CSE2003 DSA: Lab Assignment #2

Due on Thursday, February 9, 2016

Shaik Naseera 2:00 pm

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Contents

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(){
    int a;
    printf("Enter the element: ");
    scanf("%d",&a);
    if((top+1)==max)
    {
        printf("Stack overflow");
        return;
    }
    else
    {
        top++;
        s[top]=a;
        return;
    }
}
void pop(){
    if(top==-1)
    {
        printf("Stack is empty");
        return;
    }
    else;
    {
        printf("Popped element is %d",s[top]);
        top--;
    }
}
void peep(){
    int b;
    printf("Enter the position of the elemnt you want to see from top");
    scanf("%d", &b);
    if(b>(top+1)||b<0)
    {
        printf("No element present at this position");
        return;
    }
    else
    {
        printf("Element is %d",s[top-b+1]);
        return;
    }
}
void display()
{
```

Problem 1 continued on next page...

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

```
    int b;
    printf("Enter the position of the elemnt you want to see from top");
    scanf("%d", &b);
    if(b>(top+1)||b<0)
    {
        printf("No element present at this position");
        return;
    }
    else
    {
        printf("Element is %d",s[top-b+1]);
        return;
    }
}
void display()
{
    int i;
    if(top==-1)
    {
        printf("Stack is empty");
        return;
    }
    printf("->");
    for(i=top;i>0;i--)
    printf("%d",s[i]);
}
int main(){
    while(1)
    {
        printf("\n1.Push\n2.Pop\n3.Peep\n4.Display\n5.Exit\n");
        scanf("%d",&choice);
        switch(choice)
        {
            case 1:push();
            break;
            case 2:pop();
            break;
            case 3:peep();
            break;
            case 4:display();
            break;
        default:exit(0);
        }
    }
}
```

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>
char infix[20],postfix[20];
char x;
int top=-1, s[30];
char y,c;
int MAX=30;
void push(int);
int pop();
int stop();
int priority(int);
int main()
{
     int i,j=0;
      printf("\nEnter the infix expression: \n");
       scanf("%s",infix);
       i=0;
       x=infix[i]; i++;
       while(x!='#')
       {
        if(isalpha(x) || isdigit(x)){
             postfix[j]=x;
             j++;
             }
        else if( x=='(')
                push(x);
           else if( x== ')')
           {
                 c=pop();
                 while(c!='('){
                          postfix[j]=c; j++; c=pop();
                     }
           }
        else
        {
                   if(priority(x) > priority(stop()))
                  push(x);
            else
            {
               while(priority(stop()) >= priority(x))
               {
                     c=pop();
                     postfix[j]=c;
                     j++;
               }
                        push(x);
```

```
            }

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

Output:

```
Jacobs-MacBook-Pro:~ jacobjohn$ ls
Applications    Documents       Library         Music           Pictures
Desktop         Downloads       Movies          OneDrive        Public
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_16BCE2205_1.pdf
WINSEM2016-17_CSE2003_ELA_2064_2_16BCE0481_1.doc
WINSEM2016-17_CSE2003_ELA_2064_2_16BCE2205_1.doc
assignment_2
assignment_2.zip
~$NSEM2016-17_CSE2003_ELA_2064_2_16BCE2205_1.doc
Jacobs-MacBook-Pro:Downloads jacobjohn$ 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$
```

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

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