[20%]

Vavuniya Campus of the University of Jaffna

First Examination in Information and Communication Technology - 2015

Second Semester - January/February 2017

ICT1242 Practical for Data Structures

Answer All Questions

Time Allowed : **Three hours**

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1. (a) Write a Java program to represent the *stack* data structure using *Singly linked list* with the following operations:

   i. isEmpty() - Return true if the stack is empty and return false otherwise.

   ii. peek() - Return the top element of the stack.

   iii. push(X) - Add an element X at the top of the stack.

   iv. pop() - Remove the top element from the stack and return it.

   v. displayStack() - Display the stack elements from top to bottom.

   [25%]

   (b) Write a Java class to evaluate the given postfix expression using the stack implemented in part (1.a).

   4 2 + 3 5 1 - * + [25%]

2. (a) Write a Java program to implement the circular queue data structure using array and to do the following operations, where elements are integer type:

   i. isFull() - Return true if the circular queue is full and return false otherwise.

   ii. isEmpty() - Return true if the circular queue is empty and return false otherwise.

   iii. enQueue(X) - Add an element X into the circular queue.

   iv. deQueue() - Remove the element from the circular queue.

   v. display() - Display the circular queue elements from front end to rear end.

   [25%]

   (b) In real life, Call Center of a phone system uses Queues to hold the people calling them until a service representative attend the call.
   Write a Java class to do each of the following tasks using the circular queue implemented in part (2.a) and it maintains up to 5 callers in the queue.

   i. Insert following callers' ID into a circular queue in given order:

   2230, 2840,3630,4540,5652 [10%]

   ii. Remove one caller ID from the circular queue. [05%]

   iii. Display the callers' ID available in the call Queue. [05%]

   iv. Add new caller ID 2330 into the circular queue. [05%]