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Pong

Arcade Game

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1 Project goal

The goal was to program a classic arcade game Pong where players control a paddle to deflect a ball at his enemy. The game can be played in two players where both control paddle on different sides, or alone where player plays against a computer which can have 3 different difficulty options.

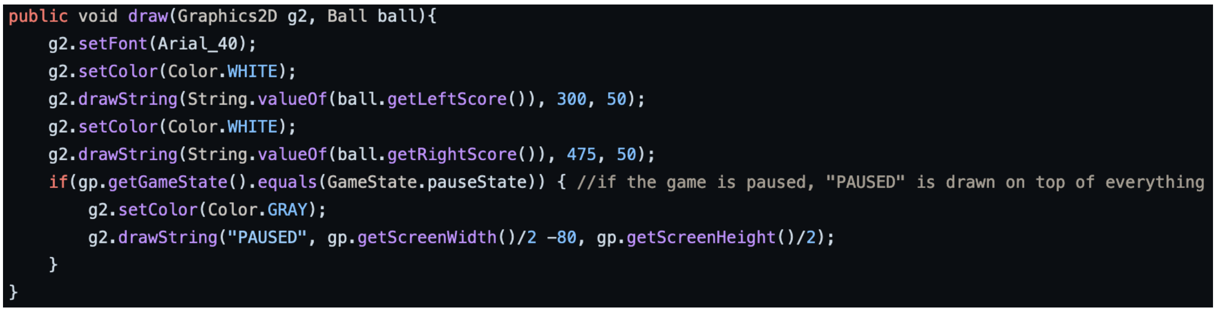
2 Software

The game was made in IntelliJ IDEA 2023.2.2 (Ultimate Edition), using Java SE Development Kit 16.0.2. No external libraries were used.

3 Game description

This game is about paddles deflecting ball. The game runs in a window.

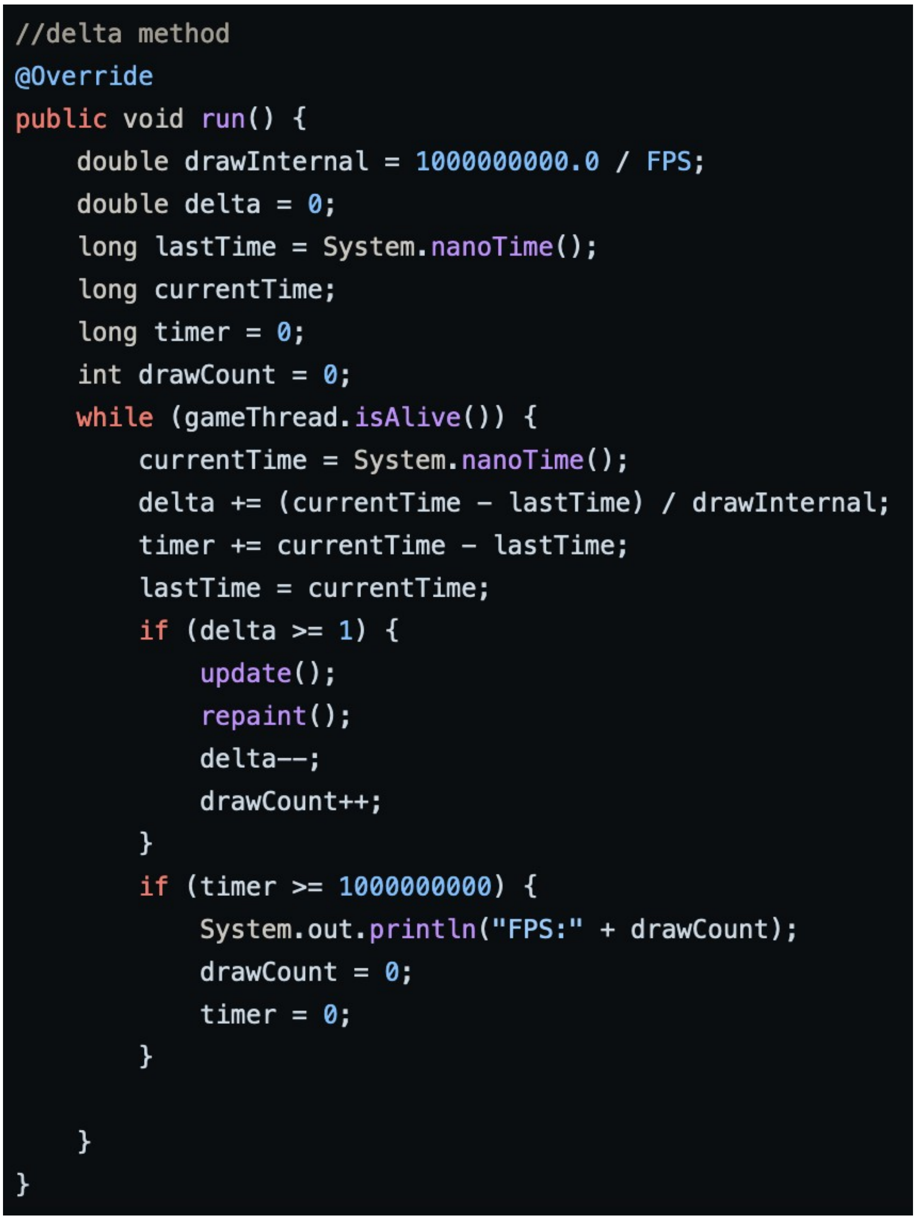
3.1 Mechanics



```
public void draw(Graphics2D g2, Ball ball){
    g2.setFont(Arial_40);
    g2.setColor(Color.WHITE);
    g2.drawString(String.valueOf(ball.getLeftScore()), 300, 50);
    g2.setColor(Color.WHITE);
    g2.drawString(String.valueOf(ball.getRightScore()), 475, 50);
    if(gp.getGameState().equals(GameState.pauseState)) { //if the game is paused, "PAUSED" is drawn on top of everything
        g2.setColor(Color.GRAY);
        g2.drawString("PAUSED", gp.getScreenWidth()/2 -80, gp.getScreenHeight()/2);
    }
}
```

Figure 1: Method for drawing score and “PAUSED” on screen

The Ball object has a parameter leftScore and rightScore which allow to display score. Whenever the game is in pauseState, we draw grey ”PAUSED” on top of everything.



```java
//delta method
@Override
public void run() {
    double drawInternal = 1000000000.0 / FPS;
    double delta = 0;
    long lastTime = System.nanoTime();
    long currentTime;
    long timer = 0;
    int drawCount = 0;
    while (gameThread.isAlive()) {
        currentTime = System.nanoTime();
        delta += (currentTime - lastTime) / drawInternal;
        timer += currentTime - lastTime;
        lastTime = currentTime;
        if (delta >= 1) {
            update();
            repaint();
            delta--;
            drawCount++;
        }
        if (timer >= 1000000000) {
            System.out.println("FPS:" + drawCount);
            drawCount = 0;
            timer = 0;
        }

    }
}
```

Figure 2: Method for running the game

This method checks how much time has passed, divides that by drawInterval and adds that to delta. If delta is bigger or equal to 1 then the game updates and repaints, delta is subtracted and loop repeats. Timer and drawCount are used to display FPS.

4 Manual

The player on the left side can control the left paddle with keys “W” and “S”, and player on the right controls his paddle with arrow up “↑” and arrow down “↓”. Game can be paused anytime by pressing “P”.

5 Conclusion