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Experiment-13 Construction of DAG

Aim:

To implement the construction of DAG using C/ C++.

Procedure:

1. Start the program.
2. Include all the header files.
3. Check for postfix expression and construct the in-order DAG representation.
4. Print the output.
5. Stop the program.

Code:

```
#include <iostream>
#include <string>
#include <unordered_map>
using namespace std;
class DAG
{
public:
   char label;
   char data;
   DAG *left;
```

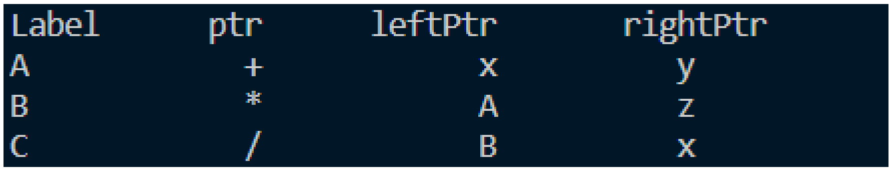
```
    DAG *right;

    DAG(char x)
    {
        label = '_';
        data = x;
        left = NULL;
        right = NULL;
    }
    DAG(char lb, char x, DAG *lt, DAG *rt)
    {
        label = lb;
        data = x;
        left = lt;
        right = rt;
    }
};

int main()
{
    int n;
    n = 3;
    string st[n];
    st[0] = "A=x+y";
    st[1] = "B=A*z";
    st[2] = "C=B/x";
    unordered_map<char, DAG *> labelDAGNode;

    for (int i = 0; i < 3; i++)
    {
        string stTemp = st[i];
    for (int j = 0; j < 5; j++)
    {
        char tempLabel = stTemp[0];
        char tempLeft = stTemp[2];
        char tempData = stTemp[3];
        char tempRight = stTemp[4];
        DAG *leftPtr;
        DAG *rightPtr;
        if (labelDAGNode.count(tempLeft) == 0)
        {
            leftPtr = new DAG(tempLeft);
        }
        else
        {
            leftPtr = labelDAGNode[tempLeft];
        }
        if (labelDAGNode.count(tempRight) == 0)
        {
            rightPtr = new DAG(tempRight);
        }
        else
        {
            rightPtr = labelDAGNode[tempRight];
        }
        DAG *nn = new DAG(tempLabel, tempData, leftPtr, rightPtr);
        labelDAGNode.insert(make_pair(tempLabel, nn));
    }
}
cout << "Label      ptr      leftPtr       rightPtr" << endl;
for (int i = 0; i < n; i++)
{
        DAG *x = labelDAGNode[st[i][0]];
        cout << st[i][0] << "          " << x->data << "          ";
        if (x->left->label == '_')
            cout << x->left->data;
        else
            cout << x->left->label;
        cout << "        ";
        if (x->right->label == '_')
            cout << x->right->data;
        else
            cout << x->right->label;
        cout << endl;
    }
    return 0;
}
```

Output:



```
Label       ptr       leftPtr       rightPtr
A             +             x           y
B             *             A           z
C             /             B           x
```

Result:

The construction of DAG was successful.