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#include<stdio.h>
#include<stdlib.h>
#define MAX 5
int s[MAX];
int top = -1;

void push(int item);
int pop();
void palindrome();
void display();

void main()
{
    int choice, item;
    while(1)
    {
        printf("\n\n\n\n~~~~~Menu~~~~~ : ");
        printf("\n 1. Push an Element to Stack and Overflow demo ");
        printf("\n 2. Pop an Element from Stack and Underflow demo");
        printf("\n 3. Palindrome demo ");
        printf("\n 4. Display ");
        printf("\n 5. Exit");
        printf("\nEnter your choice: ");
        scanf("%d", &choice);

        switch(choice)
        {
            case 1:   printf("\nEnter an element to be pushed: ");
                       scanf("%d", &item);
                       push(item);
                       break;
            case 2:   pop();
                       break;
            case 3:   palindrome();
                       break;
            case 4:   display();
                       break;
            case 5:   exit(1);
            default:  printf("\nPlease enter valid choice ") ;
                       break;
        }
    }
}

void push(int item)
{
    if(top == MAX-1)
    {
        printf("\n~~~Stack overflow~~~");
        return;
    }
    top = top + 1 ;
    s[top] = item;
}

int pop()
{
    int item;
    if(top == -1)
    {

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        printf("\n~~~~Stack underflow~~~~");
        return -1;
    }
    item = s[top];
    printf("\nElement popped is: %d", item);
    top = top - 1;
}

void display()
{
    int i;
    if(top == -1)
    {
        printf("\n~~~~Stack is empty~~~~");
        return;
    }
    printf("\nStack elements are:\n ");
    for(i=top; i>=0 ; i--)
        printf("| %d |\n", s[i]);
}

void palindrome()
{
    int flag=1,i;
    printf("\nStack content are:\n");
    for(i=top; i>=0 ; i--)
        printf("| %d |\n", s[i]);
    printf("\nReverse of stack content are:\n");
    for(i=0; i<=top; i++)
        printf("| %d |\n", s[i]);
    for(i=0; i<=top/2; i++)
    {
        if( s[i] != s[top-i] )
        {
            flag = 0;
            break;
        }
    }
    if(flag == 1)
        printf("\nIt is palindrome number");
    else
        printf("\nIt is not a palindrome number");
}

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