

Assignment 1

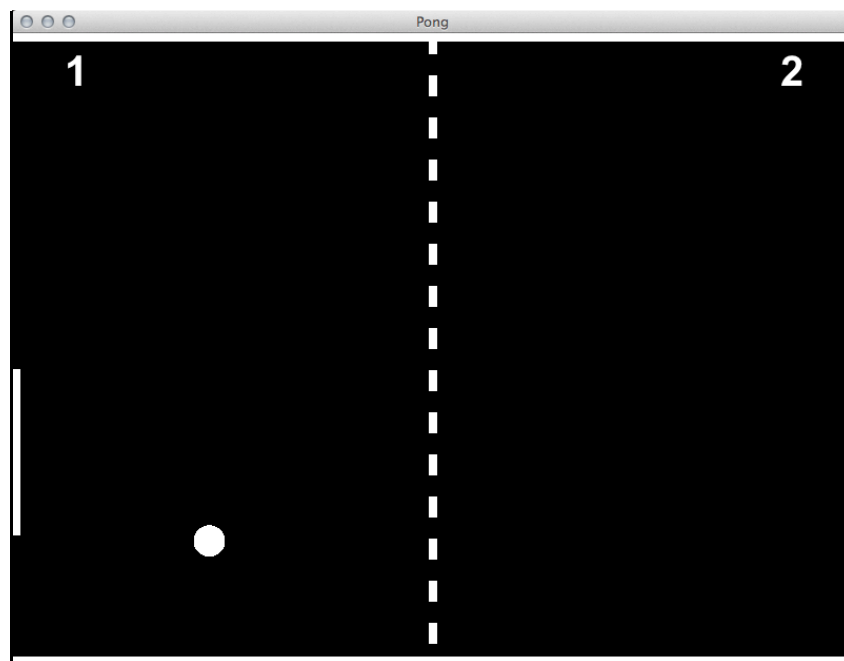
Deadline:	
Evaluation:	15 marks – which represents 15% of your final grade
Late Submission:	1 mark per day late
Teams:	The assignment must be done individually. Your submission may be submitted to originality checking systems such as Turnitin.
Purpose:	Implement a basic game as an individual

Problem to solve:

Pong is a game developed by Atari where two players compete by attempting to hit a ball back and forth. The game is similar to playing table tennis from a top-down perspective. Each player can control a paddle that can move up and down but must not be allowed to move off the screen. The game must have a ball that bounces off the walls on the top and bottom of the screen and the players paddles. If the ball reaches the left or right edge of the screen then a player has scored a point.

Requirements:

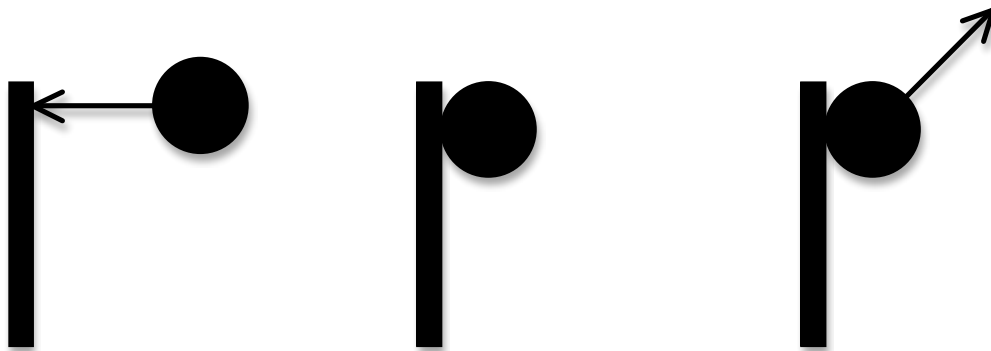
1. The ball should move in a straight line and bounce perfectly off the walls on the top and bottom of the screen and the paddles. (This can be done by reversing the vertical or horizontal velocity).
2. The two players should be able to control their paddles by pressing and holding keys on the keyboard. Hint: you can use a variable to keep track of whether a player is holding down a key or not. The update function can check this variable to see whether it should move the paddle up or down.
3. When the ball crosses the left or right edge of the field, a point is scored. This should be added to the score of the appropriate player and displayed on the screen. When a point is scored the ball should be reset to the centre of the screen and the next round starts. You can randomly initialise the ball so it moves in a random direction or make the ball always start moving in the same direction whenever it is reset.
4. Make the speed of the ball increase slightly each time the ball bounces off a paddle. This will make the game get harder the longer the game goes on.
5. Your implementation **must** be based on the game engine provided in the course (GameEngine.java).



The exact graphics are up to you but it should look something like this.

Extra Features:

1. Write an AI opponent to control one of the paddles. A simple way to do this is in the update function. Each time the game is updated the computer checks to see whether the paddle it is controlling is above or below the ball. If it's above the ball, the computer moves the paddle down, if it's below the ball, the computer moves it up. Make sure you limit the speed at which the computer can move the paddle so that it is actually possible to beat it.
2. Add sound effects to your assignment using the code from course example that plays sound files. You can use the .wav files available on the stream site for your sound effects. Play beep.wav everytime the ball bounces off a wall or a paddle and score.wav every time a player scores.
3. Change the code so that the ball doesn't bounce perfectly off the paddle but so that the direction the ball bounces depends on where on the paddle it was hit. It should always bounce horizontally but the vertical speed should depend how high on the paddle it hits. If it hits the top of the paddle make it move up, if it hits the bottom make it move down. This way the players can control where the ball moves.
(See example below)



Place the following comments at the top of your program code and **provide the appropriate information**:

```
// Family Name, Given Name, Student ID, Assignment number, 159.103  
/* Explain what the program is doing . . . */
```

Hand-in: Submit **assignment1.java** electronically on stream.

If you have any questions about this assignment, please ask the lecturer.