

# **CSE2003 DSA: Lab Assignment #2**

Due on Thursday, February 9, 2016

*Shaik Naseera 2:00 pm*

**Jacob John**

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## Problem 1

Write a program to Implement stack using Arrays.

Listing 1: C program for implementing stacks using Arrays.

```
#include<stdio.h>
#include<stdlib.h>
int max=10,top=-1,s[10],choice;
void push() {
5   int a;
   printf("Enter the element: ");
   scanf("%d",&a);
   if((top+1)==max)
   {
10      printf("Stack overflow");
      return;
   }
   else
   {
15      top++;
      s[top]=a;
      return;
   }
}
20 void pop() {
   if(top==--1)
   {
      printf("Stack is empty");
      return;
25  }
   else;
   {
      printf("Popped element is %d",s[top]);
      top--;
30  }
}
void peep() {
   int b;
   printf("Enter the position of the elemnt you want to see from top");
35  scanf("%d",&b);
   if(b>(top+1) || b<0)
   {
      printf("No element present at this position");
      return;
40  }
   else
   {
      printf("Element is %d",s[top-b+1]);
      return;
45  }
}
void display()
{
```

```
int i;
50 if (top== -1)
{
    printf("Stack is empty");
    return;
}
55 printf("->");
for (i=top; i>0; i--)
    printf("%d", s[i]);
}
int main() {
60 while (1)
{
    printf("\n1.Push\n2.Pop\n3.Peep\n4.Display\n5.Exit\n");
    scanf("%d", &choice);
    switch(choice)
65 {
        case 1: push();
            break;
        case 2: pop();
            break;
70         case 3: peep();
            break;
        case 4: display();
            break;
75         default: exit(0);
    }
}
}
```

Output:

```
Jacobs-MacBook-Pro:Downloads jacobjohn$ gcc untitled.c
Jacobs-MacBook-Pro:Downloads jacobjohn$ ./a.out

1.Push
2.Pop
3.Peep
4.Display
5.Exit
1
Enter the element: 10

1.Push
2.Pop
3.Peep
4.Display
5.Exit
2
Popped element is 10

1.Push
2.Pop
3.Peep
4.Display
5.Exit
3
Enter the position of the elemnt you want to see from top0
Element is 10

1.Push
2.Pop
3.Peep
4.Display
5.Exit
4
Stack is empty

1.Push
2.Pop
3.Peep
4.Display
5.Exit
5
Jacobs-MacBook-Pro:Downloads jacobjohn$
```

```
Exercise2.pl homework_example.pl untitled.c +
32 void pop() {
33     int b;
34     printf("Enter the position of the elemnt you want to see from top");
35     scanf("%d", &b);
36     if(b>(top+1)||b<0)
37     {
38         printf("No element present at this position");
39         return;
40     }
41     else
42     {
43         printf("Element is %d",s[top-b+1]);
44         return;
45     }
46 }
47 void display()
48 {
49     int i;
50     if(top== -1)
51     {
52         printf("Stack is empty");
53         return;
54     }
55     printf("->");
56     for(i=top; i>0; i--)
57         printf("%d",s[i]);
58 }
59 int main() {
60     while(1)
61     {
62         printf("\n1.Push\n2.Pop\n3.Peep\n4.Display\n5.Exit\n");
63         scanf("%d",&choice);
64         switch(choice)
65         {
66             case 1:push();
67             break;
68             case 2:pop();
69             break;
70             case 3:peep();
71             break;
72             case 4:display();
73             break;
74             default:exit(0);
75         }
76     }
77 }
78 }
```

Line: 78 | C Tab Size: 4 | Symbols

## Problem 2

Write a program to implement infix to postfix conversion using stack.

Listing 2: C program for implementing infix to postfix conversion using stack

```
#include<stdio.h>
#include<math.h>
#include<ctype.h>
#include<stdlib.h>
5 char infix[20], postfix[20];
char x;
int top=-1, s[30];
char y, c;
int MAX=30;
10 void push(int);
int pop();
int stop();
int priority(int);
int main()
15 {
    int i, j=0;
    printf("\nEnter the infix expression: \n");
    scanf("%s", infix);
    i=0;
20 x=infix[i]; i++;
    while(x!='#')
    {
        if(isalpha(x) || isdigit(x)){
            postfix[j]=x;
25 j++;
        }
        else if ( x=='(' )
            push(x);
        else if ( x=='(' )
30 {
            c=pop();
            while(c!='('){
                postfix[j]=c; j++; c=pop();
            }
35 }
        else
        {
            if(priority(x) > priority(stop()))
                push(x);
40 else
            {
                while(priority(stop()) >= priority(x))
                {
45 c=pop();
                postfix[j]=c;
                j++;
            }
            push(x);
        }
    }
}
```

```

    }
50
    }
    x=infix[i]; i++;
    }
    while(top>=0){
55        postfix[j]=pop(); j++;
    }
    printf("\nPostfix expression is: %s\n",postfix);
return 1;
}
60 void push(int y)
{
    if((top+1)==MAX) {
        printf("\nStack Overflow\n"); exit(0);
    }
65     else
    {
        top++;
        s[top]=y;
    }
70 }
int pop()
{
    int val;
    if (top== -1)
75     return -1;
    else
    {
        val=s[top];
        top--;
        return val;
80     }
}
int stop()
{
    if(top== -1)
85     return -1;
    else
        return s[top];
}
int priority(int x)
90 {
    if (x=='(')
        return 0;
    else if (x=='+' || x=='-')
        return 1;
95     else if (x=='*' || x=='/' || x=='%')
        return 2;
    else if (x=='^')
        return 3;
    else
100     return -1;
}
```

Output:

```

Jacobs-MacBook-Pro:~ jacobjohn$ ls
Applications  Documents  Library      Music        Pictures
Desktop      Downloads  Movies       OneDrive
Jacobs-MacBook-Pro:~ jacobjohn$ cd Do
-bash: cd: Do: No such file or directory
Jacobs-MacBook-Pro:~ jacobjohn$ cd Downloads/
Jacobs-MacBook-Pro:Downloads jacobjohn$ ls
1 HOSTEL ROOM ALLOTMENT POLICY 17-18 spot light.pdf
6-046j-fall-2005.zip
Assignment1_final.pdf
CKR AWP.jpg
Circular on CAT I and CAT II Schedule.pdf
Exercise2.1.c
Exercise2.c
Marvel's Agents of S.H.I.E.L.D. S04E07.720p.HDTV.2CH.x265.HEVC-PSA.mkv
WINSEM2016-17_CSE2003_ELA_2064_1_168CE2205_1.pdf
WINSEM2016-17_CSE2003_ELA_2064_2_168CE0481_1.doc
WINSEM2016-17_CSE2003_ELA_2064_2_168CE2205_1.doc
assignment_2
assignment_2.zip
~$NSEM2016-17_CSE2003_ELA_2064_2_168CE2205_1.doc
Jacobs-MacBook-Pro:Downloads jacobjohn$ gcc Exercise2.c
Jacobs-MacBook-Pro:Downloads jacobjohn$ ./a.out

Enter the infix expression:
a+b#

Postfix expression is: ab+
Jacobs-MacBook-Pro:Downloads jacobjohn$ ./a.out

Enter the infix expression:
a+b#

Postfix expression is: ab+
Jacobs-MacBook-Pro:Downloads jacobjohn$ ./a.out

Enter the infix expression:
(a+b)*(c+d)
Bus error: 10
Jacobs-MacBook-Pro:Downloads jacobjohn$ ./a.out

Enter the infix expression:
(a+b)*(c+d)#

Postfix expression is: ab+cd+*
Jacobs-MacBook-Pro:Downloads jacobjohn$

```

```

1  #include<stdio.h>
2  #include<stdlib.h>
3  int max=10,top=-1,s[10],choice;
4  void push(){
5      int a;
6      printf("Enter the element: ");
7      scanf("%d",&a);
8      if((top+1)==max)
9      {
10         printf("Stack overflow");
11         return;
12     }
13     else
14     {
15         top++;
16         s[top]=a;
17         return;
18     }
19 }
20 void pop(){
21     if(top==1)
22     {
23         printf("Stack is empty");
24         return;
25     }
26     else;
27     {
28         printf("Popped element is %d",s[top]);
29         top--;
30     }
31 }
32 void peep(){
33     int b;
34     printf("Enter the position of the elemnt you want to see from top");
35     scanf("%d", &b);
36     if(b>(top+1)||b<0)
37     {
38         printf("No element present at this position");
39         return;
40     }
41     else
42     {
43         printf("Element is %d",s[top-b+1]);
44         return;
45     }
46 }
47 void display()
48 {

```

Line: 78 | C | Tab Size: 4 | Symbols