

Department of Electrical and Computer Engineering
University of Massachusetts Dartmouth

ECE560: Computer Systems Performance Evaluation

Spring 2024

Homework #2

Name: _____

Instructor: Dr. Liudong Xing

ECE560: Computer Systems Performance Evaluation (Spring 2024)

Homework #2

Assigned: February 5, Monday

Due: February 12, Monday, 12:30pm

Instructions:

1. Print your name on the cover page if you choose to use it or on the first page of your answer sheets.
2. Show all steps of your solution. Answers without justification would subject to a big penalty.
3. If you submit via email, please organize all pages of your answers into one file, name your file using “**HW2-your last name.pdf or doc**” (e.g., HW2-Xing.pdf), and submit it to lxing@umassd.edu
4. There are three problems in this homework.
5. Relevant lecture: [Lecture #5](#)

Problems:

#1: Problem 23 (Page91) in Chapter 2 of the Textbook by Allen (a copy of the problem is included below)

23. [12] Fred Poisson, the chief statistician at Disneyland, has found that 72% of the visitors go on the Jungle Cruise, 56% ride the Monorail, 60% take the Matterhorn ride, 50% go on the Jungle Cruise and ride the Monorail, 45% go on the Jungle Cruise and on the Matterhorn ride, 40% ride the Monorail and take the Matterhorn ride, and 30% take all three rides. Assuming Poisson's figures are correct, calculate the probability that a visitor to Disneyland will
- (a) go on at least one of the three rides.
 - (b) ride the Monorail given that the Jungle Cruise was taken.
 - (c) take the Matterhorn ride given that both the Jungle Cruise and Monorail rides were taken.

#2: Problem 26 (Page92) in Chapter 2 of the Textbook by Allen (a copy of the problem is included below)

26. [10] The employees parking lot at the Buss Stout Fence Company has 50 percent U.S. cars, of which 15 percent are compact; 30 percent of the cars are European, of which 40 percent are compact; and 20 percent of the cars are Japanese, of which 60 percent are compact. If a car is randomly selected from the lot, calculate

- (a) The probability it is a compact.
- (b) Given that the car is a compact, the probability that it is European.

#3: Consider the experiment of rolling two dice. Let the sample space $S = \{(i, j) \mid 1 \leq i, j \leq 6\}$. Also, assume that each sample point is assigned a probability of $1/36$. Define the events A, B, and C so that

- A = “first die results in a 1, 2, or 3”
- B = “second die results in a 4, 5, or 6”
- C = “the sum of the two faces is 7”

Answer the following questions. **Please justify your answer.**

- 1) Are events A, B, and C pair-wise independent?
- 2) Are events A, B, and C mutually independent?