NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCES
DEPARTMENT OF COMPUTER SCIENCE

PROGRAMMING AND PROGRAM DESIGN
SCS 1207

Examination Paper
SEPTEMBER 2024

This examination paper consists of 4 pages

Time Allowed: **3 hours**

Total Marks: **100**

Examiner's Name: **Mr. M. Ruzive**

External Examiner:

INSTRUCTIONS

1. Answer any four (4) questions
2. Each question carries 25 marks

MARK ALLOCATION

QUESTION	MARKS
1.	**25**
2.	**25**
3.	**25**
4.	**25**
5.	**25**
TOTAL FOR ANY FOUR QUESTION	100

QUESTION ONE

a. Using examples, explain the following terms:

   i) Algorithm (2)

   ii) Pseudo code (2)

   iii) Function (2)

b. Draw and briefly explain any five (5) Flowchart notations. (10)

c. Describe how the if-elif-else control structure works in Python. Provide an example of a scenario where this structure might be used. (3)

d. Use examples to demonstrate the three (3) basic control constructs used in Python programming. (6)

QUESTION TWO

a. Given the following list of numbers, explain how you can sort the numbers in ascending order using the bubble sort algorithm:

   189, 57, 71, 28, 98, 60, 63, 14, 7, 11 (5)

b. Outline the functionality, time and space complexity for Linear and Binary searching algorithms. (10)

c. Use examples to explain any four (4) Python data types. (8)

d. What is the difference between syntax errors and runtime errors in Python? (2)

QUESTION THREE

a. State and explain the seven (7) stages of a typical Systems Development Life Cycle (SDLC). (14)

b. Draw a Gantt chart and explain how it is used in Software Project Management. (4)

c. Answer the following using either True or False. (7)

i. Strings are mutable.
ii. Algorithm must be language dependent.
iii. In Python print () does the same as PRINT().
iv. A,B = B,A swaps the contents of the two variables.
v. When designing structure charts, high cohesion and low coupling is recommended.
vi. Python programming support both Procedural and Object Oriented Programming.
vii. A structure chart is composed of modules that work together to form a program.

QUESTION FOUR

a. Object-Oriented Programming (OOP) is a programming paradigm that uses objects and classes to model real-world entities and relationships. State and explain the key principles of OOP. (8)

b. Create a Python class called **BankAccount** that has attributes **AccountNumber** and **balance**. The class has two (2) methods **deposit,** which adds a supplied amount to the balance and **withdraw,** which subtracts a supplies amount from the balance. Demonstrate object instantiation and how the two methods can be used. (10)

c. What are the following operators used for in Python? (7)

i. ==
ii. #
iii. \n
iv. +=
v. **
vi. //
vii. %

QUESTION FIVE

a. Complete the following table using either True or False: (15)

	String	List	Tuple	Set	Dictionary
Mutable					
Allows Duplicates					
Syntax uses { curly braces }					
Fastest data structure					
Consumes the most memory					
Order matters					

b. Write a Python program that reads a list of 20 student names and their grades and store them in a dictionary. The program should then print all the students who scored above 80. (10)

END OF QUESTION PAPER