**Department of Computer Science and Engineering**

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| **Course Code:CSE220** | **Credits:1.5** |
| **Course Name: Data Structure** | **Semester: Fall’18** |

**Lab 03  
Circular Array**

1. **Topic Overview:**

Students will be able to create a circular array practically. They will have hands-on practice over the basic operations on circular array including array traversal, resize, shifting, linearizing the circular form of array etc. Some practical use of circular array will also be covered.

1. **Lesson Fit:**

The lab itself should be followed by the previous lab and theory knowledge on the array data structure as well as the circular nature of array. Moreover, students need to be familiar with basic programming in Java and IDE (Dr. Java)

1. **Learning Outcome:**

After this lecture, the students will be able to:

* 1. Use circular characteristics of the array.
  2. Understand an important application of the modulo operator.
  3. Practice real-life application with checking palindrome.

1. **Anticipated Challenges and Possible Solutions**
   1. Task 1: Students may encounter with not handing modular operation or changing the pointer to start position array reached to its last position.

**Solutions:**

* + 1. Use index = index % array.length
    2. If(index == array.length) index = index –array.length
  1. Task 1: print forward may have the same problem as described in a.

**Solutions**:

* + 1. Same as a
  1. Task 1: print backward may have the same problem similar to a. when the index reaches to start point of the circular array they might not handle the index pointer.

**Solutions**:

* + 1. Use index = index % array.length
    2. If(index < 0) index = array.length-1
  1. Task 7: Students think that the first input is always larger

**Solutions:**

* + 1. Check both numbers in order to find the larger value

1. **Acceptance and Evaluation**

Students will be evaluated according to their progress in the lab as they complete each problem. Maybesome of the students will not be able to finish all the 14tasks; they will submit them later and give anoral justification to get their performance mark.

1. **Activity Detail**
   1. **Hour: 1  
      Discussion:**1. A short quiz on the previous lab topic.  
      2. Evaluating and discussing the quiz question. **Problem Task:**
      1. Quiz question will be prepared by the lab faculty members
   2. **Hour: 2**

**Discussion:**

A quick review of the previous lab and recap the theory and basic structure of circular array that is already demonstrated in the classroom.

**Problem Task:**

* + 1. Task 1 to 8 (Page 4)
  1. **Hour: 3**

**Discussion:**

Check task 1 to 8 while the students continue with the rest.

**Problem Task:**

* + 1. Task 9 to 14(Page 4 to 5)

1. **Home tasks**
   1. Unfinished tasks

**Lab 1 Activity List**

**Task 1**

Build a circular array and print them in forward and backward order. Also,print the linear status of the array.

**Task 2**

Convert the circular array into liner array.

**Task 3**

Resize the circular array without changing the start pointer.

**Task 4**

Resize the circular array after linearizing the circular array.

**Task 5**

Insert into a circular array with a right shift.

**Task 6**

Insert into a circular array with a left shift.

**Task 7**

Remove from circular array considering left shift

**Task 8**

Remove from circular array considering a right shift

**Task 9**& **Task 10**

Check if the array consists of palindrome matching.

**Task 11**

Sort the circular array.

**Task 12**&**Task 13**&**Task 14**

Check equivalence of circular array considering different test cases.