, 2\}, \{3, 4, 5\}, \{6, 7, 8\}, \{2, 4, 6\}, \{1, 4, 7\}, \{2, 5, 8\}, \{0, 4, 8\}, \{1, 5, 6\}, \{2, 3, 7\}, \{0, 5, 7\}, \{1, 3, 8\}$ 

 $\{4, 14, 24\}, \{1, 14, 23\}, \{0, 24, 26\}, \{2, 17, 20\}, \{3, 16, 20\}, \{10, 13, 14\}, \{6, 9, 13\}, \\ \{4, 10, 21\}, \{1, 11, 26\}, \{7, 20, 24\}, \{5, 14, 26\}, \{8, 15, 22\}, \{6, 16, 21\}, \{3, 9, 12\}, \\ \{20, 21, 26\}, \{12, 15, 17\}, \{6, 11, 24\}, \{13, 15, 25\}, \{0, 13, 19\}, \{13, 20, 23\}, \\ \{2, 11, 15\}, \{0, 12, 21\}, \{11, 14, 21\}, \{4, 17, 18\}, \{18, 21, 25\}, \{8, 19, 26\}, \\ \{0, 18, 23\}, \{5, 19, 23\}, \{6, 12, 19\}, \{8, 17, 24\}, \{3, 14, 15\}, \{10, 23, 26\}, \\ \{3, 18, 26\}, \{7, 11, 18\}, \{2, 13, 26\}, \{0, 3, 10\}, \{8, 12, 14\}, \{6, 15, 26\}, \{1, 16, 25\}, \\ \{12, 20, 25\}, \{8, 11, 20\}, \{10, 12, 24\}, \{5, 22, 25\}, \{3, 19, 22\}, \{4, 15, 20\}, \\ \{1, 21, 24\}, \{10, 15, 16\}, \{4, 9, 23\}, \{9, 11, 19\}, \{7, 12, 26\}, \{7, 15, 23\}, \\ \end{cases}$ 

 $\{12, 16, 23\}, \{7, 21, 22\}, \{7, 9, 17\}, \{17, 22, 26\}, \{2, 14, 16\}, \{3, 17, 21\}, \{12, 16, 23\}, \{12, 12, 22\}, \{13, 16, 23\}, \{13, 17, 21\}, \{13, 16, 23\}, \{13,$  $\{5, 10, 20\}, \{8, 13, 21\}, \{3, 24, 25\}, \{9, 14, 20\}, \{6, 17, 25\}, \{5, 13, 17\},$  $\{18, 20, 22\}, \{1, 19, 20\}, \{2, 10, 25\}, \{1, 10, 17\}, \{9, 16, 24\}, \{1, 9, 22\}, \{3, 6, 23\}, \{1, 10, 17\}, \{1,$  $\{0, 9, 15\}, \{4, 13, 22\}, \{15, 19, 21\}, \{7, 13, 16\}, \{8, 9, 10\}, \{0, 16, 22\}, \{2, 19, 24\}, \{1, 13, 22\}, \{2, 19, 24\}, \{2, 19, 24\}, \{2, 19, 24\}, \{3, 10\}, \{4, 13, 22\}, \{4, 13,$  $\{4, 16, 26\}, \{6, 14, 22\}, \{14, 18, 19\}, \{0, 14, 17\}, \{9, 25, 26\}, \{0, 6, 20\}, \{14, 18, 19\}, \{14, 1$  $\{3, 11, 13\}, \{7, 14, 25\}, \{6, 10, 18\}, \{11, 17, 23\}, \{22, 23, 24\}, \{2, 9, 18\},$  $\{5, 9, 21\}, \{16, 17, 19\}, \{8, 16, 18\}, \{1, 15, 18\}, \{5, 11, 16\}, \{2, 21, 23\},$  $\{8, 23, 25\}, \{4, 19, 25\}, \{2, 12, 22\}, \{10, 11, 22\}, \{0, 11, 25\}, \{4, 11, 12\}, \{10, 11, 22\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{10, 11, 25\}, \{11, 12\},$  $\{5, 12, 18\}, \{7, 10, 19\}, \{13, 18, 24\}, \{5, 15, 24\}, \{1, 12, 13\}$  $\{6, 7, 8\}, \{2, 5, 8\}$  $\{0, 1, 2\}, \{3, 4, 5\}, \{2, 4, 6\}, \{0, 3, 6\}, \{1, 4, 7\}, \{1, 3, 8\}, \{0, 4, 8\}, \{1, 5, 6\},$  $\{2,3,7\}, \{0,5,7\}$  $\{17, 19, 22\}, \{1, 13, 19\}, \{8, 12, 21\}, \{3, 23, 24\}, \{0, 23, 25\}, \{0, 17, 24\}, \{6, 7, 15\}, \{1, 13, 19\}, \{1, 13, 19\}, \{2, 12, 21\}, \{3, 23, 24\}, \{1, 23, 25\}, \{2, 17, 24\}, \{2, 21\}, \{3, 23, 24\}, \{4, 23, 25\}, \{4, 17, 24\}, \{4, 23, 25\}, \{4, 17, 24\}, \{4, 23, 25\}, \{4, 17, 24\}, \{4, 23, 25\}, \{4, 17, 24\}, \{4, 23, 25\}, \{4, 17, 24\}, \{4, 23, 25\}, \{4, 17, 24\}, \{4, 23, 25\}, \{4, 17, 24\}, \{4, 23, 25\}, \{4, 17, 24\}, \{4, 17,$  $\{0, 14, 21\}, \{11, 12, 17\}, \{7, 14, 19\}, \{7, 21, 25\}, \{16, 24, 25\}, \{20, 22, 25\},$  $\{15, 16, 17\}, \{5, 8, 17\}, \{3, 12, 19\}, \{3, 16, 21\}, \{5, 15, 22\}, \{1, 16, 20\},$  $\{5, 21, 24\}, \{13, 16, 22\}, \{6, 20, 26\}, \{4, 11, 19\}, \{7, 13, 20\}, \{10, 17, 25\},$  $\{0, 12, 20\}, \{12, 24, 26\}, \{8, 25, 26\}, \{2, 8, 11\}, \{0, 11, 22\}, \{1, 18, 21\}, \{0, 11, 22\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{1, 18, 21\}, \{2, 18, 21\}, \{2, 18, 21\}, \{2, 18, 21\}, \{2, 18, 21\}, \{3,$  $\{3, 13, 17\}, \{2, 14, 18\}, \{5, 19, 25\}, \{6, 8, 24\}, \{4, 16, 26\}, \{4, 10, 24\}, \{2, 16, 19\},$  $\{4, 20, 21\}, \{2, 15, 24\}, \{9, 14, 16\}, \{1, 15, 23\}, \{10, 21, 23\}, \{19, 21, 26\},$  $\{6, 17, 21\}, \{4, 22, 23\}, \{8, 10, 22\}, \{11, 15, 21\}, \{2, 13, 25\}, \{9, 22, 24\},$  $\{11, 20, 23\}, \{3, 15, 20\}, \{3, 10, 26\}, \{2, 21, 22\}, \{6, 14, 25\}, \{1, 17, 26\},$  $\{7, 17, 23\}, \{4, 12, 18\}, \{13, 14, 23\}, \{14, 15, 26\}, \{7, 18, 24\}, \{6, 18, 22\},$  $\{7, 10, 11\}, \{0, 13, 26\}, \{6, 19, 23\}, \{5, 9, 20\}, \{10, 18, 19\}, \{2, 12, 23\}, \{7, 8, 9\}, \{10, 10, 10\}, \{10, 10,$  $\{0, 10, 15\}, \{19, 20, 24\}, \{5, 10, 16\}, \{4, 9, 25\}, \{8, 15, 19\}, \{4, 13, 15\},$  $\{3, 14, 22\}, \{6, 11, 16\}, \{10, 12, 14\}, \{8, 13, 18\}, \{2, 5, 26\}, \{5, 18, 23\}, \{2, 5, 26\}, \{5, 18, 23\}, \{5,$  $\{9, 15, 18\}, \{3, 9, 11\}, \{3, 18, 25\}, \{1, 9, 10\}, \{1, 12, 22\}, \{0, 9, 19\}, \{17, 18, 20\},$  $\{1, 11, 25\}, \{7, 22, 26\}, \{5, 11, 14\}, \{8, 16, 23\}, \{12, 15, 25\}, \{8, 14, 20\},$  $\{5, 12, 13\}, \{0, 16, 18\}, \{9, 23, 26\}, \{2, 10, 20\}, \{6, 10, 13\}, \{4, 14, 17\}, \{6, 9, 12\}, \{6, 9, 12\}, \{6, 10, 13\}, \{4, 14, 17\}, \{6, 10, 12\}, \{6, 10, 13\}, \{1, 10, 10\}, \{1, 1$  $\{9, 13, 21\}, \{7, 12, 16\}, \{1, 14, 24\}, \{2, 9, 17\}, \{11, 18, 26\}, \{11, 13, 24\}$  $\{0, 4, 8\}, \{2, 5, 8\}, \{1, 5, 6\}$  $\{0, 1, 2\}, \{3, 4, 5\}, \{6, 7, 8\}, \{0, 3, 6\}, \{1, 4, 7\}, \{1, 3, 8\}, \{2, 4, 6\}, \{0, 5, 7\},$  $\{2, 3, 7\}$  $\{2, 13, 21\}, \{0, 22, 24\}, \{0, 18, 23\}, \{9, 13, 22\}, \{3, 14, 23\}, \{4, 8, 26\}, \{4, 16, 22\}, \{4,$  $\{8, 9, 17\}, \{7, 12, 23\}, \{22, 25, 26\}, \{3, 11, 20\}, \{7, 17, 26\}, \{5, 16, 23\},$  $\{8, 14, 15\}, \{1, 9, 26\}, \{8, 10, 24\}, \{4, 12, 15\}, \{9, 15, 24\}, \{13, 20, 26\},\$  $\{0, 17, 20\}, \{4, 14, 17\}, \{6, 17, 25\}, \{4, 9, 18\}, \{10, 11, 12\}, \{15, 16, 18\},$  $\{14, 18, 26\}, \{2, 11, 23\}, \{9, 12, 20\}, \{3, 12, 16\}, \{5, 9, 21\}, \{0, 16, 19\},$  $\{0, 12, 14\}, \{6, 10, 14\}, \{7, 9, 14\}, \{5, 11, 26\}, \{12, 24, 25\}, \{1, 10, 23\},$  $\{5, 13, 17\}, \{2, 14, 22\}, \{13, 14, 25\}, \{8, 20, 23\}, \{2, 18, 20\}, \{0, 15, 26\}, \{2, 18, 20\}, \{0, 15, 26\}, \{13, 14, 25\}, \{13, 14, 25\}, \{13, 14, 25\}, \{2, 14, 20\}, \{2, 14, 20\}, \{2, 14, 20\}, \{2, 14, 20\}, \{2, 14, 20\}, \{2, 14, 20\}, \{2, 14, 20\}, \{2, 14, 20\}, \{2, 14, 20\}, \{2, 14, 20\}, \{3, 14, 20\},$  $\{1, 15, 22\}, \{4, 19, 21\}, \{0, 11, 21\}, \{10, 15, 20\}, \{1, 14, 21\}, \{3, 17, 22\},$  $\{7, 13, 24\}, \{23, 24, 26\}, \{20, 21, 25\}, \{1, 6, 20\}, \{7, 15, 21\}, \{7, 16, 25\},$  $\{8, 12, 21\}, \{3, 9, 10\}, \{19, 23, 25\}, \{2, 8, 25\}, \{6, 12, 13\}, \{1, 5, 12\}, \{6, 18, 21\}, \{8, 12, 13\}, \{8, 12, 13\}, \{1, 12, 12\}, \{1, 12, 13\}, \{1, 12, 12\}, \{1, 1$ 

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 $\begin{array}{l} \{7,10,22\}, \ \{5,8,18\}, \ \{2,19,24\}, \ \{4,20,24\}, \ \{3,19,26\}, \ \{10,18,19\}, \\ \{7,19,20\}, \ \{10,21,26\}, \ \{6,16,26\}, \ \{8,19,22\}, \ \{0,9,25\}, \ \{12,17,19\}, \\ \{5,20,22\}, \ \{15,17,23\}, \ \{5,6,24\}, \ \{1,11,17\}, \ \{0,4,10\}, \ \{3,21,24\}, \\ \{16,17,21\}, \ \{5,14,19\}, \ \{1,13,19\}, \ \{10,13,16\}, \ \{6,11,22\}, \ \{6,9,23\}, \\ \{1,18,25\}, \ \{2,10,17\}, \ \{6,15,19\}, \ \{2,12,26\}, \ \{2,9,16\}, \ \{3,15,25\}, \ \{2,5,15\}, \\ \{17,18,24\}, \ \{7,11,18\}, \ \{21,22,23\}, \ \{4,13,23\}, \ \{11,13,15\}, \ \{4,11,25\}, \\ \{1,16,24\}, \ \{8,11,16\}, \ \{12,18,22\}, \ \{5,10,25\}, \ \{14,16,20\}, \ \{0,8,13\}, \\ \{11,14,24\}, \ \{9,11,19\}, \ \{3,13,18\} \\ \{1,5,6\}, \ \{6,7,8\}, \ \{2,4,6\}, \ \{0,4,8\} \end{array}$ 

 $\{0,1,2\}, \{3,4,5\}, \{1,3,8\}, \{0,3,6\}, \{1,4,7\}, \{2,5,8\}, \{2,3,7\}, \{0,5,7\}$ 

 $\{20, 24, 26\}, \{13, 18, 19\}, \{11, 15, 17\}, \{6, 16, 26\}, \{0, 4, 18\}, \{3, 10, 13\}, \{11, 15, 17\}, \{21, 12, 12\}, \{11, 15, 17\}, \{11, 15, 17\}, \{21, 12, 12\}, \{21, 1$  $\{3, 22, 25\}, \{5, 10, 20\}, \{4, 20, 23\}, \{4, 8, 25\}, \{17, 21, 25\}, \{2, 6, 25\}, \{1, 10, 24\}, \{2, 25\}, \{$  $\{3, 14, 24\}, \{5, 6, 12\}, \{3, 16, 18\}, \{4, 21, 24\}, \{6, 18, 22\}, \{5, 19, 21\}, \{7, 8, 18\}, \{6, 18, 22\}, \{5, 19, 21\}, \{7, 8, 18$  $\{9, 16, 21\}, \{8, 10, 19\}, \{19, 24, 25\}, \{4, 12, 22\}, \{7, 9, 13\}, \{2, 10, 22\}, \{0, 16, 23\}, \{2, 10, 22\}, \{0, 16, 23\}, \{1, 12, 22\}, \{1, 12, 22\}, \{2, 10, 22\}, \{2, 10, 22\}, \{2, 10, 22\}, \{3, 10, 22\}, \{4, 12, 22\}, \{4,$  $\{2, 19, 20\}, \{15, 19, 22\}, \{8, 16, 24\}, \{8, 20, 21\}, \{12, 17, 20\}, \{17, 22, 26\}, \{17$  $\{1, 16, 25\}, \{7, 23, 26\}, \{5, 9, 25\}, \{0, 10, 21\}, \{6, 15, 20\}, \{1, 15, 18\}, \{7, 10, 15\},$  $\{0, 14, 22\}, \{2, 13, 23\}, \{8, 9, 26\}, \{10, 11, 14\}, \{18, 20, 25\}, \{5, 23, 24\},$  $\{14, 16, 19\}, \{7, 12, 19\}, \{4, 9, 15\}, \{9, 10, 18\}, \{0, 13, 20\}, \{2, 15, 16\}, \{1, 5, 17\}, \{1, 2, 10\}, \{1, 2, 10\}, \{2, 10, 10\}, \{1, 2, 10\}, \{1, 2, 10\}, \{1, 2, 10\}, \{2, 10, 10\}, \{1, 2, 1$  $\{10, 16, 17\}, \{4, 13, 14\}, \{1, 11, 22\}, \{2, 18, 21\}, \{4, 6, 19\}, \{8, 13, 17\},$  $\{3, 15, 26\}, \{5, 11, 26\}, \{8, 22, 23\}, \{4, 10, 26\}, \{0, 8, 12\}, \{6, 9, 17\}, \{1, 9, 19\}, \{2, 19\}, \{2, 19\}, \{2, 19\}, \{2, 19\}, \{2, 19\}, \{2, 19\}, \{2, 19\}, \{3, 10\}, \{3, 10\}, \{3, 10\}, \{3, 10\}, \{3, 10\}, \{4, 10$  $\{3, 9, 23\}, \{2, 9, 24\}, \{1, 14, 20\}, \{17, 18, 23\}, \{11, 19, 23\}, \{0, 15, 25\},$  $\{1, 12, 23\}, \{4, 11, 16\}, \{13, 22, 24\}, \{7, 21, 22\}, \{3, 11, 20\}, \{11, 18, 24\},$  $\{8, 14, 15\}, \{6, 10, 23\}, \{6, 14, 21\}, \{1, 6, 13\}, \{5, 13, 15\}, \{15, 21, 23\},$  $\{5, 16, 22\}, \{0, 17, 24\}, \{2, 4, 17\}, \{3, 17, 19\}, \{0, 9, 11\}, \{1, 21, 26\}, \{3, 12, 21\}, \{1, 21, 26\}, \{2, 4, 17\}, \{2, 4, 17\}, \{3, 17, 19\}, \{1, 21, 26\}, \{2, 4, 17\}, \{3, 17, 19\}, \{1, 21, 26\}, \{2, 4, 17\}, \{3, 17, 19\}, \{1, 21, 26\}, \{2, 4, 17\}, \{3, 17, 19\}, \{1, 21, 26\}, \{2, 12, 21\}, \{3, 12, 21\}, \{3, 12, 21\}, \{4, 12\}, \{4$  $\{6, 7, 24\}, \{7, 14, 17\}, \{13, 25, 26\}, \{10, 12, 25\}, \{0, 19, 26\}, \{5, 14, 18\},$  $\{11, 13, 21\}, \{7, 16, 20\}, \{14, 23, 25\}, \{6, 8, 11\}, \{12, 13, 16\}, \{2, 11, 12\}$  $\{0, 1, 2\}, \{0, 5, 7\}, \{0, 3, 6\}, \{6, 7, 8\}, \{0, 4, 8\}$ 

 $\{2,4,6\}, \{3,4,5\}, \{2,3,7\}, \{1,3,8\}, \{1,4,7\}, \{2,5,8\}, \{1,5,6\}$ 

 $\{3, 12, 26\}, \{0, 4, 12\}, \{7, 20, 22\}, \{3, 9, 23\}, \{5, 14, 26\}, \{13, 19, 24\}, \{7, 12, 19\}, \\ \{1, 22, 25\}, \{1, 11, 19\}, \{6, 10, 13\}, \{16, 17, 25\}, \{6, 12, 15\}, \{5, 17, 23\}, \{6, 7, 11\}, \\ \{0, 9, 11\}, \{3, 13, 15\}, \{4, 8, 18\}, \{14, 21, 24\}, \{4, 10, 14\}, \{5, 7, 15\}, \{12, 23, 24\}, \\ \{0, 13, 14\}, \{8, 12, 13\}, \{15, 22, 23\}, \{4, 15, 26\}, \{2, 14, 23\}, \{16, 20, 26\}, \\ \{9, 12, 20\}, \{15, 18, 20\}, \{19, 25, 26\}, \{1, 12, 16\}, \{3, 6, 24\}, \{2, 16, 24\}, \\ \{0, 3, 17\}, \{13, 18, 21\}, \{8, 11, 14\}, \{4, 11, 22\}, \{10, 12, 21\}, \{10, 15, 19\}, \\ \{0, 1, 15\}, \{0, 18, 22\}, \{11, 20, 24\}, \{7, 9, 21\}, \{6, 18, 19\}, \{6, 16, 23\}, \{2, 13, 20\}, \\ \{1, 18, 23\}, \{7, 14, 16\}, \{11, 15, 16\}, \{9, 10, 16\}, \{17, 19, 22\}, \{6, 8, 17\}, \\ \{8, 23, 26\}, \{5, 16, 19\}, \{11, 12, 17\}, \{6, 9, 26\}, \{5, 10, 22\}, \{14, 15, 17\}, \\ \{5, 11, 13\}, \{2, 12, 22\}, \{4, 17, 20\}, \{0, 7, 25\}, \{8, 9, 22\}, \{2, 11, 18\}, \{2, 9, 17\}, \\ \{13, 17, 26\}, \{6, 14, 22\}, \{3, 16, 18\}, \{12, 14, 18\}, \{5, 20, 21\}, \{10, 20, 23\}, \\ \{1, 14, 20\}, \{0, 21, 23\}, \{6, 21, 25\}, \{5, 12, 25\}, \{10, 17, 18\}, \{4, 19, 23\}, \\ \{7, 17, 24\}, \{1, 9, 13\}, \{1, 2, 26\}, \{2, 10, 25\}, \{2, 15, 21\}, \{1, 17, 21\}, \{7, 13, 23\}, \\ \$ 

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