

# Programming 'Phutball' with pygame

4TPU140U

2023 - rev. 0.1

The aim of this project is to implement a game named “Phutball” created by Elwyn Berlekamp, John Horton Conway and Richard K. Guy.

The rules of this game can be found at the following internet address :

<https://en.wikipedia.org/wiki/Phutball>.

## 1 Phutball in 1D

First you will implement the game for a 1 dimensional grid, on the terminal. That means, you will implement the game on a grid of size  $1 \times N$  where  $N$  is a strictly positive integer.

At the starting, you will ask to the user, the size of the grid and start the game for two human players. That means, at each turn, you have to display the board game, the name of the player to play and ask which move the player wants to make. And, if a player win, you have to display it's victory on the screen.

Now we will write learn how to write a graphical game with pygame.

## 2 Writing a graphical game with Pygame

Pygame is a library allowing to write some games in Python. The website of that library is <https://www.pygame.org/> and the page of it's documentation is <https://www.pygame.org/docs/>.

First, download from [https://www.labri.fr/perso/boussica/archives/cours/4TPU140U/bouncing\\_game\\_in\\_one\\_file.tar.gz](https://www.labri.fr/perso/boussica/archives/cours/4TPU140U/bouncing_game_in_one_file.tar.gz)

a simple implementation of a bouncing ball. Execute the project and analyse the source code to understand how the application works.

Find in the source code when and how :

- a window is created,
- the images and the fonts are loaded in memory,
- the keyboard events are processed,
- the ball position and the ball velocity are updated,
- the text and the ball are displayed.

Now write the 4 simple programs that :

1. Display a ball on the center of the windows.
2. Draw a triangle on the windows.
3. Display the text “hello world” on the center of the windows.

4. Display a ball at the mouse position, when user click on the mouse left button. You have to read the following official documentation of pygame :  
<https://www.pygame.org/docs/ref/mouse.html>.

### **3 Phutball in 2D**

Propose an implementation in 2D of the game, with an arbitrary grid and for two human players by using the pygame library.

### **4 An AI for phutball (optional)**

Propose to the user an AI opponent. The player can now plays against that AI.