Computació Gràfica i Multimèdia

Màster en Enginyeria Informàtica

Curs 2022/23

Project description

This year we will develop a project devoted to the creation of a "Pacman"-type videogame.

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 Pacman map.
- Implement an application that draws the map on a graphical window using OpenGL.

Task 1. Random generation of a Pacman 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 an input parameter.
- There are two types of squares: “wall” and “corridor”. Your algorithm has to assign one of these types to each square. Employ a **depth-first search** procedure implemented using **backtracking**.
- There is a room at the center of the map. In forthcoming work packages, this room will be the starting point for the enemies.
- The map is vertically symmetrical.
- The map is connected. There exists a path between each pair of corridor-type squares.

It is strongly recommended to implement a procedure for viewing the generated map in text mode. We also 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).

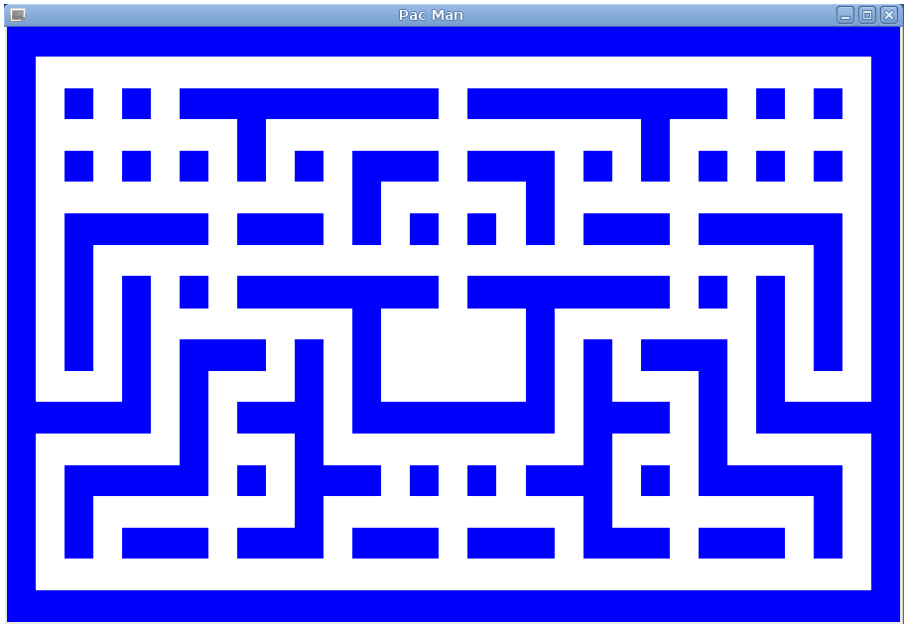
- A random generation procedure that sets the value of each square to “wall” or “corridor” satisfying the previously mentioned requirements.
- A procedure for printing the map in text mode.

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

```
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0                                                         0
0   0   0   0 0 0 0 0 0 0 0 0   0 0 0 0 0 0 0 0 0   0   0 0
0               0                           0             0
0   0   0   0   0   0   0 0 0   0 0 0   0   0   0   0   0 0
0                       0           0                     0
0   0 0 0 0 0   0 0 0   0   0   0   0   0 0 0   0 0 0 0 0 0
0   0                                                 0   0
0   0   0   0   0 0 0 0 0 0 0   0 0 0 0 0 0 0   0   0   0 0
0   0   0               0           0               0   0 0
0   0   0   0 0 0   0   0           0   0   0 0 0   0   0 0
0       0   0       0   0           0   0       0   0       0
0 0 0 0 0   0   0 0 0   0 0 0 0 0 0 0   0 0 0   0   0 0 0 0 0
0           0       0                       0       0     0
0   0 0 0 0 0   0   0 0 0   0   0   0 0 0   0   0 0 0 0 0   0
0   0               0                       0           0 0
0   0   0 0 0   0 0 0   0 0 0   0 0 0   0 0 0   0 0 0   0   0
0                                                         0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

Task 2. Draw the Pacman map on a 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 has to be handed in before **October, 27th, at 18.00h**, 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.

Each group will be interviewed about the uploaded activity.