Objective: to review and refresh probabilities

Exercise 1: Basic Probability, Methods of Counting, Conditional Probability

Qn 1

Consider a family with two children. Assume

$$P(boy) = P(girl) = 0.5$$

What is the probability of the family with one boy and one girl?

Qn 2

In a roll of fair dice, let E be the event the number is even. Let F be the event that the number is less than or equal to 4. What is the probability that the number is even or less than or equal to 4?

Qn 3

Chevalier de Méré, a writer and nobleman from Louis XIV's court, found that it is a good strategy to bet that a '6' would turn up with one die in 4 throws, but he constantly lost if he betted that two '6' would turn up with two dice in 24 throws. He asked Pascal why? Can you help him?

Qn 4

A password has 8 letters. The first letter must be Capital Letter and the next 4 letters are lower case letters. The last three letters are numbers. How many different passwords are possible?

Qn 5

Suppose you have five books. In how many ways can the books be put on the bookshelf?

Qn 6

There are 120 students in Grade 6 of your secondary school. A Student Committee of 3 students is to be elected from Grade 6 students. How many different possibilities for the composition of the Committee is there?

Qn 7

Suppose 8 students are divided into 2 freely formed groups of 4. How many possible grouping arrangements are there?

Qn 8

Calculate the winning probabilities for 'Mark Six' a) winning 1st price; b) winning 2nd prize.

Qn 9

A fair coin is one for which there is a equal probability of turning up “head” and “tail”. If a fair coin is tossed twice, what is the conditional probability that both flips land on “heads”, given that the first flip lands on “heads”?

Qn 10

A student is taking a 2 hour exam. Suppose the probability that the student will finish the exam in less than x hours is $x/2.5$. Given that the student is still working after 1.5 hours, what is the conditional probability that he can finish the exam within 2 hours?

Qn 11

Joseph is undecided whether to take EE4222 Digital Forensics or EE4146 Data Engineering and Learning Systems. He estimates that his probability of getting B+ would be 2/3 in EE4222 and 0.5 in EE4146. If Joseph decides to base his decision on the flip of a fair coin, what is the probability that he gets a B+ in EE4222?

Qn 12

Suppose that a bag contains 4 red balls and 4 white balls. We draw 2 balls from the bag without replacement. If we assume that at each draw each ball is equally likely to be chosen, what is the probability that both balls drawn are white?

Answers:

Can be found in Lecture 2 notes. Only look at answers after completing the exercise. Finish this exercise and answer the survey in Quizzes of Canvas (deadline 7th September).