Project 2

Project

The task in this project is to write two functions: `embedGraph()` and `plotGraph()`. The first function provides an embedding of a graph into a plane. The second function plots the embedding. We will also use the `readInGraph()` function from the first project. Before we go any further, we need to explain what is embedding. Embedding a graph into a plane requires assigning a point on a plane to each vertex of a graph.

The above problem is quite simple. There is one other restriction: the embedding must be such that after plotting a graph, no two edges cross. The functions must work only for trees, that is graphs without cycles. All graphs in the archive from the first project are trees.

Warning: this project is more complicated than the two other projects. If you are not up to the task, you can solve the simpler version with any embedding.

We can show an application of the required functions. First, we read in a medium-sized graph.

```
### Reading in graph
gOrg <- readInGraph( path = "./graph_medium.dat")
```

Once the graph is read in, we can create an embedding and then plot it.

```
### Creating embedding
g <- embedGraph( g = gOrg, r = 1, rstep = 0.95)

### Plotting
png( filename = "./fig1.png")
plotGraph( g, col = rgb( 0, 0, 1, .4), cex = .8, lwd = .5)
dev.off()
```

The following figure shows the visualization. Note that no two edges cross as expected.

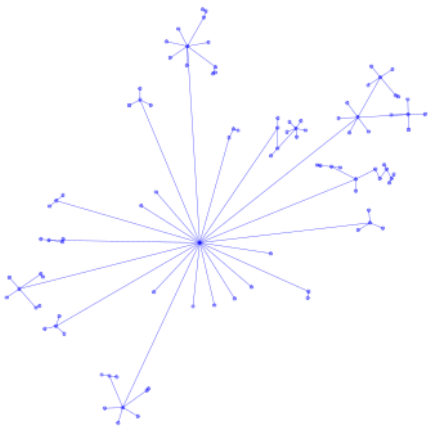

Figure 1: Graph visualization

Technical conditions

The project should be solved in a single file. Within the file, there should be a solution and an example of use. If one of these parts is missing, the solution will not be accepted. The use of additional packages is not allowed unless explicitly stated in the project's description. The R file with a solution must not contain any non-ASCII characters. The optimal coding is UTF-8.

Date: 2020-05-11 Mon 00:00
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Created: 2020-05-11 Mon 22:15
Validate