

LAB PROGRAMS

Data Structure and Applications

3. Design, Develop and Implement 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 **functions** for each of the above operations.

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

```
#define MAX 5
```

```
int stack[MAX];
```

```
int top=-1;
```

```
void push();
```

```
void pop();
```

```
void display();
```

```
void palindrome();
```

```
void main()
```

```
{
```

```
    int choice;
```

```
    while(1)
```

```
    {
```

```
        printf("*****\n");
```

```
        printf("Stack Operations\n");
```

```

printf("1.Push\n 2:Pop\n 3.Dislay\n 4:Palindrome\n5.Exit\n");
printf("*****\n");
printf(" Enter your choice\n");
scanf("%d", &choice);
switch(choice)
{
    case 1: push();
            break;
    case 2: pop();
            break;
    case 3: display();
            break;
    case 4: palindrome();
            break;
    case 5: return;
    default: printf(" Invalid Choice\n");

}

}
}
void push()
{
    int item;
    if(top==MAX-1)
        printf(" sorry stack is full\n");
    else
    {
        printf(" Enter element to push\n");
        scanf("%d",&item);
        stack[++top]=item;
    }
}
void pop()
{

```

```

if(top== -1)
    printf("Sorry stack is empty\n");
else
{
    printf(" Popped item is %d\n", stack[top--]);

}
}
void display()
{

    int i;
    if(top== -1)
        printf("Sorry there is nothing to display\n");
    else
    {
        printf(" Elements of the stack are\n");
        for(i=top; i>=0; i--)
        {
            printf("stack[%d] = %d\n", i, stack[i] );
        }
    }
}
void palindrome()
{

    int i, count=0;
    for(i=0; i<=(top/2); i++)
    {
        if(stack[i]==stack[top-i])
            count++;
    }
    if((top/2+1)==count)
        printf("Stack contents are palindrome\n");
    else

```

```
    printf("Stack contents are not palindrome\n");  
}
```