Documentation

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Engineering Method

Phase 1

Client	ICESI university
User	Teacher
Functional Requirements	**FR1**: Add player **FR2**: Create map **FR3**: Generate Enemies **FR4**: Show score **FR5**: Show Easy Way **FR6:** Unlock Easy Map
Problem Context (Identification)	A professor at ICESI University is bored in his spare time and has decided to hire a development team to make him a game that incorporates his favorite data structure, graphs.
No Functional Requirements	**NFR1:** Use graphs **NFR2:** Implements algorithms as BFS, DFS, Dijkstra, Floyd-Warshall, Prim, Kruskal

Phase 2:

Precedents: We have looked for some video games in which the use of a graph can be included and we have found games like bomberman, zelda (classic) in which the navigation between areas of the map is done through doors or open areas on the map for the user to enter and move.
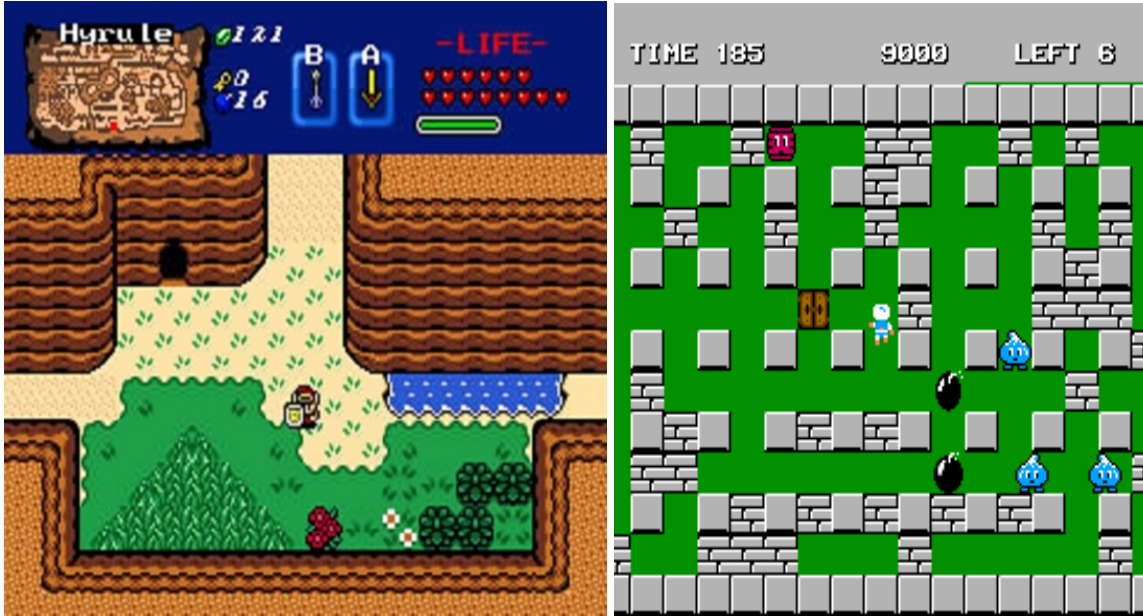
We compare what we think with what is done in this type of games and we notice that it is possible to apply it to the problem we have, although we still have some doubts to solve, such as:

+ Distribution of the maps based on the network.
+ Use of the MST for the reduction of routes

Phase 3:

a) Brainstorm

+ Maybe use FXGL which is a JavaFX Game Development Framework, with which we can extend the JavaFX functionalities and develop the game in a more efficient way.
+ We have also taken a look at libGDX, which is a java based framework, but not in JavaFX, so we should check if we can use it.

+   We have thought about using BFS to create a hint to let the player know which path to take.
+   Use the MST to generate an easier route for the player, this can be done if the player finds a special item in the game.
+   A wall system in which certain nodes will be of wall type and the player will be able to unlock these walls if he pays to pass through, which implies an in-game coin system.

b) Review list.
+   How to assign a node to doors on the map in specific areas.
+   Which framework.
+   Implementation of the coin system.
+   Investigate if it is possible to generate a map randomly and make assignments after its generation.

Data structure
Graph:

A Graph is a non-linear data structure consisting of vertices and edges. The vertices are sometimes also referred to as nodes and the edges are lines or arcs that connect any two nodes in the graph. More formally a Graph is composed of a set of vertices(V) and a set of edges(E). The graph is denoted by G(E, V).