

Computació Gràfica i Multimèdia

Work Package 1

Màster en Enginyeria Informàtica

2021/22 year

Project description

This year we will develop a project devoted to the creation of a “race in labyrinth” 3D videogame.

Game rules

At the beginning, the game shows a labyrinth-type map. There are two characters on the map: the main character controlled by the player, and an adversary managed by the computer. Each character has an assigned starting point.

When the game starts, the mission of each character is to get onto the starting point of its opponent. The first character to get onto its opponent’s starting point is the winner.

If the winner is the main character, a new map is generated and the next level is played. Otherwise, the game concludes.

Moreover,

- The two characters cannot overlap. A character cannot move to a place which is being occupied by its adversary.
- Characters can shoot. If a shot bullet collides against a character, it disappears from the map. Two seconds later, it will be placed at its starting point.

The project is composed of four work packages. This document describes the first one.

Work plan for the first work package

The first work package is composed of the following tasks:

- Develop an algorithm that generates a random map.
- Implement an application that draws the map on a 2D graphical window using OpenGL.

Task 1. Random generation of a map

The generated map has to fulfill the following requirements:

- The algorithm considers a world consisting of a two-dimensional array of squares. The number of rows and the number of columns are received as input parameters.
- There are two types of squares: “wall” and “corridor”. Your algorithm has to assign one of these types to each square.
- The map is connected. There exists at least one path between each pair of corridor-type squares.
- A map has two special squares corresponding to the starting points of each character.

We recommend implementing the map as a C++ class with, at least, the following procedures:

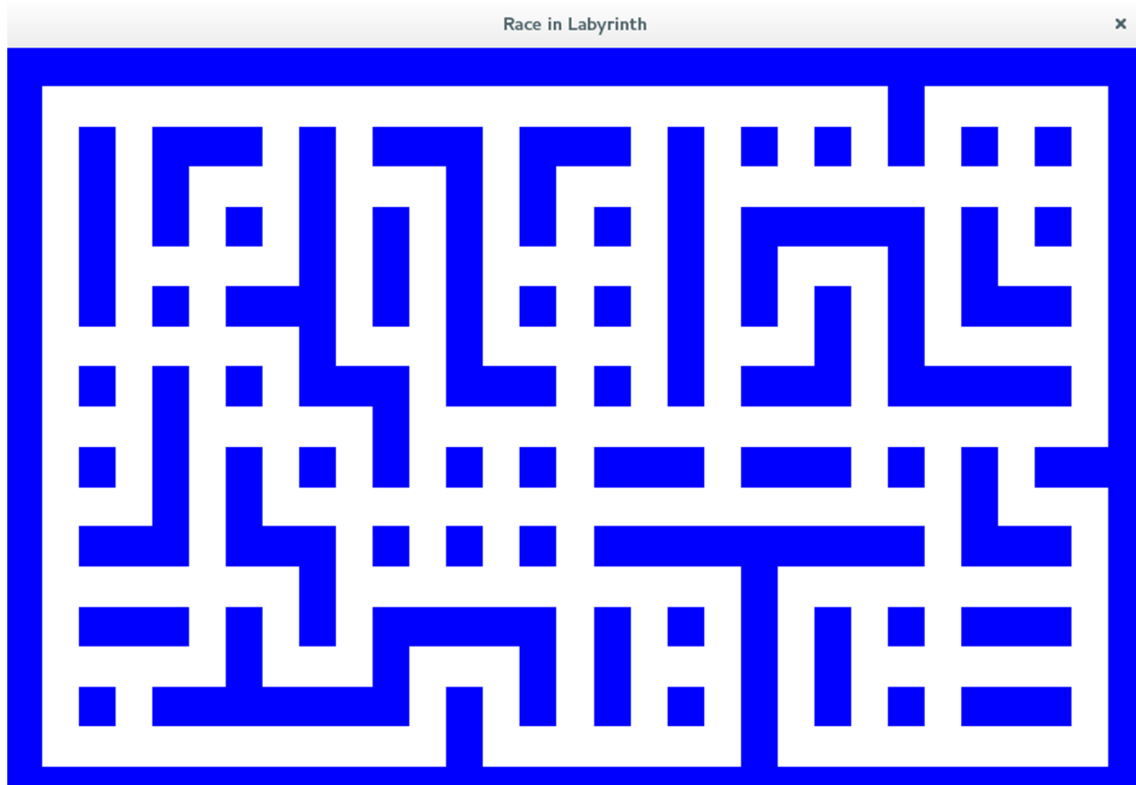
- A constructor procedure that receives two integer input parameters (number of rows and number of columns).
- A random generation procedure that sets the value of each square to “wall” or “corridor” satisfying the previously mentioned requirements.
- A procedure for printing the map in text mode.

Next, we show an example of such a map. Symbol ‘0’ represents a “wall” while spaces are for “corridor”-type squares.

[illegible]

Task 2. Draw the map on a 2D graphical window

Implement a C++ program that draws a previously generated map on a graphical windows using OpenGL. An example is next shown.



Deadline

This activity is recommended to be handed in before **September 30th, at 18:10h**, by uploading a zipped file containing the source code through the corresponding activity of the virtual campus. Include **only** “.c”, “.cpp” and “.h” files together with a “Makefile” script which compiles the project in a Linux console.