INFO0004 : Object-Oriented Programming Projects

Final project : PACoronam (PAC-MAN 2020 edition)

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Introduction

Pac-Man was one of the very first arcade games developed around 1980. The objective of this project is to make a PAC-MAN game with a touch of a virus outbreak that we will discuss later. The game will be in C++14 with the SFML library for graphics in an object oriented approach.

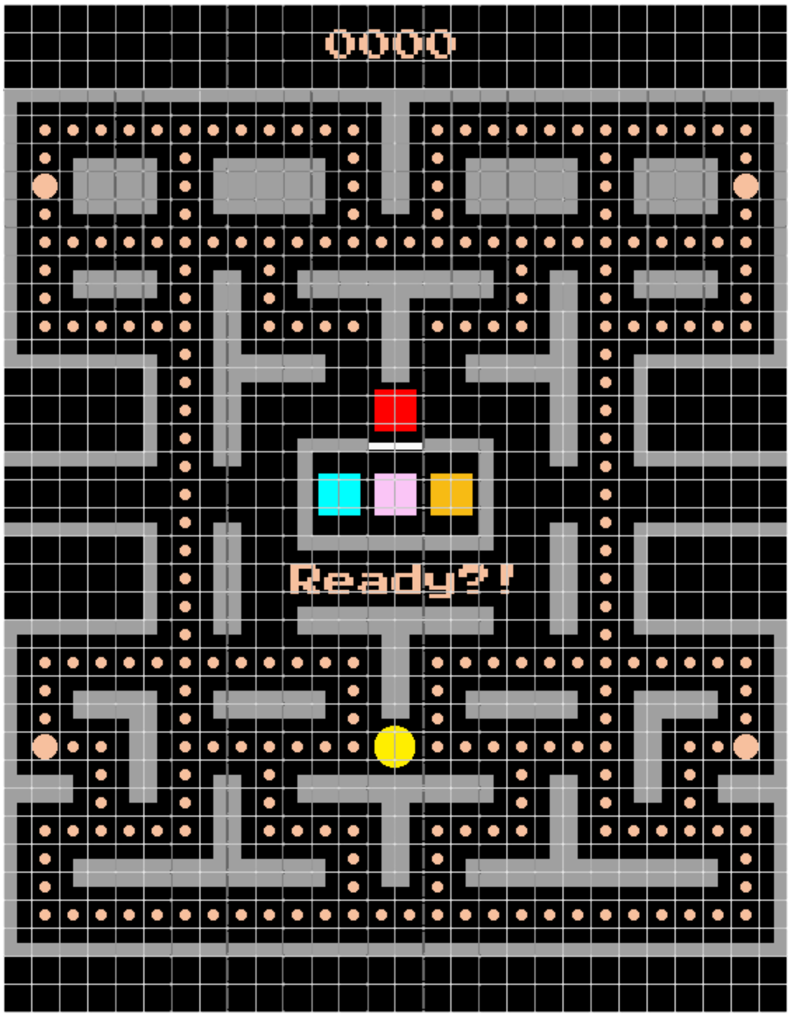
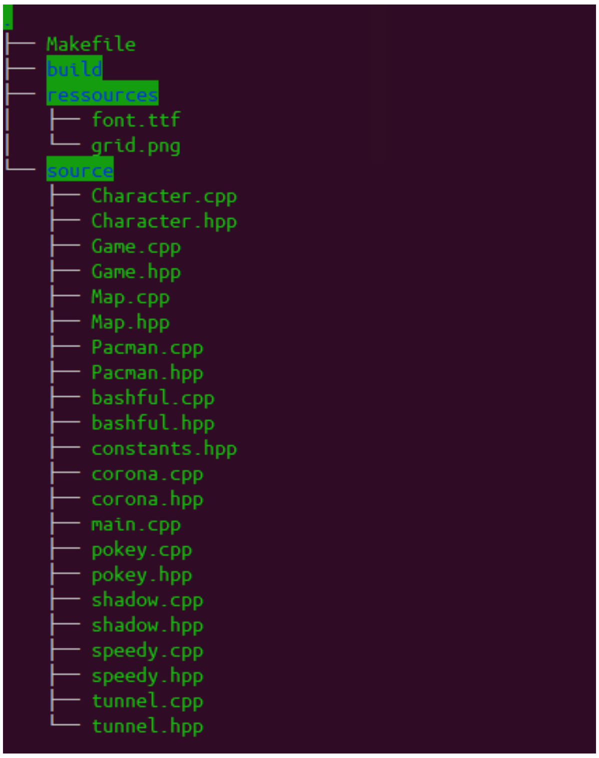


Figure 1 – Grid view of the start configuration

In our Pac-Man, all the characters can moove smoothly in a continuous movement in the maze and they always stay in the middle of the hallways besides an exception as we will see in the Pacman class description.

Project folder tree

The makefile to build this project is in the root of the project folder, it support separate, incremental compilation. The objects and dependencies are in the build folder with the executable. In the source folder we have our .cpp and .hpp files. Finally, the font and grid needed for the project are in the ressources folder.



```
.
├── Makefile
├── build
├── ressources
│   ├── font.ttf
│   └── grid.png
└── source
    ├── Character.cpp
    ├── Character.hpp
    ├── Game.cpp
    ├── Game.hpp
    ├── Map.cpp
    ├── Map.hpp
    ├── Pacman.cpp
    ├── Pacman.hpp
    ├── bashful.cpp
    ├── bashful.hpp
    ├── constants.hpp
    ├── corona.cpp
    ├── corona.hpp
    ├── main.cpp
    ├── pokey.cpp
    ├── pokey.hpp
    ├── shadow.cpp
    ├── shadow.hpp
    ├── speedy.cpp
    ├── speedy.hpp
    ├── tunnel.cpp
    └── tunnel.hpp
```

FIGURE 2 – Project folder tree

Main classes

Game :

The Game class contains the necessary methods to display the map along with the monsters and pacman itself, the text,the score, and to read key from the keyborad.
To do that, in Game.hpp, we include Map.hpp, Pacman.hpp the monsters header files and SFML graphics library.

Map :

The map is displayed thanks to a **cellType grid[HEIGHT][WIDTH]** that contains the different types of a cell. A new type was made using enum and the typedef keyword, it's a cellType, and it defines the state of each cell in the map (EMPTY, FULL, GATE, PILL, TREAT, etc.)

The method display() in the Map class has to go through the map's grid and display SFML shapes accordingly.

Character :

The Character class contains the coordinates x and y for every character along with the speed, direction and next direction. It's the parent for the Pacman and monsters classes.

Pacman :

Pacman is a child of the class Character and inherits the coordinates, speed and direction properties.

Monsters :

Because the monsters have different behaviours, we chose to have an individual class for each monster. The monsters will certainly have the characters properties but can have different speeds, chasing modes, etc.

There are four monsters types therefore four classes : Bashful, Pokey, Speedy and Shadow.