



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (MATHEMATICS AND COMPUTER SCIENCE)

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO103/SST202 OBJECT ORIENTED PROGRAMMING I

DATE: 26/3/2021

TIME: 2.00-4.00 PM

INSTRUCTION: Answer Question ONE and any other TWO Question

QUESTION ONE

- a) Outline FOUR features of Java Programming Language (4 marks)
- b) write a program to determine the sum of the following harmonic series for a given numbers n (5 marks)
$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{n}$$
- c) Describe FOUR types of visibility control in Java (4 marks)
- d) Define the following terms as used in object oriented programming. (4 marks)
 - i. Inheritance
 - ii. Abstraction
 - iii. Dynamic binding
 - iv. Message passing
- e) Differentiate between the following set of terms as used in object oriented programming (6 marks)
 - i. Specialization and generalization
 - ii. Method overriding and method overloading
 - iii. Base class and derived class
- f) Write a program for computing the area of a rectangle and a circle using polymorphism concept (5 marks)

- g) Describe the meaning of an exception as used in Java (2 marks)

QUESTION TWO

- a) Describe how Java supports event handling. (5 marks)
- b) Using inheritance, write a program that has two classes named *Calculation* and *My_Calculation* respectively. The class *Calculation* should have two methods, *addition* and *Subtraction* that will enable it to find sum and difference of two numbers. The class *My_Calculation* should have a method *multiplication* that calculates product of two numbers and also inherit the methods of *Calculation* class. The program should display the results of the three methods when called in the main program. (10 marks)
- c) What are the advantages of object-oriented programming over procedural programming? (5 marks)

QUESTION THREE

- a) Outline FOUR types of operators used in Java programming giving an example in each case. (4 marks)
- b) Write a Java program that outputs grades A, B, C or D depending on Marks entered by a user of a certain subject. Use *switch* statement (5 marks)
- c) Write a Java program that prompts the user to enter the amount of rainfall recorded every day of the week and then display the input entered in reverse order. (5 marks)
- d) List and explain THREE steps required when creating an object from a class. (6 marks)

QUESTION FOUR

- a) State the two aspects of an object that are linked together by encapsulation. (2 marks)
- b) Outline rules for method overriding in object oriented programming. (4 marks)
- c) Explain TWO limitations of arrays. How does Java address these limitations? (4 marks)
- d) Using GUI, write a program that prompts the user for two numbers, the length and width of a rectangle. Use a message box to calculate and display the area of the rectangle. (Use formula: Area=Length x width). (10 marks)

QUESTION FIVE

- a) Outline the general syntax of a derived class in Java programming (6 marks).
- b) List THREE types of inheritance, hence demonstrate the syntax for each implementation. (10 marks)
- c) List FOUR main properties that characterise good abstraction. (4 marks)
- d) Give the basic syntax for a class definition (4 marks)