Homework 12

The goal of this homework is to practice the visitor pattern. In the lecture, we given an example of using a visitor to traverse a tree. In that example, we assume each nonterminal node has no value. In this homework, you need to develop visitors assuming that each nonterminal node has an integer value. Of course, each terminal node also has an integer value. Your visitor should traverse the whole tree to calculate the sum of the values of all terminal and nonterminal nodes. You need to program two such visitors, one is implemented using the stack and another one is implemented with any stack. You need to program classes Node, TerminalNode, NonTerminalNode, Visitor, StackBasedSumVisitor, and NonStackBasedSumVisitor so that the following main function will compile and output as follows:

```cpp
int main(int argc, char** argv) {
    NonTerminalNode* root = new NonTerminalNode(0);

    NonTerminalNode* ntrn1 = new NonTerminalNode(1);
    NonTerminalNode* ntrn2 = new NonTerminalNode(2);
    NonTerminalNode* ntrn3 = new NonTerminalNode(3);

    root->addChild(ntrn1);
    root->addChild(ntrn2);
    root->addChild(ntrn3);

    ntrn1->addChild(new TerminalNode(4));
    ntrn1->addChild(new TerminalNode(5));
    ntrn1->addChild(new TerminalNode(6));

    ntrn2->addChild(new TerminalNode(7));
    ntrn2->addChild(new TerminalNode(8));
    ntrn2->addChild(new TerminalNode(9));

    ntrn3->addChild(new TerminalNode(10));
    ntrn3->addChild(new TerminalNode(11));
    ntrn3->addChild(new TerminalNode(12));

    StackBasedSumVisitor sbsv;
    root->Accept(&sbsv);
    cout<<"StackBasedSumVisitor Result: "<<sbsv.getResult()<<endl;

    NonStackBasedSumVisitor nsbsv;
    root->Accept(&nsbsv);
    cout<<"NonStackBasedSumVisitor Result: "<<nsbsv.getResult();

    return 0;
}
```

Output:
StackBasedSumVisitor Result: 78
NonStackBasedSumVisitor Result: 78

Due: March 18th, 11:59PM, 2019.

Turn in one file via handin: the zip file of your whole NetBean directory. No UML. The name of your zip file should be: LastName_FirstName.zip. For example, if your name is John Smith, you should turn in one files: Smith_John.zip.