



MACHAKOS UNIVERSITY

University Examinations for 2017/2018

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR FIRST SEMESTER EXAMINATION FOR DIPLOMA IN
INFORMATION COMMUNICATION TECHNOLOGY

DIT 102: FUNDAMENTALS OF PROGRAMMING

DATE: 6/12/2017

TIME: 2.00-4.00 PM

INSTRUCTIONS: Answer Question ONE and any other TWO Questions

1. a) Explain the meaning of the following terms
 - i. Abstract data types
 - ii. Data structure
 - iii. Big O notation
 - iv. Functional programming paradigm
 - v. Object oriented programming paradigm (10 marks)
- b) Describe the following meaning of the following terms
 - i. Pseudo code
 - ii. Algorithms
 - iii. Decision Tables (3 marks)
- c) Explain the different types of program design. (4 marks)
- d) State and briefly discuss any **four** properties of an algorithm (4 marks)

- e) Write a flow chart to implement the following program. A program that accepts the basic salary of a worker and then outputs the PAYEE. Use the following information (5 marks)

Basic salary	PAYEE
≥ 30000	30% of basic salary
≥ 20000	20% of basic salary
< 20000	15% of basic salary

- f) Explain the **four** *search strategies* (4 marks)
2. a) Using *bubble sort*, illustrate how the following values can be sorted
36 24 10 6 12 (6 marks)
- b) Discuss how the following sorting Algorithms work:
- i. Merge sort
 - ii. Selection sort
 - iii. Insertion sort (6 marks)
- c) Define the term *divide and conquer* algorithm (2 marks)
- d) Using a suitable example, show the general syntax for declaring an *array* explaining each of the parts used in the declaration (4 marks)
- e) Define the term *Data types* (2 marks)
3. a) Explain the different types of test data (4 marks)
- b) Explain the meaning of the following terms
- i. Syntax
 - ii. Source code
 - iii. Mnemonics
 - iv. Compiler (4 marks)
- c) Given the following values, explain the execution of merge sort algorithm
8,5,7,3,12,23,56,45,12 (6 marks)
- d) Explain the different parts of a *decision table* (4 marks)
- e) Explain the meaning of the term **node** (2 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 **four** types of Feasibility studies conducted during program development life cycle (4 marks)
- b) Explain the meaning of the following terms giving examples for each
- i. Homogenous data structures
 - ii. Linear data structures (4 marks)
- c) Explain any **two** reasons that may lead to users rejecting a new program (2 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 **two** categories of test data used in programming. (4 marks)