/\*

\* To change this license header, choose License Headers in Project Properties.

\* To change this template file, choose Tools | Templates

\* and open the template in the editor.

\*/

**package** binarytree;

**public** **class** BinaryTree {

**int**[] branch = {51, 54, 69, 79, 88, 99, 102, 113, 116, 124, 127, 132, 135};

**int**[] counter = **new** **int**[200];

**public** **static** **int** getLineNumber() { **return** Thread.*currentThread*().getStackTrace()[2].getLineNumber();} //from https://stackoverflow.com/questions/115008/how-can-we-print-line-numbers-to-the-log-in-java

**public** **static** **float** getbranch(**float** x, **float** y) { **return** x/y; }

**private** Node root;

**public** BinaryTree(){

root = **null**;

}

**public** **void** insert(**int** val){

root=insert(root, val);

}

**public** **void** printPostOrder(){

printPostOrder(root);

}

**public** **void** printInOrder(){

printInOrder(root);

}

**public** **void** printPreOrder(){

printPreOrder(root);

}

**public** **int** size(){

**return** size(root);

}

**public** **int** maxDepth(){

**return** maxDepth(root);

}

**public** **boolean** isBST(){

**return** isBST(root, Integer.***MIN\_VALUE***, Integer.***MAX\_VALUE***);

}

**private** **boolean** isBST(Node node, **int** min, **int** max){

counter[*getLineNumber*()]++; **if**(node == **null**)

{ counter[*getLineNumber*()]++;**return** **true**;}

counter[*getLineNumber*()]++;**if**(node.data<min || node.data>max)

{ **return** **false**;}

counter[*getLineNumber*()]++;**return** isBST(node.left, min, node.data) &&

isBST(node.right, node.data, max);

}

**private** Node NewNode(**int** val){

Node root = **new** Node();

root.data = val;

root.left = **null**;

root.right = **null**;

**return** root;

}

**private** **void** printInOrder(Node node){

counter[*getLineNumber*()]++; **if**(node == **null**) {

counter[*getLineNumber*()]++; **return**;

}

printInOrder(node.left);

System.***out***.println(node.data);

printInOrder(node.right);

}

**private** **void** printPostOrder(Node node){

counter[*getLineNumber*()]++; **if**(node == **null**){

**return**;

}

counter[*getLineNumber*()]++;printInOrder(node.left);

printInOrder(node.right);

System.***out***.println ( node.data );

}

**private** **void** printPreOrder(Node node) {

counter[*getLineNumber*()]++;**if**(node==**null**){

counter[*getLineNumber*()]++;**return**;

}

System.***out***.println(node.data);

printPreOrder(node.left);

printPreOrder(node.right);

}

**private** **int** size(Node node){

counter[*getLineNumber*()]++;**if**(node==**null**){

counter[*getLineNumber*()]++;**return** 0;

}

**else** {

counter[*getLineNumber*()]++;;**return** (size(node.left) + 1 + size(node.right));

}

}

**private** Node insert(Node node, **int** val){

counter[*getLineNumber*()]++;**if**(node==**null**){

counter[*getLineNumber*()]++;**return** NewNode(val);

}

counter[*getLineNumber*()]++;**if**(val <= node.data ){

counter[*getLineNumber*()]++;node.left = insert(node.left, val);

}

**else** {

counter[*getLineNumber*()]++;node.right = insert(node.right, val);

}

counter[*getLineNumber*()]++;

**return** node;

}

**private** **int** maxDepth(Node node){

counter[*getLineNumber*()]++;**if**(node==**null**){

counter[*getLineNumber*()]++;**return** 0;

}

**else**

{ counter[*getLineNumber*()]++;

**int** leftDepth = maxDepth(node.left);

**int** rightDepth = maxDepth(node.right);

counter[*getLineNumber*()]++;

**if**(leftDepth>rightDepth){

counter[*getLineNumber*()]++;**return** leftDepth+1;

}

**else** {

counter[*getLineNumber*()]++;**return** rightDepth+1;

}

}

}

**public** **void** printnumber() {

**for**(**int** i = 0; i < counter.length; i++) {

**if**(counter[i] != 0) {

System.***out***.println("Line "+ i + " executed " + counter[i] + " times");

}

}

}

**public** **void** printbranch() {

**for**(**int** i = 0; i < branch.length; i++) {

**for**(**int** j = 0; j < counter.length; j++) {

**if**(j == branch[i]) {

**if**(j == 102) System.***out***.println("Branch at line " + branch[i] + " taken " + *getbranch*((**float**)counter[j+1], (**float**)counter[j-3]) + "%");

**else** **if**(j == 116) System.***out***.println("Branch at line " + branch[i] + " taken " + *getbranch*((**float**)counter[j+1], (**float**)counter[j-3]) + "%");

**else** **if**(j == 127) System.***out***.println("Branch at line " + branch[i] + " taken " + *getbranch*((**float**)counter[j+1], (**float**)counter[j-3]) + "%");

**else** **if**(j == 132) System.***out***.println("Branch at line " + branch[i] + " taken " + *getbranch*((**float**)counter[j+1], (**float**)counter[j-1]) + "%");

**else** **if**(j == 135) System.***out***.println("Branch at line " + branch[i] + " taken " + *getbranch*((**float**)counter[j+1], (**float**)counter[j-4]) + "%");

**else** System.***out***.println("Branch at line " + branch[i] + " taken " + *getbranch*((**float**)counter[j+1], (**float**)counter[j]) + "%");

}

}

}

}

}