

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE
(EDUCATION)**

ACSC 121: PROGRAMMING PARADIGMS

STREAMS: BSC AGED Y4S1

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 18/12/2024

11.30 A.M – 1.30 P.M

INSTRUCTIONS:

- Answer all in question **ONE** and **TWO** other questions
- Do not write anything on the question paper
- This is a **closed book exam**, no reference materials are allowed in the examination room
- There will be **NO** use of mobile phones or any other unauthorized materials
- Write your answers legibly and use your time wisely.

SECTION A: ANSWER ALL QUESTION IN THIS SECTION

Question One [30 marks]

- Define program design and explain its importance in the development of software. How does it contribute to creating efficient and maintainable programs? [4 marks]
- Define in programming. Describe three basic data types commonly used in high-level programming languages and their significance in defining variables. [4 marks]
- Define control structures in programming. What are the key types of control structures, and how do they affect the flow of a program? [4 marks]
- Explain the difference between functions and procedures in programming. How do these components help modularize and simplify complex programs? [4 marks]
- Explain stepwise refinement in programming. Describe how this technique assists in solving complex problems by breaking them down into manageable components. [4 marks]
- Describe how input/output operations and file structures can vary between different high-level

- programming languages. Provide an example of how one language handles file reading and writing, highlighting any unique language-specific features. [4 marks]
- g. Explain an alternate approach to transitioning gradually from a problem statement to a structured algorithm. How does this process differ from traditional problem-solving methods in programming, and what are the key steps involved in refining the problem into a workable algorithm? Provide an example to illustrate your explanation. [4 marks]
- h. List any TWO modern SDEs you are familiar with. [2 marks]

SECTION B (ANSWER ANY TWO QUESTIONS ONLY)

Question Two [20 marks]

- a. Write brief notes on Recursion vs Iteration. [10 marks]
- b. Write a C program, demonstrating application of Recursion in Binary search. [10 marks]

Question Three [20 marks]

- a. Compare and contrast the following concepts:
- i. Aspect vs Concept [4 marks]
 - ii. Code simplicity vs Memory usage [4 marks]
 - iii. Performance vs Error handling [4 marks]
- b. Write a C program to calculate Fibonacci numbers [8 marks]

Question Four [20 marks]

- a. Write a C++ program that asks the user for their name and age. The program should then print out a message greeting the user and stating their age. [8 marks]
- b. Write a C program that prompts the user to enter an integer. The program should then check if the entered number is **even** or **odd** using the modulus operator (%) and output the result. [8 marks]
- c. List the Four best practices of modern program design. [4 marks]

Question Five [20 marks]

- a. Write a pseudocode that asks the user for three numbers, compares them, and prints the largest number. [4 marks]
- b. List and Explain the Steps in Stepwise Refinement. [6 marks]
- c. Develop a program that calculates the factorial of a given integer **n**. Use the **iterative** development approach, starting with a basic version that only works for small positive integers and then refining the program to handle larger numbers, invalid inputs, and performance improvements. [10 marks]
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