

**UNIVERSITY COLLEGE TATI (UC TATI)****FINAL EXAMINATION QUESTION BOOKLET**

COURSE CODE	: BCT1113
COURSE	: COMPUTER PROGRAMMING
SEMESTER/SESSION	: 2 - 2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains **4** questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Students are allowed to refer to the lecturer's notes.
4. Students are allowed to use their own laptops.
5. For code writing questions, save the file in Notepad with the format ".cpp" for the source code file and ".exe" for the executable file.
6. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 6 PRINTED PAGES INCLUDING COVER PAGE

COMPUTER PROGRAMMING (BCT 1113)

QUESTION 1

- (a) Answer following questions:
- i. Define "programming language". (2 marks)
 - ii. Describe the three basic elements of a computer system. (2 marks)
 - iii. List some examples of high-level programming languages. (2 marks)
 - iv. Define "syntax" in programming languages. (2 marks)
- (b) Discuss the different types of elements that make up a computer system. (3 marks)
- (c) Clarify the difference between machine language and high-level programming languages. (3 marks)

QUESTION 2

- (a) Answer following questions:
- i. Define data types in C++. (2 marks)
 - ii. Describe the relationship between data types, variables, and assignment statements in C++. (2 marks)
 - iii. Write an example of an arithmetic expression in C++ that uses operators, operator precedence, and expressions. (2 marks)
 - iv. List the steps involved in using variables, assignment statements, and input statements in a C++ program. (2 marks)
 - v. State the purpose of increment and decrement operators in C++. (2 marks)
- (b) Answer following question by select the correct option from the multiple choices provided:
- i. Which of the following are valid data types in C++? (2 marks)
 - a) int
 - b) bool
 - c) float
 - d) char
 - ii. Which of the following statements about variables in C++ are correct? (2 marks)
 - a) Variables must be declared before they can be used.
 - b) The data type of a variable can be changed once it has been declared.
 - c) Variables can be initialized when they are declared.
 - d) The scope of a variable determines where it can be accessed in the program.
 - iii. Which of the following are arithmetic operators in C++? (2 marks)
 - a) +
 - b) -
 - c) *
 - d) /

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- iv. Which of the following statements about input statements in C++ are correct? (2 marks)
- a) The cin statement is used to read input from the keyboard.
 - b) Input can be read into multiple variables in a single cin statement.
 - c) The >> symbol is used to separate the input values in a cin statement.
 - d) Input can be read from a file using the cin statement.
- v. Which of the following operators are increment and decrement operators in C++? (2 marks)
- a) ++
 - b) --
 - c) +=
 - d) -=
- (c) Construct a C++ program that calculates the area of a rectangle using the following formula: (9 marks)

$$\text{area} = \text{length} * \text{width}$$

The program should prompt the user to enter the length and width of the rectangle as floating-point values, and then calculate and display the area.

Your program should use appropriate data types, variable names, and comments to make the code easy to understand.

Marks distribution:

Proper use of data types and variable names: 2 marks

Proper use of comments: 1 mark

Prompting the user to enter length and width: 2 marks

Calculating the area using the formula: 2 marks

Displaying the calculated area: 2 marks

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QUESTION 3

- (a) Answer following question:
- i. Define I/O stream and Standard I/O Device. (2 marks)
 - ii. Describe the process of using predefined functions in a program. (2 marks)
 - iii. List some examples of output formatting in C++. (2 marks)
 - iv. State the difference between output and formatting output in C++. (2 marks)
- (b) Answer following question:
- i. Explain the difference between standard input and standard output stream in C++. (2 marks)
 - ii. Give an example of a predefined input function in C++. (2 marks)
 - iii. Justify the use of formatting output in C++. (2 marks)
 - iv. Compare the use of `getline()` and `cin` in C++ input. (2 marks)
 - v. Explain what happens when an input fails in C++. (2 marks)
- (c) Construct a C++ program that calculates the sum of two integers entered by the user. The program should prompt the user to enter the first integer, then the second integer, and then calculate and display the sum of the two integers. (10 marks)

Your program should use appropriate data types, variable names, and comments to make the code easy to understand.

Grading Rubric:

- Program correctly prompts for user input (2 mark)
- Program correctly stores user input in variables (2 mark)
- Program correctly calculates the sum of the two integers (2 mark)
- Program correctly displays the sum of the two integers (2 mark)
- Appropriate use of data types and variable names (2 mark)

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QUESTION 4

- (a) Answer following question by select the correct option from the multiple choices provided:
- i. Which of the following statements best defines a function? (1 marks)
 - a) A piece of code that is executed only once in a program.
 - b) A segment of code that performs a specific task and can be called by other parts of the program.
 - c) A variable that stores data for later use.
 - ii. How are user-defined functions different from system-defined functions? (1 marks)
 - a) User-defined functions are written by the programmer, while system-defined functions are built into the language.
 - b) User-defined functions are faster than system-defined functions.
 - c) User-defined functions can only be called from within the same program, while system-defined functions can be used across different programs.
 - iii. Which of the following is an example of a system-defined function in C++? (1 marks)
 - a) cout
 - b) cin
 - c) sqrt
 - iv. What is the purpose of the return statement in a function? (1 marks)
 - a) To terminate the function.
 - b) To return a value from the function to the calling program.
 - c) To call another function.
 - v. Which of the following functions is not a standard library function in C++? (1 marks)
 - a) pow
 - b) printf
 - c) getline
- (b) Answer following question:
- i. Explain the concept of a function in programming. (2 marks)
 - ii. Compare and contrast user-defined functions and system-defined functions. (2 marks)
 - iii. Give an example of a user-defined function in C++. (2 marks)
 - iv. Explain why functions are useful in programming. (2 marks)
 - v. Justify the importance of using return statements in functions. (2 marks)

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- (c) Write a C++ program that uses both a user-defined function and a system-defined function to perform a series of calculations on an array of integers. The program should accomplish the following: (14 marks)
- i) a) Declare an array of integers with a size of 10, and initialize it with the values {10, 20, 30, 40, 50, 60, 70, 80, 90, 100}. (2 marks)
- ii) b) Define a user-defined function named "sumArray" that takes the array as an argument and returns the sum of all the integers in the array. (3 marks)
- iii) c) Define a system-defined function named "sqrt" that takes a single argument and returns the square root of that argument.
- iv) d) Use the "sumArray" function to calculate the sum of the integers in the array, and store the result in a variable named "sum".
- v) e) Use a loop to iterate through each integer in the array, and use the "sqrt" function to calculate the square root of each integer. Store each result in a new array named "sqrtArray".
- vi) f) Display the sum of the integers in the original array, as well as the square root of each integer in the "sqrtArray" array.

Grading Rubric:

Declare and initialize the array: (2 marks)

Define the user-defined function "sumArray": (3 marks)

Define the system-defined function "sqrt": (2 marks)

Calculate the sum of the integers in the array using "sumArray": (2 marks)

Calculate the square root of each integer in the array using a loop and "sqrt": (2 marks)

Store the square roots in a new array: (1 mark)

Display the sum of the integers in the array and the square roots of each integer: (2 marks)

----- End of questions -----

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