



SABARAGAMUWA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

DEPARTMENT OF COMPUTING & INFORMATION SYSTEMS
BSc DEGREE PROGRAMME IN SOFTWARE ENGINEERING
SE 2019/2020 SEMESTER I EXAMINATION SEPT/OCT 2022

SE1107 – FUNDAMENTALS OF STATISTICS

Time allowed: **Three (03) Hours**

INSTRUCTIONS TO CANDIDATES:

This paper consists of 05 questions. Answer ALL questions.

The marks given in brackets are indicative of the weight given to each part of the question.

Write your Index No clearly in all places where appropriate.

Write clearly in English and use blue or black ink.

Non-programmable calculators are ALLOWED in this examination.

No clarifications will be provided on the given questions.

Strike a line through all unused pages in the answer booklet/sheets.

Cross out all scratch paper and hand it in at the time of collection.

01. (a) ABC Inc. manufactures chocolates, and they have just finished a limited-edition run of chocolates for the holiday season. They want to check the quality of those chocolates.

I. What is the target population? [2 marks]

II. What is the sampling unit? [2 marks]

III. Briefly explain how you develop a sampling frame. [4 marks]

IV. What other things might you need to consider when forming your sample? [4 marks]

- (b) You've been given 10 boxes of chocolates and been asked to sample the chocolates in them. There are white, milk, and dark chocolates in the boxes. Your target population is all of the chocolates, and the sampling unit is one chocolate. Briefly explain how you apply simple random sampling, stratified sampling and cluster sampling to this problem. [8 marks]

02. Consider the frequency distribution of 20 individuals given in the below table with Mid Value and Class Frequency.

Mid Value	8	13	18	23	28	33	38
Frequency	1	2	3	5	4	3	2
Class Boundary

- (a) Complete the Class Boundary column. (Hint: Frequency distribution has classes of equal width.) [3 marks]

- (b) Construct a Histogram for the above frequency distribution. [4 marks]

- (c) Compute the following measures for the above distribution. [9 marks]

- I. Mean
- II. Median
- III. Mode

- (d) Calculate the Standard Deviation and describe what the Standard Deviation tells about the above distribution. [4 marks]

03. (a) The amounts shown below are the line-up times (in minutes) to be served in two coffee houses; A and B.

A	B
20 26 26 27 19 18 12 12 16 12 15 17 20 8 8 18	17 16 15 3 10 16 10 10 29 20 22 22 12 13 24 15

- I. Construct stem-and-leaf plots for A and B. [4 marks]
 - II. Find the 5-number summary and draw box-and-whisker plots for the two distributions. [6 marks]
 - III. Compare the two distributions using the boxplots. [3 marks]
 - IV. Are there line-up times to be served in coffee houses; A and B which appear to be quite different from those of the rest? How many? Which ones? Explain. [3 marks]
 - V. Briefly describe why it might be best and less confusing not to discard outliers. [4 marks]
04. (a) A card is drawn at random from an ordinary deck of 52 playing cards. Describe the sample space (Suits: hearts, spades, diamonds, and clubs) [4 marks]
- I. if suits are not taken into consideration
 - II. if suits are taken into consideration
- (b) Referring to the experiment of 04. (a), find the probability that the drawn card is [12 marks]
- I. an ace
 - II. a jack of hearts
 - III. a three of clubs or a six of diamonds
 - IV. any suit except hearts
 - V. a ten or a spade
 - VI. neither a four nor a club
- (c) Two cards are drawn at random from an ordinary deck of 52 playing cards. Find the probability that they are both aces [4 marks]
- I. if the card is replaced
 - II. if the card is not replaced

- 05 (a) Four different mathematics books, six different physics books, and two different chemistry books are to be arranged on a shelf.
- I. How many different arrangements are possible; [4 marks]
 - a. if the books in each particular subject must all stand together?
 - b. if only the mathematics books must stand together?
 - II. If the shelf has 6 mathematics books and 4 physics books, find the probability that 3 particular mathematics books will be together. [3 marks]
- (b)
- I. A poker hand consists of 5 cards and there are 52 cards in a pack. How many different arrangements are there? [2 marks]
 - II. A royal flush is a hand that consists of a 10, Jack, Queen, King and Ace, all of the same suit. What's the probability of getting this combination of cards? Use your answer above to help you. [3 marks]
 - III. Four of a kind is when you have four cards of the same denomination. Any extra card makes up the hand. What's the probability of getting this combination? [3 marks]
- (c) 50 sports enthusiasts at the Head First Health Club are asked whether they play baseball, football or basketball. 10 only play baseball. 12 only play football. 18 only play basketball. 6 play baseball and basketball but not football. 4 play football and basketball but not baseball.
- I. Draw a Venn diagram for this probability space. How many enthusiasts play baseball in total? How many play basketball? How many play football? [3 marks]
 - II. Are any sports' rosters mutually exclusive? [2 marks]