Lab program 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.

```c
#include <stdio.h>

#define MAX 5


int stack[MAX];

int top = -1;



void push(int value) {

    if (top == MAX - 1) {

        printf("Stack Overflow! Cannot push %d\n", value);

    } else {

        top++;

        stack[top] = value;

        printf("%d pushed into the stack\n", value);

    }
}




void pop() {

    if (top == -1) {

        printf("Stack Underflow! Cannot pop from an empty stack\n");

    } else {

        printf("%d popped from the stack\n", stack[top]);
```

```c
        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, value;


    do {


        printf("\nStack Operations 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);
```

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

        case 2:
            pop();
            break;

        case 3:
            display();
            break;

        case 4:
            printf("Exiting the program.\n");
            break;

        default:
            printf("Invalid choice! Please try again.\n");
    }
} while (choice != 4);

return 0;
}
```

```
Stack Operations Menu:
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter the value to push: 10
10 pushed into the stack

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

Stack Operations Menu:
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter the value to push: 30
30 pushed into the stack
```

```
Stack Operations Menu:
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 2
30 popped from the stack

Stack Operations Menu:
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 2
20 popped from the stack
```

```
Stack Operations Menu:
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 2
Stack Underflow! Cannot pop from an empty stack
```