Data Structures and Algorithms Lab

05. Slay the Basic Data Structures

Lab Code: 17ECSP201 **Lab No:** 05 **Semester:** III

Date: 20 Aug, 2018 **Batch:** D1-D2

Question: Implementing a Stack, Queue, List

Objective: Implementing and Perfecting the Stack, Queue and List operations

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Stack Properties

- A Stack is a First In Last Out data structure (Can also be referred to Last In First Out, Pushdown List)
- Basic operations on stack are:
  - PUSH
  - POP
  - PEEK
- All operations happen with respect to "top" of the stack
- Stack elements are always printed from top to '0' index. (However print is a illegal operation)

Queue Properties

- A Queue is a First In First Out data structure (Can also be referred to Last In Last Out)
- Basic operations on Queue are:
  - ENQUEUE
  - DEQUEUE
- Insert operations happen at the "rear" end and delete operations happen at "front" end of the queue
- A queue elements are always printed from front to rear (print however is illegal)

List Representation

- A node has a data unit and is a self referential structure
- Collection of nodes becomes a list
- Basic operation on lists: Insert at front and end, delete from front and end

Questions:

1. Implement a integer stack with its basic operations
2. Implement a integer queue with its basic operations
3. Implement a integer list with its basic operations
4. Implement a double ended integer stack with two tops. One top should point to -1 and another to STACKSIZE. When user inputs a number you need to ask for the stack and push it accordingly. The code must contain 2 empty conditions and only one full condition.