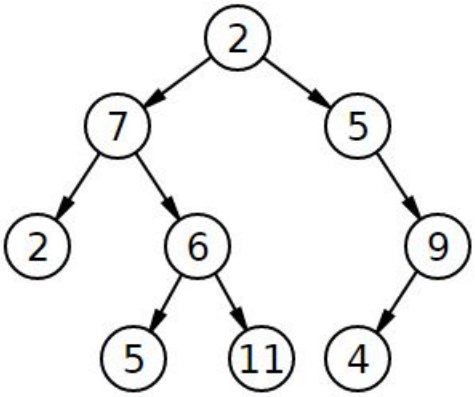
Homework 6 : Generics

In computer science, a binary tree is a tree data structure in which each node has at most two children, which are referred to as the left child and the right child[1]. Except the root node, each node in the binary tree should have a parent node. The root node does not have a parent. In the below figure, the root node whose value is 2 is the root node of the binary tree. The value of the left child of the root node is 7 and the value of the right child of the root node is 5.



An example binary tree with a root node whose value is 2.

In this homework, you are to design an interface to represent a binary tree node. The interface should declare accessor and mutator methods for the parent node, left node, right node and the value of the node. You should also provide an implementation for the interface. Both the interface and implementation you provided should support generics. Your code should perform the following behaviours assuming BinaryTreeNode and BinaryTreeNodeImpl are the name of the interface and class, respectively.

Test 1

```
public static void main(String[] args) {
    BinaryTreeNode<String> root = new BinaryTreeNodeImpl<String>();
    root.setValue("abc");

    BinaryTreeNode<String> left = new BinaryTreeNodeImpl<String>();
    left.setValue("xyz");
    root.setLeft(left);

    System.out.println(left.getParent().getValue());
    System.out.println(root.getLeft().getValue());
}
```

output:

abc

xyz

Test 2

```
public static void main(String[] args) {
    BinaryTreeNode<String> root = new BinaryTreeNodeImpl<>();
    root.setValue("abc");

    BinaryTreeNode<Integer> left = new BinaryTreeNodeImpl<>();
    left.setValue(7);
    root.setLeft(left);
}
```

output

"root.setLeft(left);" causes type mismatch error during compile-time

Due date: 21.03.2016 13:30

Submission:

- You will submit your homework to **onurkilincceker@gmail.com**
- Write CENG 1004 HW6 in the subject line of your email.
- To this email, you should attach your compressed deliverable file (zip file) which contains the source files of your application.
- The name of your zip file should be in the following format: StudentID_HW6.zip and you should replace StudentID with your own ID number. Assuming 1007090002 is your ID number, then the name of your zip file should be 1007090002_HW6.zip