



# MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)

University Examinations 2013/2014

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR FIRST SEMESTER DIPLOMA IN INFORMATION COMMUNICATION

TECHNOLOGY

DIT102 FUNDAMENTALS OF COMPUTER PROGRAMMING

Date: 8/12/2014

Time: 8:00 – 10:00 AM

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## **INSTRUCTIONS**

### **Answer Question 1 and any other two questions**

- 1 a) State and briefly discuss any **four** properties of an algorithm (4 marks)
- b) Define the term *data structure*, state any **two** data structures and state an application area for each data structure (4 marks)
- c) Explain the meaning of the following terms giving examples for each
- i) Homogenous data structures
  - ii) Linear data structures (4 marks)
- d) Write a *flow chart* to implement the following program. A program that accepts the basic salary of a worker and the outputs the PAYEE. Use the following information (5 marks)

Basic salary	PAYEE
$\geq 30000$	30% of basic salary
$\geq 20000$	20% of basic salary
$< 20000$	15% of basic salary

- e) Explain any **three** programming tools that can be used during program development (6 marks)
- f) Explain **two** categories of test data used in programming. (4 marks)
- g) Write a pseudo code for a program that will accept a *value* then display the

value, and a Message indicating whether the value is an *even* number or an *odd* number. (3 marks)

2 a) Supposing the characters 'D','C','B','A' are placed in a queue (in that order), and then removed one at a time, in what order will they be removed? (2 marks)

b) Discuss how the following sorting Algorithms work:

i) Bubble sort

ii) Selection sort

iii) Insertion sort (6 marks)

c) Define the term *Array* (2 marks)

d) Using a suitable example, show the general syntax for declaring an array and explain each of the parts used in the declaration. (4 marks)

e) Explain any **four** types of program maintenance (4 marks)

f) Define the term *Data types* (2 marks)

3 a) Explain the meaning of the following terms

i) Syntax

ii) Source code

iii) Mnemonics

iv) Compiler (4 marks)

b) Given the following values, Demonstrate the execution of merge sort algorithm  
8,5,7,3,12,23,56,45,12 (4 marks)

c) Explain the meaning of the term *divide and conquer* algorithm (2 marks)

d) Explain the different parts of a *decision table* (4 marks)

e) Explain the *purpose* of the following program translators

i) Assembler

ii) Compiler

iii) Interpreter (6 marks)

4 a) discuss the different types of *queues* (6 marks)

b) You have been provided with the following values, 2,10,8,5,4,16  
sort the values clearly showing your working using:

i) Selection sort

ii) Insertion sort (6 marks)

- c) Given the following scenarios, state and explain the most suitable **ADT** to use
- i) Serving customers in a banking hall
  - ii) Deleting characters from text editor using back space key
  - iii) Checking if expression has the correct set of delimiters (6 marks)
- d) List any two types of data types used in C programming (2 marks)
- 5 a) Explain any **three** types of *Feasibility studies* conducted during program development life cycle (6 marks)
- b) Explain any **two** reasons that may lead to users rejecting a new program (2 marks)
  - c) Explain the *different* types of program design. (4 marks)
  - d) Explain the meaning of the term *Flowchart* as used in programming. (2 marks)
  - e) List any **two** advantages of *low level languages* over *high level languages*. (4 marks)
  - f) Explain the meaning of the **Big O** notation (2 marks)