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Subject: Data Structure and Algorithm Laboratory
Assignment No.4

```
#include<iostream>
using namespace std;
#include<string.h>
class node
{
public:
char data;
node *left;
node *right;
};
class tree
{
char prefix[20];
public:
node *top;
void expression(char[]);
void display(node *);
void non_rec_postorder(node *);
void del(node *);
};
class stack1
{
node *data[30];
int top;
public:
stack1()
{
top=-1;
}
int empty()
{
if(top== -1)
return 1;
return 0;
}
void push(node *p)
{
data[++top]=p;
}
node *pop()
{
return(data[top--]);
}
};
void tree::expression(char prefix[])
{
char c;
stack1 s;
node *t1,*t2;
int len,i;
len=strlen(prefix);
for(i=len-1;i>=0;i--)
{
```

```

top=newnode;
top->left=NULL;
top->right=NULL;
if(isalpha(prefix[i]))
{
top->data=prefix[i];
s.push(top);}
elseif(prefix[i]=='+'||prefix[i]=='-'||prefix[i]=='/')
{
t2=s.pop();
t1=s.pop();
top->data=prefix[i];
top->left=t2;
top->right=t1;
s.push(top);
}
}
top=s.pop();
cout<<"\nPrefix expression is\n";
display(top);
}
void tree::display(node *root)
{
if(root!=NULL)
{
cout<<root->data;
display(root->left);
display(root->right);
}
}
void tree::non_rec_postorder(node *top)
{
stack<node*> s1,s2;
node *T=top;
cout<<"\n";
s1.push(T);
while(!s1.empty())
{
T=s1.pop();
s2.push(T);
if(T->left!=NULL)
s1.push(T->left);
if(T->right!=NULL)
s1.push(T->right);
}
while(!s2.empty())
{
top=s2.pop();
cout<<top->data;
}
}
void tree::del(node *node)
{
if(node==NULL)
return;
del(node->left);
del(node->right);
cout<<"Deleting node "<<node->data;
delete(node);
}

```

```

int main()
{
    char expr[20];
    treet;
    cout<<"Enter prefix expression";
    cin>>expr;
    cout<<"\nPrefix Expression is:\n"<<expr;
    t.expression(expr);
    cout<<"\nPostfix expression is=";
    t.non_rec_postorder(t.top);
}
/*
Enter prefix expression +ab
Prefix Expression is:
+ab
Prefix expression is
+ab
Postfix expression is =
ab+
*/

```

The screenshot shows a Windows command prompt window titled "D:\AbdulMuiz\College Practicals\DSA\exptree.exe". The user has entered the prefix expression "+ab". The program outputs the prefix expression as "+ab", the prefix expression as "+ab", and the postfix expression as "ab+". The window also shows the process exit message: "Process exited after 3.845 seconds with return value 0" and "Press any key to continue . . .". The Windows taskbar at the bottom shows the date and time as 11/04/2021, 13:18.

```

D:\AbdulMuiz\College Practicals\DSA\exptree.exe
Enter prefix expression+ab
Prefix Expression is:
+ab
Prefix expression is
+ab
Postfix expression is =
ab+
-----
Process exited after 3.845 seconds with return value 0
Press any key to continue . . .

```