Assignment 2

Available Since: April 30, 2015  Due Date: May 7, 2015, 12:00 a.m.
You are permitted and encouraged to work in groups of two.

Exercise 1: 5 Points

Let $T$ be a rooted tree with $n$ vertices and the property that any vertex is either a leaf or has at least two children.

(a) Give a tight lower bound for the number of leaves of $T$.

(b) Give a tight upper bound for the height of $T$.

Exercise 2: 15 Points

Implement the Reingold-Tilford algorithm presented in the lecture. Ensure linear-time complexity of your implementation!

- use BinaryTreeGenerator, and use graph.firstNode() as the root of the tree
- use class name lastname1.lastname2.a02.ReingoldTilford
- consider using y.base.NodeMap to store contour lists and x-offsets

Test the efficiency of your implementation by generating random trees, node number between 1 000 and 25 000 (step width 200). Measure your running times (not those of the generator) and create a plot (i.e. using gnuplot, R, Excel) that documents your results. Submit the plot together with the theoretical exercises and the implementation via svn.

General Hints:

- See the previous assignment for instructions on setting up the environment and checking out the project.
- For more information on the yFiles library used in this project, check docs.yworks.com/yfiles/doc/developers-guide/.
- Feel free to extend the project with further functionality.