**Development of Virtual lab: Round 1 (R1) Pedagogy - Template (Worksheet)**

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| **Name of Faculty:** **Dr. Amit Tripathi**  **Institute: Rajkiya Engineering College Banda**  **Email ID** (as submitted in the registration form)**: amittri13@gmail.com**  **Discipline to which the Lab belongs: Computer Science & Engineering**  **Name of the Lab: Data Structures Lab**  **Name of experiment: Operations on Queue ADT using Linked List**  (only one Experiment per worksheet. for submitting more than one experiments, please fill up another worksheet)**:**  **Kindly Refer these documents before filling the worksheet**   1. **Coursework (MOOC ) on Pedagogy , Storyboard , Lab Manual :**  [**http://bit.ly/Vlabs-MOOC**](http://bit.ly/Vlabs-MOOC) 2. **Additional Documentation booklet for reference.** [**http://vlabs.iitb.ac.in/vlabs-dev/document.php**](http://vlabs.iitb.ac.in/vlabs-dev/document.php) 3. **Sample Git Repository:** |

**1.1 FOCUS AREA: Data Structures**

**1.2 About the Experiment:**

Queue is a data structure in which the elements are added at one end, called the rear, and deleted from the other end, called the front. It is a First In First Out data structure (FIFO). The rear of the queue is accessed whenever a new element is added to the queue, and the front of the queue is accessed whenever an element is deleted from the queue. The middle elements in a queue are inaccessible even if queue elements are sorted in an array unlike a stack.

There are two basic operations which can be implemented on the linked queues. The operations are Insertion and Deletion.

## Insertion operation:

The insertion operation append the queue by adding an element to the end of the queue. The new element will be the last element of the queue. There can be the two scenario of insertion into the linked queue.

In the first scenario, we insert element into an empty queue. In the second case, the queue contains more than one element. With each insertion the position of REAR is incremented by 1. In linked list implementation of a queue a new element is always added at the tail of the list and d-eleted from the head of the linked list.  The essential condition which is checked before insertion in a linked queue is overflow.

## Deletion operation:

Deletion operation removes the element that is first inserted among all the queue elements. There are again two cases that whether the list is empty or the list contains some elements. With each deletion the position of FRONT is incremented by 1. The essential condition which is checked before insertion in a linked queue is overflow.

**1.3 Learning Objectives:**

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| **S. No.** | **Learning Objective** | **Cognitive Level** | **Action Verb** |
| 1. | **Describe** what is a queue | Recall | Describe |
| 2. | **Understand** basic operations on queue data structure | Understand | Perform |
| 3. | **Acquire** knowledge about mechanism of insertion and deletion | Understand | Perform |

**2. Instructional Strategy**

Expository Method

**2.1 Instructional Strategy:**

Figure 1: Steps of the completion of the project

**2.3 Assessment Method:**

**Quizzes will be taken for evaluation (Example is given below)**

**Pre Test:**

1. What is datatype of a queue?

a) Abstract b) Integer c) Float d) Double

2. The essential condition that is checked before insertion in a queue is?

a) Underflow b) Overflow c) Front value d) Rear value

3. The essential condition that is checked before deletion from a queue is?

a) Underflow b) Overflow c) Rear value d) Front value

**Post Test:**

1. In linked list implementation of a queue, where is the new element inserted?

a) At head of link list

b) At center of link list

c) At tail of the link list

d) None of these

2. In linked list implementation of a queue, from where is the item deleted?

a) At head of link list

b) At center of link list

c) At tail of the link list

d) None of these

**3. Task & Assessment Questions**

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| **Sr.No** | **Learning Objective to be met** | **Tasks to be performed by the students** | **Assessment questions aligned to the task** |
| **1** | Student will **recall** the concept of queue | He will study the theory and will be given a question on queue | What is datatype of a queue?  a) Abstract b) Integer c)Float d) Double |
| **2** | Student will **learn** about the insertion operations on queue |  | The essential condition that is checked before insertion in a queue is?  a) Underflow b) Overflow c) Rear value d) Front value |
| **3** | Student will **acquire** knowledge about the deletion operations on queue |  | The essential condition that is checked before deletion from a queue is?  a) Underflow b) Overflow c) Rear value d) Front value |

**4. Simulator Interactions**

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| **What students will do?** | **What simulator will do?** | **Purpose of the task** |
| The student will take elements for input in a queue. | Simulator will store the values of the elements. | Student will be able to make a queue. |
| The student will click the insertion button. | Simulator will perform the insertion operation | Student will learn how insertion is carried out in a queue. |
| The student will click the deletion button | Simulator will perform the deletion operation | Student will acquire knowledge about the deletion operation in a queue. |