ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATE

FACULTY OF ENGINEERING

DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY

FIRST SEMESTER EXAMINATION, 2020/2021 ACADEMIC SESSION

COURSE TITLE: DATA STRUCTURE AND ALGORITHMS

COURSE CODE: ECT 535

EXAMINATION DATE: MARCH, 2021

COURSE LECTURER: ENGR. T. T. ADEYEMO

TIME ALLOWED: 2 HRS.

HOD's SIGNATURE

INSTRUCTIONS:

1. ANSWER QUESTION ONE (1) AND ANY OTHER THREE (3)
2. SEVERE PENALTIES APPLY FOR MISCONDUCT, CHEATING, POSSESSION OF UNAUTHORIZED MATERIALS DURING EXAM.
3. YOU ARE **NOT** ALLOWED TO BORROW ANY WRITING MATERIALS DURING THE EXAMINATION.

Question One

a. Give a real-world example of queue and stack and list their basic operations. [4 Marks]
b. Discuss the advantages and disadvantages of recursive programming. [4 Marks]
c. Write a C++ program to demonstrate working of a recursion. [4 Marks]
d. List six (6) standard algorithms that follows Divide and Conquer algorithm. [3 Marks]

Question Two

a. Elucidate on the differences between the following terms:
   i. List and string;
   ii. Sorting and searching algorithm;
   iii. Array and pointer;
   iv. List and array; and
   v. Linear and binary search. [10 Marks]
b. Mention two advantages of using Abstract Data Types (ADTs). [2 Marks]
c. Discuss the difference between divide and conquer, dynamic and greedy algorithm. [3 Marks]

Question Three

a. Mention the three (3) methods for assigning a value to a variable in lookahead. [3 Marks]
b. Briefly discuss the characteristics of a good algorithm. [6 Marks]
c. Write short notes on the following sorting algorithms:
   i. Bubble Sort;
   ii. Insertion Sort;
   iii. Selection sort;
   iv. Merge sort:
   v. Shell sort; and
   vi. Quick sort. [6 Marks]

Question Four

a. Mention the advantages and disadvantages of divide and conquer algorithm. [6 Marks]
b. With the aid of a diagram, discuss the three (3) basic type of graphs. [6 Marks]
c. Explain how a divide and conquer algorithm works. [3 Marks]

Question Five

a. Differentiate between sequential and interval search. Give an example of each. [3 Marks]
b. Apart from the primary operations of a stack, there are other operations used in stack implementation. Write the basic algorithms for these operations. [6 Marks]
c. Mention four (4) operations of a list Abstract Data Type (ADT). [2 Marks]
d. Discuss the two main complexity measures used for the efficiency of an algorithm. [4 Marks]

Question Six

a. Pointers are variables that hold a memory location. As a programmer, what are the four (4) fundamental things that you need to know about them? [4 Marks]
b. Discuss the benefits of Abstract Data Types (ADTs). [5 Marks]
c. Write a java program for array implementation of stack. [6 Marks]