**PROGRAM -3**

**Develop a menu driven Program in C for the following operations on STACK of Integers (Array Implementation of Stack with maximum size MAX)**

**a. Push an Element on to Stack**

**b. Pop an Element from Stack**

**c. Demonstrate how Stack can be used to check Palindrome**

**d. Demonstrate Overflow and Underflow situations on Stack**

**e. Display the status of Stack**

**f. Exit**

**Support the program with appropriate functions for each of the above operations**

Program:

#include<stdio.h>

#define MAX 4

int s[MAX], top = -1, ele, i;

void push(int ele) {

if (top == MAX - 1) {

printf("Stack Overflow\n");

return;

}

top++;

s[top] = ele;

}

int pop() {

if (top == -1) {

printf("Stack Underflow\n");

return -1; // Returning -1 to indicate an error since the stack is empty.

}

int ele = s[top];

top--;

return ele;

}

void display() {

if (top == -1) {

printf("Stack Underflow\n");

return;

}

printf("Stack Contents are:\n");

for (i = top; i >= 0; i--) {

printf("%d\n", s[i]);

}

}

void pal() {

top = -1;

int i = 1, len = 0, rev = 0, digit, temp, n;

printf("Enter a Number\n");

scanf("%d", &n);

temp = n;

// Push digits onto the stack

while (n != 0) {

digit = n % 10;

n = n / 10;

push(digit);

len++;

}

// Pop digits to form the reverse number

while (len != 0) {

digit = pop();

rev = rev + (digit \* i);

len--;

i = i \* 10;

}

// Check if the original number is equal to its reverse

if (temp == rev)

printf("Number is a palindrome\n");

else

printf("Number is not a palindrome\n");

}

void main() {

int ch;

do {

printf("1: push\n2: pop\n3: display\n4: palindrome\n5: exit\n");

printf("Enter your choice\n");

scanf("%d", &ch);

switch (ch) {

case 1:

printf("Enter the element to be pushed \n");

scanf("%d", &ele);

push(ele);

break;

case 2:

ele = pop();

if (ele != -1) {

printf("Element deleted is %d\n", ele);

}

break;

case 3:

display();

break;

case 4:

pal();

break;

case 5:

printf("Exiting the program.\n");

break;

default:

printf("Invalid choice\n");

}

} while (ch != 5);

}