



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND/THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

BACHELOR OF SCIENCE IN ELECTRICAL AND ELECTRONIC ENGINEERING

EMM308/ EEE202: PROGRAMMING II: SUPPLEMENTARY

DATE:

TIME:

INSTRUCTIONS

This paper consists of FIVE questions

*Answer **question one** and other **two questions** in this paper*

1. a) i) Explain the difference between high level and low level programming languages (4 marks)
- ii) Write a program that asks the user to enter two numbers, obtains them from the user and prints their sum, product, difference, quotient and remainder. (3 marks)
- b) i) Felix wants to write a C++ program. Briefly explain to him the importance of polymorphism in a program code (2 marks)
- ii) List any three data types used in C++, giving an example of its declaration. (3 marks)
- c) i) Classes in OOP are made of private and public members. Briefly describe these class members. (4 marks)
- ii) Explain the meaning of operator overloading as used in OOP. (2 marks)
- d) i) Explain the difference between source code and object code as used in high level programming (4 marks)
- ii) Explain what an identifier in programming. Explain any three rules that must be observed when naming identifiers in C++. (4 marks)
- e) Using the *switch statement*, write a C++ code segment that displays a proverb based on the number input by the user, as shown in the table below. Assume variable *num* was already declared. (4 marks)

Option	Proverb
1	A rolling stone gathers no moss
2	A bird in hand is worth two in the bush
3	A fool and his money are soon parted.
Any other number	You must enter either 1, 2, or 3.

2.
 - a)
 - i) To support the principles of object-oriented programming, all OOP languages, including C++, have three traits in common: encapsulation, polymorphism, and inheritance. Briefly discuss each of these principles. (6 marks)
 - ii) An application of function floor is rounding a value to the nearest integer. The statement $y = \text{floor}(x + .5)$; will round the number x to the nearest integer and assign the result to y . Write a C++ program that reads several numbers and uses the preceding statement to round each of these numbers to the nearest integer. For each number processed, print both the original number and the rounded number. (6 marks)
 - b) Write a simple program showing the structure of a C++ program. (3 marks)
 - c) Using the while loop, write a C++ program that requests user to enter a number and then displays a line of asterisks (*). The number of asterisks displayed is equal to the value entered by the user. The program should not allow lines longer than 50 characters (5 marks)

3.
 - a)
 - i) High level languages such as C++ support different data types for numeric values, such as integers, double and floating-point values? Explain any two reasons why all numeric values do not just use the same data type? (4 marks)
 - ii) Briefly discuss three types of operators used in high level languages, giving examples for each of the operator type. (6 marks)
 - b)
 - i) The simplest form of the for loop is shown here: *for(a; b; c) statement*; Explain the parts labelled a,b, c: (3 marks)
 - ii) Using the *for loop*, write a C++ program that prints the numbers 1 through 100 on the screen. (4 marks)
 - c)
 - i) Explain what is meant by interactive programming (1 mark)
 - ii) Give two applications of interactive programming (2 marks)

4.
 - a) List any three inbuilt functions in C++ and describe their purpose. (3 marks)
 - b) Explain the following data structures as used in programming and state their importance (4 marks)
 - i) Pointer
 - ii) Array

c) List any three examples of high level languages (3 marks)

d) i) Write a C++ program that takes in the salary of the employee as a screen input from the user. It then deducts the income tax from the salary on the following basis (7 marks)

30% income tax if the salary is above Ksh. 50000.

20% income tax if the salary is between Ksh 20000 and \$50000.

10% income tax if the salary is below Ksh 20000.

The salary, income tax and the net salary is then displayed as output.

iii) Describe three functions of a compiler in programming (3 marks)

5. a) Students in a Programming class scored marks as shown in the table below.

Write a C++ program that creates an array of ten elements and assigns each element a value. The program should then compute the average score and find the minimum and the maximum scores. (10 marks)

21	33	70	7	42	56	100	12	60	86
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b) Explain the difference between constructor and destructor as used in C++.

(4 marks)

c) Briefly explain three types of program errors, giving an example for each type

(6 marks)