1. 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>
#define MAX 5   // Maximum size of stack

int stack[MAX];
int top = -1;

// Function to push an element
void push() {
   int value;
   if (top == MAX - 1) {
      printf("Stack Overflow! Cannot push element.\n");
   } else {
      printf("Enter the value to push: ");
      scanf("%d", &value);
      top++;
      stack[top] = value;
      printf("%d pushed into stack.\n", value);
   }
}

// Function to pop an element
void pop() {
   if (top == -1) {
      printf("Stack Underflow! Cannot pop element.\n");
   } else {
      printf("%d popped from stack.\n", stack[top]);
      top--;
   }
}

// Function to display the stack
void display() {
   if (top == -1) {
```

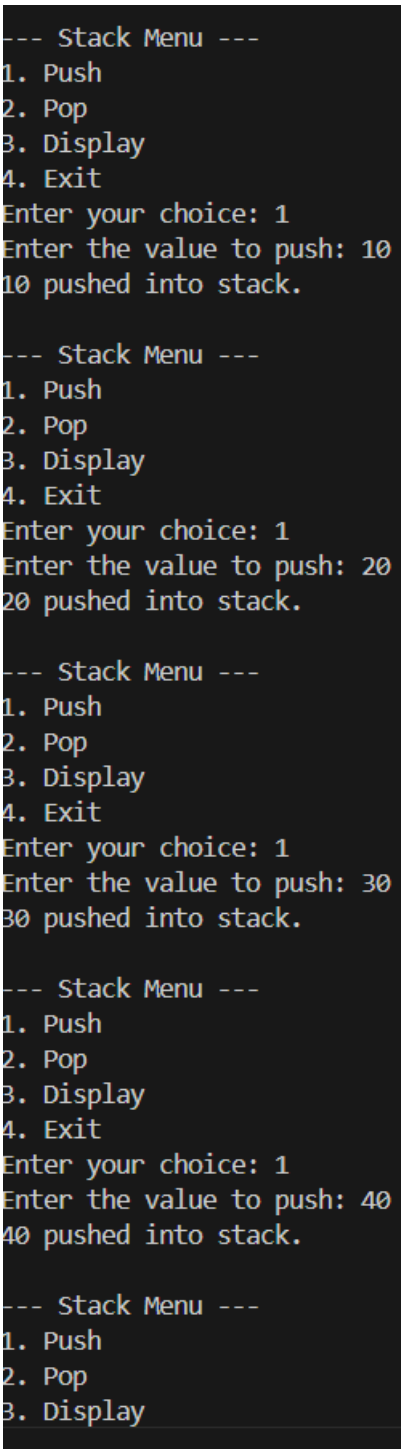
```
  printf("Stack is empty.\n");
    } else {
        printf("Stack elements are:\n");
        for (int i = top; i >= 0; i--) {
            printf("%d\n", stack[i]);
        }
    }
}

int main() {
    int choice;
 do {
        printf("\n--- Stack Menu ---\n");
        printf("1. Push\n");
        printf("2. Pop\n");
        printf("3. Display\n");
        printf("4. Exit\n");
        printf("Enter your choice: ");
        scanf("%d", &choice);

        switch (choice) {
            case 1:
                push();
                break;
            case 2:
                pop();
                break;
            case 3:
                display();
                break;
            case 4:
                printf("Exiting program.\n");
                break;
            default:
                printf("Invalid choice! Try again.\n");
        }
    } while (choice != 4);

    return 0;
}
```

OUTPUT:


--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter the value to push: 10
10 pushed into stack.
--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter the value to push: 20
20 pushed into stack.
--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter the value to push: 30
30 pushed into stack.
--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter the value to push: 40
40 pushed into stack.
--- Stack Menu ---
1. Push
2. Pop
3. Display

```
Enter your choice: 1
Enter the value to push: 40
40 pushed into stack.

--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter the value to push: 50
50 pushed into stack.

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

--- Stack Menu ---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 3
Stack elements are:
40
30
20
10

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