**Assignment - 6**

1. Design a stack using arrays. The array should be created using dynamic memory allocation (malloc).
   1. Implement push, pop, top, isempty, and isfull operations.

***Input/Output:***

Enter the size of the stack: 5

Enter the elements: 3 7 1 9 4

The elements are: 4 9 1 7 3

1. Find the minimum element in a stack. (After finding the minimum, the order of elements in the stack should be preserved).

***Input/Output:***

Enter the size of the stack: 5

Enter the elements: 3 7 1 9 4

The minimum element: 1

The elements in the stack: 4 9 1 7 3

1. Design a queue using arrays. The array should be created using dynamic memory allocation (malloc).
   1. Implement enqueue, dequeue, isempty, and isfull operations.

***Input/Output:***

Enter the size of the queue: 5

Enter the elements: 3 7 1 9 4

The elements are: 3 7 1 9 4

1. Implement a queue using two stacks. This means you have to implement the above operations of queue using push, pop operations of the stack (which you have been provided).
2. Implement a stack using two queues. This means you have to implement the above operations of stack using enqueue and dequeue operations of the queue (which you have been provided).
3. Reverse the order of words in a sentence by using a stack. Use a character array to store the sentence and the array itself should be modified after the reverse operation. E.g. the array “data structures becomes “structures data” after the operation.
4. Implement a unique random number generator that generates an array of unique random positive numbers each within a given range. For example: random\_generate(10, 20) generates an array of 10 unique random integers each within the range [0, 20).

You can use the following method (from Knuth’s Art of Computer Programming):

/\* Here, n is the numbers in the array, m is the range \*/

Initialize an array x[m] as x[i] = i for all i from 0 to m-1

for i from 0 to n-1

swap x[i] with x[a random number between i to m-1] /\*use rand() along with suitable modulus for this \*/

x[0…n-1] is the unique random number array.

**Note: You can use this random number generator for the problem in the last assignment (counting sort using bit vector on unique integers).**

1. Find kth largest element in an array of distinct numbers using Median of Medians (MoM)? (Generate the numbers using a random function)

***Input/Output:***

Enter the value of k: 5

The 5th largest number is 94

The list of numbers in decreasing order is

234 211 123 100 94 76 ……….

1. Write a Program to illustrate stack operations using MACROS

Implement push, pop, top, isempty, and isfull operations.

1. [Write a Program to check whether a given string is Palindrome or not using Stack](http://www.sanfoundry.com/c-program-palindrome-stack/)