



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2014/2015 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING

First Year Second Semester Examination for Bachelor of Science Information Technology

SIT 106

PROGRAMMING METHODOLOGY

Date: April 2015

Time: 8:30 – 10:30 AM

Instructions: Answer question ONE and any other TWO questions

Question One (30 Marks)

- a) Define the following terms as used in programming.
 - i) Programming language;
 - ii) Algorithm;
 - iii) Syntax. (3marks)
- b) i) Explain the Top down problem solving strategy. (1 mark)
 - ii) Explain **four** tools used in Top down problem solving strategy. (4 marks)
- c) Explain **three** types of errors that may be encountered during debugging. (6 marks)
- d) Describe **five** data types used in C language programming. (5 marks)
- e) Write a function mul(int a, int b) that is to be used by the main function to multiply the numbers a and b and return the product. (5 marks)
- f) Distinguish between the following sets of terms:
 - i) Global and local variables;
 - ii) Array and structure;
 - iii) Function definition and function declaration. (6 marks)

Question Two (20 Marks)

- a) Differentiate between variable declaration and variable initialization giving an example in each case. (3marks)
- b) Write a C language program that would read two integers. The program then computes the sum, difference, and product of the two integers and displays them. (8marks)
- c) i) Define the term statement as used in C language program. (1 mark)
ii) Explain **four** types of statements used in C language programming. (4 marks)
- d) Differentiate between a function and a function prototype. (4marks)

Question Three (20 Marks)

- a) Explain **four** types of algorithms used in programming. Use diagrams where appropriate. (6 marks)
- b) Explain **four** types of operators used in C language programming. (6 marks)
- c) Write a C program that reads two values through the keyboard. The program then compares the two values. If they are equal, the program outputs the statement "Equal Values". If the first is greater than the second, it outputs "First Number is Larger", otherwise it displays "Second Number is Larger". (8 marks)

Question Four (20 Marks)

- a) State **three** tasks performed by a computer program. (3 marks)
- b) Explain the meaning of the statement $\text{Area} = L \times W$ in C programming language. (2 marks)
- c) Write a code segment that will allow a user to input a mark. The code segment outputs "Pass" when the mark is greater than 50 and "Fail" otherwise. This should be repeated as long as the user inputs 'y' or 'Y'. (8 marks)
- d) A program accepts the Principal Amount, rate and Time. The program then computes Simple Interest using the formula.

$$\text{Interest} = (\text{Principle} \times \text{Rate} \times \text{Time}) / 100.$$

- i) Write a Pseudocode for the program. (3 marks)
- ii) Draw a flow chart to represent the program logic. (4 marks)

Use both pseudo code and flow chart.

Question Five

- a) With the aid of diagrams, distinguish between Repeat...until and While loops. (3 marks)
- b) Explain **three** basic execution steps of a C program. (3 marks)
- c) Explain each of the following phases of program development, stating clearly the significance of each phase: (6 marks)
- i) Problem analysis;
 - ii) Program design;
 - iii) Maintenance.
- d) Table 1 shows details of Tax computation in a certain organization. Use it to answer the question that follows.

GROSS PAY (Ksh)	TAX RATE
Over 10,000	30% of gross pay
5000 and below 10000	17% of gross pay
Below 5000	No tax is charged

Table 1

The computations are done as shown below:

$$\text{Tax Amount} = \text{Gross Pay} \times \text{Tax Rate}/100$$

$$\text{Net Pay} = \text{Gross Pay} - \text{Tax Amount}$$

Write a C language program to read the gross pay. The program then computes and displays Net pay. (8 marks)