Q1.Write a program to simulate the working of stack using an array with the following:

a) Push

b) Pop

c) Display

The program should print appropriate messages for stack overflow, stack underflow

```
#include <stdio.h>
#include <stdlib.h>

#define MAX 5
int stack[MAX];
int top = -1;

void push(int item) {
   if (top == MAX - 1) {
      printf("Stack Overflow! Cannot push %d\n", item);
   } else {
      stack[++top] = item;
      printf("Pushed %d\n", item);
   }
}

void pop() {
   if (top == -1) {
      printf("Stack Underflow! Stack is empty\n");
   } else {
```

```
        printf("Popped %d\n", stack[top--]);
    }
}
 void display() {
    if (top == -1) {
        printf("Stack is empty\n");
    } else {
        printf("Stack elements are:\n");
        for (int i = top; i >= 0; i--) {
            printf("%d\n", stack[i]);
        }
    }
}

int main() {
    int choice, item;
    while (1) {
        printf("\n--- Stack Operations ---\n");
        printf("1. Push\n2. Pop\n3. Display\n4. Exit\n");
        printf("Enter your choice: ");
        scanf("%d", &choice);

        switch (choice) {
            case 1:
                printf("Enter element to push: ");
                scanf("%d", &item);
                push(item);
                break;
```

```
        case 2:
            pop();
            break;

        case 3:
display();
            break;

        case 4:
            exit(0);

        default:
            printf("Invalid choice\n");
    }
 }

 return 0;
```

```
--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 2
Popped 20

--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 3
Stack elements are:
10

--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 4

Process returned 0 (0x0)   execution time : 115.073 s
Press any key to continue.
```

```
--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter value to push: 10
Pushed 10

--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter value to push: 20
Pushed 20

--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 3
Stack elements are:
20
10
```