

## Homework 1: due Tuesday July 27

*Instructor: Donlapark Ponnoprat*

Please show all steps in your solutions to the following questions:

- Suppose that you have two biased coins, one with  $P(\text{head}) = 1/3$  and the other with  $P(\text{head}) = 1/4$ . Compute the probability that
  - 0 heads occur
  - 1 head occurs
  - 2 heads occur.
- Suppose that 0.5% of men and 0.25% of women are color-blind. Assume that 50% of the population are males and 50% are females. If a randomly chosen person is color-blind, what is the probability that the person is male?
- In the game of Yahtzee, five dice are rolled at the same time. We are going to assume that **the order of the roll does not matter**.

(a) What is the probability of getting the following rolls:

□, □, □, □, □

(Note that this roll is the same as □, □, □, □, □ and □, □, □, □, □ and so on).

Hint: Use the Basic Product or Conditional Probability.

(b) What is the probability of getting the following rolls:

□, □, □, □, □

Hint: Use the Combination to count the number of ways that two out of the five dice are □, then use the Basic Product or the Conditional Probability.

- Suppose that you were to roll 10,000 dice. What is the expected value of the number of □'s that you would get?  
Hint: For  $i = 1, 2, \dots, 10,000$ , let  $X_i = 1$  if the  $i$ -th roll is 6 and 0 otherwise.