CENG 242

Hw #1

Spring 2006/2007

(Due: March 18th, 2007 Sunday 23:59)

In this homework, you will write a Haskell code finding a one-to-one and onto correspondence between two given binary trees if possible. The tree is defined as follows:

```
data Tree = Empty | Leaf Integer | Branch Integer Tree Tree
```

You will write a function **isEqual** in the form:

```
isEqual <firstTree> <secondTree>
```

The function should return an empty list if two trees are structurally different or one-to-one and onto correspondence couldn't be achieved. If achieved, return the list of tuples defining the correspondence. Some examples are:

```
> isEqual (Branch 3 (Leaf 5) (Leaf 3)) (Branch 5 (Leaf 6) (Leaf 5))
```

[(3,5),(5,6)]

```
> isEqual (Branch 3 (Leaf 5) (Leaf 3)) (Branch 6 (Leaf 7) (Leaf 8))
```

[]

```
> isEqual (Branch 3 (Leaf 5) Empty) (Branch 5 (Leaf 6) (Leaf 8))
```

[]

```
> isEqual (Branch 3 (Leaf 5) (Leaf 6)) (Branch 4 (Leaf 8) (Leaf 4))
```

[]

```
> isEqual (Branch 4 Empty Empty) (Leaf 6)
```

[(4,6)]

```
> isEqual (Branch 3 (Branch 2 (Branch 7 Empty (Leaf 4)) Empty)(Branch 4
(Leaf 3) (Branch 8 (Leaf 3) Empty))) (Branch 7 (Branch 5 (Branch 9
Empty (Branch 8 Empty Empty)) Empty)(Branch 8 (Leaf 7) (Branch 6
(Branch 7 Empty Empty) Empty)))
```

[(2,5),(7,9),(4,8),(8,6),(3,7)]

Order of the tuples in the resulting list is not important. So, for example *[(3,5),(5,6)]* and *[(5,6),(3,5)]* for first example both considered as true. But the orders of Integer's in the tuples are important. e.g. *[(3,5)]* and *[(5,3)]* are not the same.