

2048 Full-Stack Java Project

What is this?

A complete classic **2048** puzzle game implemented in Java.

```
Game2048_Project
├── Game2048-Server  # Spring Boot REST + Thymeleaf + JPA
└── Game2048-Swing   # Java Swing desktop client (with AI)
```

What does it do?

Feature	Description
Desktop Client	Smooth Swing GUI with keyboard & AI autoplay
Powerful AI	Iterative-deepening Expectimax, scores 15-20 k+
REST API	<code>/scores</code> POST upload, <code>/scores/json</code> GET top scores
Web Leaderboard	<code>/scores</code> shows modern Bootstrap page, auto-refresh
Timestamps	Every entry stored with upload time
Desktop ↔ Web	In-game button opens the web leaderboard
Persistence	Default H2, switch to MySQL with 1-line config

Technologies

- Java 17, Maven 3.8+, Database
- Swing, multithreading, Gson
- Spring Boot 3, Spring Data JPA, Bootstrap 5

Quick-start

1 Start back-end

```
cd Game2048-Server
mvn spring-boot:run
```

2 Run desktop client

```
cd Game2048-Swing  
mvn clean package  
java -jar target/Game2048-Swing*-jar-with-dependencies.jar
```

Controls: ← ↑ → ↓ to move • **A** toggle AI • **R** restart

3 Web leaderboard

Open <http://localhost:8080/scores>