

## AG44 Project 1 – Ariadne's Thread

### Questions

- 1) In the first point, the classical problem we need to deal with is to find the strongly connected components of the places of the game.

- 2) We obtain the following outputs when we try to find the Strongly Connected Components of the given matrix in my project (the number of the group of SCC corresponds to the level in-game) :

```
group of SCC n°1 : 1
group of SCC n°2 : 3 7 6 2
group of SCC n°3 : 4 5
group of SCC n°4 : 8
```

- 3) The matrix we obtain in my project with the given matrix where we can find the levels with the number of passages between them is the following :

```
Matrix N :
0 1 0 0
0 0 2 2
0 0 0 2
0 0 0 0
```

### Data Structures

I choose to represent vertices in a class Vertex.java that contains the index of the vertex and an ArrayList of the index of his successors.

The graph is represented in the class Graph.java and contains an ArrayList of elements Vertex.

We perform Kosaraju on the graph with the class Kosaraju.java.

### Used Algorithms

We used the DFS seen in courses inside the Kosaraju algorithm in order to detect Strongly Connected Components in the game's graph. Kosaraju traverse twice the graph and use DFS in each traverse.