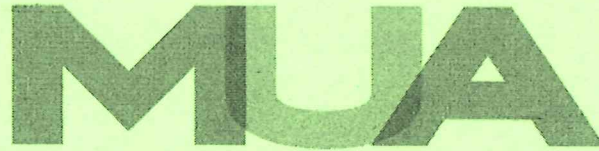


The
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CERTIFICATE UNIVERSITY EXAMINATIONS

SCHOOL OF MANAGEMENT AND LEADERSHIP

CERTIFICATE IN INFORMATION COMMUNICATION

TECHNOLOGY

CIT 103: BASICS OF C PROGRAMMING

DATE: 2ND APRIL 2025

DURATION: 2 HOURS

MAXIMUM MARKS: 70

INSTRUCTIONS:

1. Write your registration number on the answer booklet.
2. **DO NOT** write on this question paper.
3. This paper contains **SIX (6) questions**.
4. Question **ONE** is compulsory.
5. Answer any other **FOUR** questions.
6. Question **ONE** carries **30 MARKS** and the rest carry **10 MARKS** each.
7. Write all your answers in the Examination answer booklet provided.

QUESTION ONE

Read the Case Study below carefully and answer the questions that follow:

Software Design

Software design is the process of decomposing a software problem into subsystems that interact to form a working whole. A well-designed program is flexible, extensible and maintainable, and the key to such design is modularity. A modular design permits different parts of the program to be built and debugged in isolation. Thus, large-scale systems may be built without an overwhelming growth of complexity induced by dependencies between subtasks. The process of software design usually involves a series of steps starting from stating the basic program requirements, and successively adding detail.

A typical progression is as follows.

- Requirements and specification: The required program operation is described at a general and then a detailed level.
- Program flow: The flow of steps, decisions, and loops are planned, usually in the form of a diagram. This stage indicates dependencies between different subtasks. That is, it defines the sequence of operations, and the requirements for communication of data.
- Data structures. The format of variable types for passing data between functions must be chosen in order to design function interfaces.
- Top-down and/or bottom-up design. The structure and components of the program have to be designed. These two design paradigms facilitate organising overall structure and individual modules, respectively.
- Coding. Having produced a plan of how the program should appear, the problem becomes a matter of implementation. The process of coding often uncovers flaws in the original design, or suggests improvements or additional features. Thus, design and implementation tend to be iterative and not a linear progression.

- Testing and debugging. All non-trivial programs contain errors when first written, and should be subjected to thorough testing before being shipped to customers.

Required:

- a) From casestudy above, discuss the concept of modular programming in C, citing other types of programming approaches. **[7 Marks]**
- b) Elaborate the of role program specification as a key process discussed in the case study above. **[3 Marks]**
- c) List FOUR high level programming languages **[4 Marks]**
- d) Discuss the benefits of Bottom - up approach to programming as compared to the top-down design approach, mention the key limitation to top-down **[6 Marks]**
- e) Evaluate the following data types in the equivalent of bits.
- i. Char **(1 Mark)**
 - ii. int **(1 Mark)**
 - iii. long int **(1 Mark)**
 - iv. float **(1 Mark)**
 - v. double **(1 Mark)**
 - vi. long double **(1 Mark)**
- f) Discuss any TWO types of errors associated with programming **[4 Marks]**

QUESTION TWO

- a) Discuss the TWO types of arrays In C programming language **[4 Marks]**
- b) Evaluate the TWO ways in which a function can be called in C **[6 Marks]**

QUESTION THREE

- a) Differentiate between *if* and *nested if* statements [6 Marks]
- b) Assess the following concepts of data types:
- i. Void [2 Marks]
 - ii. integer [2 Marks]

QUESTION FOUR

- a) Explain the concept of modular programming [3 Marks]
- b) Briefly discuss the history of software development [6 Marks]
- c) Define programming [1 Mark]

QUESTION FIVE

- a) List FOUR types of operators in C [4 Marks]
- b) Illustrate the difference between = and == symbols in C programming [6 Marks]

QUESTION SIX

- a) Explain software deployment in a C program development [4 Marks]
- b) Define parametrized macros [2 Marks]
- c) List FOUR basic data types associated with C [4 Marks]