

Lab Test: WIA1002/WIB1002 Data Structure**Instruction:**

- (a) This quiz consists 2 questions. Answer ALL questions.**
- (b) Time allocation: 60 minutes**
- (c) Each Question 5 marks**
- (d) Marking scheme :**
 - 5 marks – 100% running according requirement + no bug**
 - 4 marks – 80% running according requirement + very minor bug**
 - 2.5 marks – 50% running partial requirement + bug**
 - 1 mark – 20% attempted incorrectly**
 - 0 mark – 0 no attempt or no answer**

Question 1

By using Queue data structure, write a program to implement stack where the elements are accessed, inserted, and deleted only from the end. The implementation of the stack using queue shall be able:

- to push item using push() method
- to remove item using pop() method
- to return top of stack using top() method

Queue methods allowed are:

- enqueue(x) - Add an item x to rear of queue.
- dequeue() - Remove an item from front of queue.
- isEmpty() - Checks if a queue is empty or not.
- peek () – Get First element of the Queue

An example output of the program is as follows:

```
Push 10,20,30 into the stack
Top element is: 30
Execute pop() operation
Push 40 into the stack
Push 50 into the stack
Execute pop() operation
Top element now is: 40
```

Question 2

A restaurant needs to use an online order management system enabling its customers to make an online order of food. Write a program using a Queue by demonstrating the following functions:

- User must be able to interact with the program. The user should enter a list of food items to order.
- Display the list of the ordered food items.
- Display the first food item in the queue list
- Calculate the number of orders.
- Delete the first food item in the queue order
- Determine whether the order consists of food that customers want to check.

An example output of the program is as follows:

```
To order = Press 1 or to exit = Press X:
1
Please enter food
Fried Rice
To order = Press 1 or to exit = Press X:
1
Please enter food
Nasi Lemak
To order = Press 1 or to exit = Press X:
1
Please enter food
Soup
To order = Press 1 or to exit = Press X:
1
Please enter food
Roti
To order = Press 1 or to exit = Press X:
x
Food ordered:
[Fried Rice, Nasi Lemak, Soup, Roti]
First food ordered: Fried Rice
Number of food ordered: 4
Deleting the first food: Fried Rice
Enter food you want to check from the ordered list:
Roti
Roti is in the list
```