2. Write an algorithm to perform push, pop, display operation for a stack (using array).

Solution:

Algorithm for PUSH operation in stack:

Step 1: START

Step 2: Declare Stack[MAX]; //Maximum size of Stack

Step 3: Check if the stack is full or not by comparing top with (MAX-1)

If the stack is full, then print "Stack Overflow" i.e., stack is full and cannot be pushed with another element

Step 4: Else, the stack is not full

Increment top by 1 and set, Stack[top] = x

which pushes the element x into the address pointed by top.

// The element x is stored in Stack[top]

Step 5: STOP

Algorithm for POP operation in stack:

Step 1: START

Step 2: Declare Stack[MAX]

Step 3: Push the elements into the stack

Step 4: Check if the stack is empty or not by comparing top with base of array i.e., 0

If top is less than 0, then stack is empty, print "Stack Underflow"

Step 5: Else, if top is greater than zero the stack is not empty, then store the value pointed by top in a variable x=Stack[top] and decrement top by 1. The popped element is x.

Step 5: STOP

5. Write an algorithm to implement Circular Queue(using array).

Solution:

Algorithm for DISPLAY operation in stack:

Step 1: START

Step 2: If top is less than 0, then stack is empty, print "Stack is empty…"

Step 3: Else, if top is greater than zero the stack is not empty, then print the values from Stack[0] to Stack[top]

Step 4: STOP

Algorithm to insert an element in a circular queue

Step 1: IF (REAR+1)%MAX = FRONT  
Write " OVERFLOW "  
Goto step 4  
[End OF IF]

Step 2: IF FRONT = -1 and REAR = -1  
SET FRONT = REAR = 0  
ELSE IF REAR = MAX - 1 and FRONT ! = 0  
SET REAR = 0  
ELSE  
SET REAR = (REAR + 1) % MAX  
[END OF IF]

Step 3: SET QUEUE[REAR] = VAL

Step 4: EXIT

Algorithm to delete an element from the circular queue

Step 1: IF FRONT = -1  
Write " UNDERFLOW "  
Goto Step 4  
[END of IF]

Step 2: SET VAL = QUEUE[FRONT]

Step 3: IF FRONT = REAR  
SET FRONT = REAR = -1  
ELSE  
IF FRONT = MAX -1  
SET FRONT = 0  
ELSE  
SET FRONT = FRONT + 1  
[END of IF]  
[END OF IF]

Step 4: EXIT