

## ASSIGNMENT 1

### 2. 3. 4. Single, double and circular Linked List:

- SIMILARITY :  
Insertion at head takes  $O(1)$  time  
Insertion at end takes  $O(n)$  time  
Insertion at in between position takes  $O(n)$  time  
  
Deletion at head takes  $O(1)$  time  
Deletion at end takes  $O(n)$  time  
Deletion at in between position takes  $O(n)$  time  
  
Space Complexity  $O(n)$
- Dissimilarity :  
In C, we need to free the memory which is pointing to garbage, but in python garbage collector automatically done this.

### 5. Stack :

- SIMILARITY :  
Push and pop operation takes  $O(1)$  time  
Space Complexity  $O(n)$
- Dissimilarity:
  - a) In C program , stack is implemented using array and in python program, stack is implemented using linked list
  - b) In python program, linked list can grow infinitely until memory is exhausted, but in c program ,array can grow till its capacity .
  - c) In C, we need to free the memory which is pointing to garbage, but in python garbage collector automatically done this.

### 6.8. Queue and Circular Queue :

- SIMILARITY :  
Enqueue will happen from rear end and dequeue will happen from rear end  
Enqueue and Dequeue operation takes  $O(1)$  time  
Space Complexity  $O(n)$
- Dissimilarity:
  - a) In C program , queue is implemented using array and in python program, queue is implemented using linked list
  - b) In python program, linked list can grow infinitely until memory is exhausted, but in c program ,array can grow till its capacity .
  - c) In C, we need to free the memory which is pointing to garbage, but in python garbage collector automatically done this.

## 7. Dequeue :

- SIMILARITY :  
Enqueue will happen from rear and front end and dequeue will happen from rear and front end  
Enqueue and Dequeue operation takes  $O(1)$  time  
Space Complexity  $O(n)$
- Dissimilarity:
  - a) In C program , queue is implemented using array and in python program, queue is implemented using linked list
  - b) In python program, linked list can grow infinitely until memory is exhausted, but in c program ,array can grow till its capacity .
  - c) In C, we need to free the memory which is pointing to garbage, but in python garbage collector automatically done this.

## 9. Priority Queue :

- SIMILARITY :  
In both language , it is implemented using linked list  
Enqueue will happen in  $O(N)$  time  
Dequeue will happen in  $O(1)$  time [Min element will be dequeued].  
Space Complexity  $O(n)$   
Linked list is sorted in the order of priority of elements .Smaller the priority value, bigger its priority.