061306T4CSC

COMPUTER SCIENCE LEVEL 6

ICT/OS/CS/CR/08/6/A

UNDERSTAND ALGORITHMS AND DATA STRUCTURES

NOV/DEC 2023

TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)

PRACTICAL ASSESSMENT

Time: 2 Hours

INSTRUCTIONS TO CANDIDATES:

i. In this practical assessment, you are required to write a C++ program that implements THREE data structures (Array, Stack and Linked List) and their operations.
ii. You have **Ten** minutes to read through the instructions and check availability of resources for the practical.
iii. The task has specific instructions.
iv. The task carries **50** marks.
v. The assessor will record your performance at critical points using audio-visual means.

You will be provided with the following resources:

i. A working computer
ii. C++ IDE
iii. Two Plain papers

Task

An array contains the following items {5, 8, 2, 1, 9, 3} using a C++ program, write a program that contains the following features:

a) Implement a stack using an array. Include the following operations: (15 Marks)
   i. Push - add an element to the top of the stack
   ii. Pop - remove the top element from the stack
   iii. Peek - return the top element without removing it
   iv. Display - print all the elements in the stack

b) Sort the array elements using the bubble sort algorithm. (7 Marks)

c) Perform the binary search on the sorted array elements and return the index of the target element. (8 Marks)

d) Implement a linked list and perform the following operations: (20 Marks)
   i. Insertion - add a node at the beginning, end, or a specific position in the list
   ii. Deletion - remove a node from the list
   iii. Search - search for a specific element in the list and return its position
   iv. Display - print all the elements in the list

THIS IS THE LAST PRINTED PAGE