

MAT 199H1S L0291 Aha! Mathematical Discovery and Creative Problem Solving
Assignment 10

Prof. McCann

Due: 2 pm Thursday April 1, 2021

NOT TO BE HANDED IN:

Read Sections 8.4–8.5 of 4th ed. and the handout on Fibonacci numbers.

Do problems 2, 5, 6, 11 from the Fibonacci handout plus §8.4 #11, 40

TO BE TURNED IN:

Problems 7 and 14 from the Fibonacci handout, plus:

A) You and your friend each pick a card from a regular deck of 52 cards but do not look at them. Both of you hold your cards up by your foreheads so you can each see the other person's card, but you can't see your own card. Your friend is holding an 8. What is the probability that your card is higher? (Assume that ace counts as the lowest card in the deck.)

B) You are a paleontologist who finds a dinosaur bone. You estimate it came from a stegosaurus with probability 40%, a triceratops with probability 25% and some other type of dinosaur with probability 35%. Later your colleague finds a confirmed Tyrannosaurus Rex bone at the same site. Earlier research shows that of all confirmed discoveries of stegosaurus bones, 2% have been found at sites that also contain Tyrannosaurus Rex bones, while of all confirmed discoveries of triceratops bones, 5% have been found at sites also containing Tyrannosaurus Rex bones. Complete a table analogous to §8.5 # 29, and then report which dinosaur is most likely to be the source of your original discovery.

C) Two people are suspected of robbing a bank. They are being interrogated in separate rooms. If both stay silent, they can be convicted of a lesser crime and sentenced to only 8 months. If one agrees to confess that they did it together, he can plea bargain a suspended sentence while the other is convicted to 5 years in prison. If both confess that they did it together, each will receive a 3 year prison term. Create a payoff matrix from the point of view of the first suspect. Find the Nash equilibrium strategies for both suspects in this game.

RECALL: Your final electronic journal entry is due by midnight Saturday April 3.