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MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIVERSITY POSTGRADUATE EXAMINATION

2021/2022 ACADEMIC YEAR

FIRST YEAR **FIRST** SEMESTER EXAMINATION FOR MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

SIT 600– PROBLEM SOLVING PROGRAMMING

DURATION: 3 HOURS

Instructions to candidates:

1. Answer Any Four questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

QUESTION ONE (25 MARKS)

a) Compare and contrast the use of computers and interpreters in translating program codes. (10 marks)

Use a sample code for the question.

b) Compare and contrast the following programming paradigms (10 marks)

(i) Aspect oriented and object oriented.

(ii) Procedural and logic.

c) Write a program in Jaka to calculate the factorial of any numbers. (5 marks)

QUESTION TWO (25 MARKS)

a) Compare and constrast the use of the following control structures in each case for both C and Java programming languages.

(i) Sequential (5 marks)

(ii) Selection (5 marks)

(iii) Iteration (5 marks)

(iv) Recursion (5marks)

b) Explain the importance of linkers during execution of computer programs. (5 marks)

QUESTION THREE (25 MARKS)

a) Use a queue data structure to compare and contrast the array and linked list implementation. (12 marks)

b) Write some code in either C or Java to create, insert and delete items in a stack clearly showing the functions for the main operations. (13 marks)

QUESTION FOUR (25 MARKS)

a) Use the following programming problem to answer this question problem.
You are required to create and address list which includes student ID, Name and Course
The list is to be printed in alphabetic order.
The names to be included in the list are from class attendance register.
Required:Develop a comprehensive algorithm using step-down decomposition approach indicating the main steps and their substeps and (or sub substeps). (25 marks)

QUESTION FIVE (25 MARKS)

a) Compare and contrast the following groups of algorithms. (10 marks)

i) Greedy algorithms and dynamic programming.

ii) Divide and conquer algorithms and decrease and conquest algorithms.

b) The steps of problem solving are almost analogous to those of solving programming problems. Use a one on one mapping to explain the two sets of steps. (10 marks)

c) Explain some of the factors that one would consider when choosing a programming language to use in solving a programming problem. (5 marks)