

CENG 222

Statistical Methods for Computer Engineering

Spring 2020-2021

Homework 2

Due date: 02 05 2021, Sunday, 23:55

Introduction

In this assignment, there are 3 questions related to the 4th chapter in your text book. While answering the questions, please **show your work** and the steps of your calculations. Give an explanation about what numbers mean in those steps. Otherwise, you may not get any point.

Questions

Q1. (40 pts.) The amount of time that it takes a student to complete a CENG222 homework is uniformly distributed between 60 and 180 minutes.

- a) Write the probability density function $f(x)$.
- b) Determine the mean, variance and standard deviation.
- c) What is the probability that the student will take between 90 and 120 minutes to finish the homework?
- d) What is the probability that the student will take more than 150 minutes, given that he always takes more than 120 minutes to finish any CENG222 homework?

Q2. (40 pts.)

In a certain country, there are 400.000 registered voters. 2% of these voters support the “Communist Party”. A random sample of 500 people are selected to conduct a poll.

Solve the following questions using *Normal approximation to Binomial distribution*.

- a) Calculate the mean and standard deviation of CP supporters in this sample.
- b) What is the probability that there are less than 8 CP supporters in this sample?
- c) What is the probability that there are more than 15 CP supporters in this sample?
- d) What is the probability that number of CP supporters will be between 7 and 14? ($7 \leq N \leq 14$)

Q3. (20 pts.)

Let's say lightning strikes a skyscraper about once a year ($\lambda = 1$).

- a) What is the probability that there will **not** be a strike within one year given that the building was hit today?
- b) What is the probability that there will **not** be a strike within one year given that the building has not been hit in a year?

Specifications

- You are expected to write your answers in LaTeX format. You can use the given template.
- Please do not skip the calculation steps. Show every step of your work.
- You have a total of 3 late days for this homework. For each late day you will lose 20 points. Homeworks submitted after 3 late days will not be graded.
- Cheating is forbidden. The violators will be punished according to the department regulations.
- Follow the course page on ODTUCLASS for any updates and clarifications. Please ask your questions on ODTUCLASS instead of e-mailing if they do not contain parts of your solution. Otherwise, you can send an email to “mdinc@ceng.metu.edu.tr”.

Submission

Submissions will be done via ODTUCLASS. You are expected to submit a PDF file named “hw2.pdf”.