

Institute of Computer Technology
B. Tech Computer Science and Engineering
Subject: DS (2CSE302)

PRACTICAL-4

AIM: - Ankit is a 5-year-old kid, who is playing in a boardroom with a basket and balls. Each ball is having numbered on it like 1, 2, 3.....upto 9. Ankit's aunt asked him to put all ball inside the basket. Here, the scenario is that basket is long enough to hold all ball but squeezed in width and can hold only one ball at a time. When the next ball is inserted, then that ball can lie on top of the old ball like this way.

a). **Write a c program to perform the following operation onto the basket:**

- **Push ball numbered as 1 inside the basket**
- **Push ball numbered as 8 inside the basket**
- **Push ball numbered as 9 inside the basket**
- **Push ball numbered as 7 inside the basket**
- **Push ball numbered as 2 inside the basket**
- **Pop ball from the basket**
- **Pop ball from the basket**
- **Push ball numbered as 3 inside the basket**

Display the balls present in the basket/stack.

SOLUTION

```
#include <stdio.h>
#include <stdlib.h>
int Top=-1,YashPra[9];
int size=8;
void PushNum()
{
    int x;
    if(Top==size)
    {
        printf("\nOverflow!\n");
    }
    else
    {
        printf("\nEnter number of ball to be inserted: ");
        scanf("%d",&x);
        Top=Top+1;
        YashPra[Top]=x;
    }
}
```

```
void PopNum()
{
    if(Top== -1)
    {
        printf("\nEmpty!\n");
    }
    else
    {
        printf("\nPopped ball numbered: %d",YashPra[Top]);
        Top=Top-1;
    }
}

void show()
{
    if(Top== -1)
    {
        printf("\nEmpty!\n");
    }
    else
    {
        printf("\nBalls in stack array are:\n");
        for(int i=Top;i>=0;--i)
        {
            printf("%d\n",YashPra[i]);
        }
    }
}

int main()
{
    int ch;
    while(1)
    {
        printf("\n(1) PUSH Ball");
        printf("\n(2) POP Ball");
        printf("\n(3) Show Stack");
        printf("\n(4) Exit");
        printf("\nEnter your choice: ");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1:
                PushNum();
```

```

break;

case 2:
PopNum();
break;

case 3:
show();
break;

case 4:
exit(0);

default:
printf("\nInvalid Choice Entered\n");
break;
}
}
return 0;
}

```

OUTPUT

```

CentOS 8 64-bit - VMware Workstation
File Edit View VM Tabs Help
Aug 19 10:50
yash@localhost:~/Desktop/DS/Prac4
File Edit View Search Terminal Help
[yash@localhost Prac4]$ gedit p4q1.c
[yash@localhost Prac4]$ gcc p4q1.c -o p4q1
[yash@localhost Prac4]$ ./p4q1

(1) PUSH Ball
(2) POP Ball
(3) Show Stack
(4) Exit
Enter your choice: 1

Enter number of ball to be inserted: 1

(1) PUSH Ball
(2) POP Ball
(3) Show Stack
(4) Exit
Enter your choice: 1

Enter number of ball to be inserted: 8

(1) PUSH Ball
(2) POP Ball
(3) Show Stack
(4) Exit
Enter your choice: 1

Enter number of ball to be inserted: 9

(1) PUSH Ball
(2) POP Ball
(3) Show Stack

```

```
CentOS 8 64-bit - VMware Workstation
File Edit View VM Tabs Help
CentOS 8 64-bit
Activities Applications Terminal
Aug 19 10:50
yash@localhost:~/Desktop/DS/Prac4
File Edit View Search Terminal Help

(1) PUSH Ball
(2) POP Ball
(3) Show Stack
(4) Exit
Enter your choice: 1

Enter number of ball to be inserted: 7

(1) PUSH Ball
(2) POP Ball
(3) Show Stack
(4) Exit
Enter your choice: 1

Enter number of ball to be inserted: 2

(1) PUSH Ball
(2) POP Ball
(3) Show Stack
(4) Exit
Enter your choice: 3

Balls in stack array are:
2
7
9
8
1

(1) PUSH Ball
Prac4 yash@localhost:~/Desktop/DS/Prac4
To direct input to this VM, click inside or press Ctrl+G.
Type here to search
```

```
CentOS 8 64-bit - VMware Workstation
File Edit View VM Tabs Help
CentOS 8 64-bit
Activities Applications Terminal
Aug 19 10:51
yash@localhost:~/Desktop/DS/Prac4
File Edit View Search Terminal Help

8
1

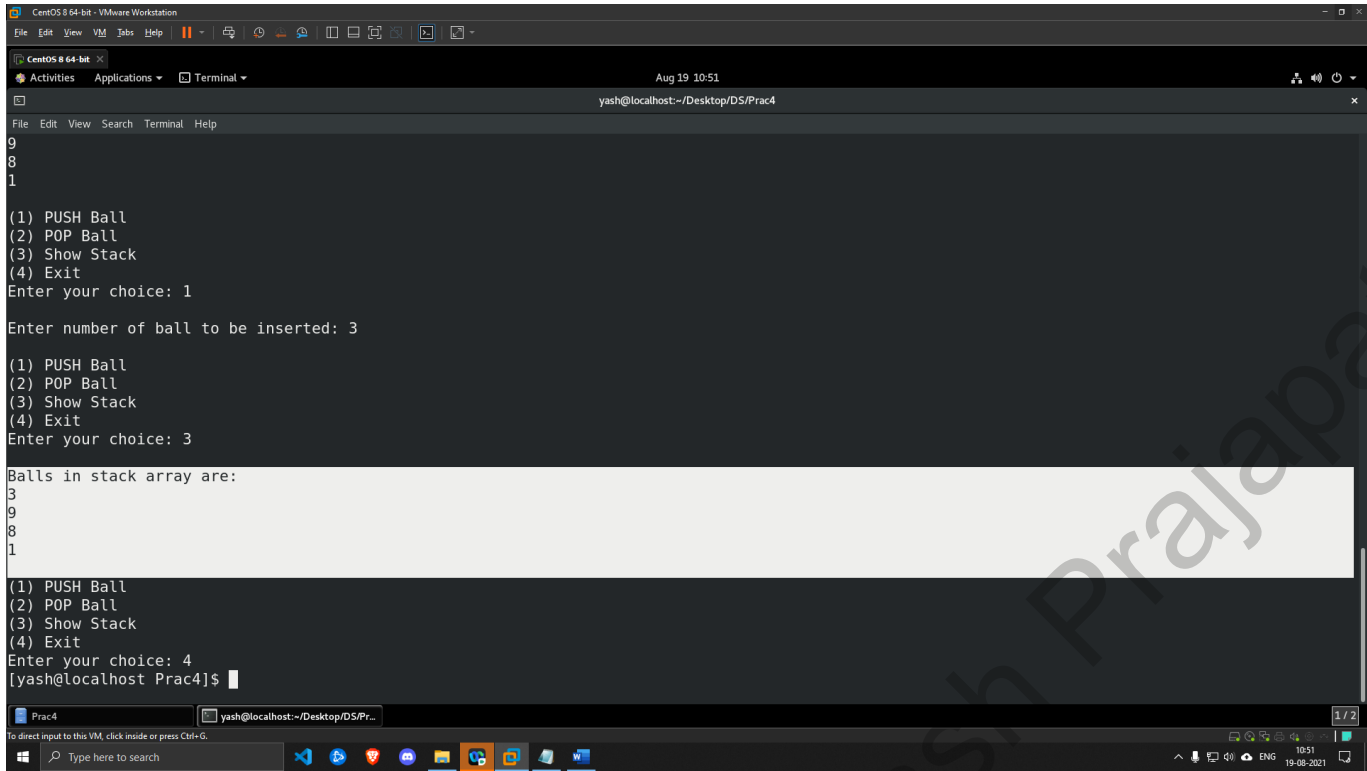
(1) PUSH Ball
(2) POP Ball
(3) Show Stack
(4) Exit
Enter your choice: 2

Popped ball numbered: 2
(1) PUSH Ball
(2) POP Ball
(3) Show Stack
(4) Exit
Enter your choice: 2

Popped ball numbered: 7
(1) PUSH Ball
(2) POP Ball
(3) Show Stack
(4) Exit
Enter your choice: 3

Balls in stack array are:
9
8
1

(1) PUSH Ball
(2) POP Ball
(3) Show Stack
Prac4 yash@localhost:~/Desktop/DS/Prac4
To direct input to this VM, click inside or press Ctrl+G.
Type here to search
```



b). Ankit stores the boll randomly (1,8,9,3 from previous question 4.a) but Ankit's aunt asked him to store odd-numbered (1,3,5,7,9) boll first and then even number boll (2,4,6,8). Ankit should start from boll numbered as 1 then should push boll numbered as 2, then 3, and so on. Once all bolls have been pushed then print all elements. Write a c program to perform the following operation onto the basket:

- Pop boll from the basket
- Pop boll from the basket
- Pop boll from the basket
- Push boll numbered as 2 inside the basket
- Push boll numbered as 3 inside the basket
- Push boll numbered as 4 inside the basket
- Push boll numbered as 5 inside the basket
- Push boll numbered as 6 inside the basket
- Push boll numbered as 7 inside the basket
- Push boll numbered as 8 inside the basket
- Push boll numbered as 9 inside the basket

Display the bolls present in the basket/stack.

Hint: Maxsize of stack = 9

SOLUTION

```
#include <stdio.h>
#include <stdlib.h>
int Top=-1,YashPra[9];
int size=8;
void PushNum()
{
    int x;
    if(Top==size)
    {
        printf("\nOverflow!\n");
    }
    else
    {
        printf("\nEnter number of ball to be inserted: ");
        scanf("%d",&x);
        if(Top== -1)
        {
            Top=Top+1;
            YashPra[Top]=x;
        }
    }
}
```

```
        else if(x>YashPra[Top] && YashPra[Top]%2==1 )
        {
            Top=Top+1;
            YashPra[Top]=x;
        }
        else if(x>YashPra[Top] && YashPra[Top]%2==0 )
        {
            Top=Top+1;
            YashPra[Top]=x;
        }
        else
        {
            printf("\nCannot PUSH %d as condition not satisfied\n",x);
        }
    }
}

void PopNum()
{
    if(Top== -1)
    {
        printf("\nEmpty!\n");
    }
    else
    {
        printf("\nPopped ball numbered: %d",YashPra[Top]);
        Top=Top-1;
    }
}

void show()
{
    if(Top== -1)
    {
        printf("\nEmpty!\n");
    }
    else
    {
        printf("\nBalls in stack array are:\n");
        for(int i=Top;i>=0;--i)
        {
            printf("%d\n",YashPra[i]);
        }
    }
}
```

```
    }  
}  
  
int main()  
{  
    int ch;  
  
    Top=Top+1;  
    YashPra[Top]=1;  
    Top=Top+1;  
    YashPra[Top]=8;  
    Top=Top+1;  
    YashPra[Top]=9;  
    Top=Top+1;  
    YashPra[Top]=3;  
  
    while(1)  
    {  
        printf("\n(1) PUSH Ball");  
        printf("\n(2) POP Ball");  
        printf("\n(3) Show Stack");  
        printf("\n(4) Exit");  
        printf("\nEnter your choice: ");  
        scanf("%d",&ch);  
        switch(ch)  
        {  
            case 1:  
                PushNum();  
                break;  
  
            case 2:  
                PopNum();  
                break;  
  
            case 3:  
                show();  
                break;  
  
            case 4:  
                exit(0);  
  
            default:  
                printf("\nInvalid Choice Entered\n");  
                break;  
        }  
    }  
}
```



```
}  
}  
return 0;  
}
```

OUTPUT

