Vavuniya Campus of the University of Jaffna

First Examination in Information and Communication

Technology - 2016

Second Semester - November/December 2017

ICT1242 Practical for Data Structures

Answer All Questions

Time Allowed : **Three hours**

Instructions:

Create a folder on Desktop with your **INDEX NUMBER** and save all the programs within it.

1. Implement a **MyStack** class in Java with following properties: [30%]

    (a) Fields:

        i. Declare an **Array** to store characters.

        ii. Declare a variable **size** for the length of the array.

        iii. Declare a **Top** variable indicates the top index of the array.

    (b) Write a constructor to initialize the fields mentioned in **part a**.

    (c) Implement each of the following **Stack** operations as methods in MyStack class:

        i. isEmpty() : boolean

        ii. isFull() : boolean

        iii. peek() : char

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iv. push(element : char) : void .

v. pop() : char

2. Write a **StackApp** class in **Java** to implement each of the following applications using stack operations.

   (a) Write a method to check whether a given sentence is a palindrome or not.

   Eg: Madam I'm Adam. [20%]

   (b) Write a method using single stack to check whether the parentheses of the following mathematical expressions are nested correctly:

   $$\{10 * [((5 + 8) * (6 * 10)) + 9]\}$$ [20%]

3. Implement a class **MergeSort** in Java to sort the following list of elements: [30%]

   [Computer, Mouse, Software, Hardware, Speaker, Printer, Scanner]