THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

HIGHER DIPLOMA IN COMPUTER STUDIES – HDIP 10A

EIT 3107 : INTRODUCTION TO DATA STRUCTURES

END OF SEMESTER EXAMINATIONS

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer booklet*

Answer question **ONE (COMPULSORY)** in section **A** and any other **TWO** questions from section **B**
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

SECTION A (30 marks)

Question 1 (Compulsory)

a) Define the following terminologies
   i) Data structures
   ii) Memory allocation
   iii) Data type
   iv) Variable
   v) Example of variables. (10marks)

b) What is hashing and explain its applications. (4marks)

c) What is a Tree Data structures and name at least 4 keys terms. (6marks)

d) What is an Array and write syntax of declaring an Array. (4marks)

e) List one advantage and one disadvantage of a Stack Data Structure. (4marks)S

SECTION A (40 marks)

Question 2 (20 marks)

a) Define the following.
   i) Encapsulation.
   ii) Queue
   iii) Abstract Data Type (ADT)
   iv) Algorithms (4marks)

b) Explain the contrast between an algorithm from a program (4marks)

c) What are the goals and why do we analyze algorithms (6marks)

d) Write an algorithm to implement Bubble sorting (6marks)

Question 3 (20 marks)

a) List any four properties of an algorithm (4marks)

b) What is the difference between a recursion and iteration in program development? (2marks)

c) Explain the following concepts as used in a tree ADT
   i) Parent
   ii) Children
   iii) Root

iv) Sibling (8marks)

d) Assuming a queue representation through circular array, write an algorithm for deletion of an element in the queue. (6marks)

Question 4 (20 marks)

a) Write the syntax of how to declare an array? (4marks)

b) What do the following mean
   i) int scores [100] (2marks)
   ii) char name [40] (2marks)
   iii) Draw storage of array of int Ar[10] (4marks)
   iv) Draw use of array element char Symon[5]={16,2,77,40,12} (4marks)

c) Write a simple program of initializing single dimensional array of Int num [5] (4marks)

Question 5 (20 marks)

a) What is the definition of stack (4marks)
b) What is a linear list and state its operation (8marks)
c) Write two advantages and 3 disadvantages of arrays (5marks)
d) What are the three categories of algorithmic operations (3marks)