

# Developer Manual (Windows + IntelliJ IDEA)

## Environment Overview

- **Operating System:** Windows 11.
- **JDK:** Oracle OpenJDK 21.0.4 (LTS).
- **IDE:** IntelliJ IDEA Community 2024.2 or newer.
- **Testing:** JUnit 5.8.1, you need to add the JUnit module in this IntelliJ project (Steps mentioned in the section Testing below).

## Project Structure

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1 | Implementation/
2 | └─ src/                # Game source code (entry: Main.java)
3 |   └─ Model/, Pages/, ...
4 | └─ Test/               # JUnit 5 tests mirroring main packages
5 | └─ out/                # IntelliJ default build output
6 | └─ archive/, replay/   # Saved games and replays
```

## Opening the Project in IntelliJ IDEA

1. Launch IntelliJ IDEA → `File > Open...` → select the repository root (`Implementation`).
2. When prompted, choose **Open as Project**. IntelliJ auto-detects `src` as Sources and `Test` as Tests. You can verify via `File > Project Structure`.
3. Configure SDK: `File > Project Structure > Project SDK` → select installed **JDK 21**.

## Building via IntelliJ

1. Use `Build > Build Project` to compile both main and test sources.
2. IntelliJ outputs compiled classes to `out/production/Code` (main) and `out/test/Code` (tests) by default.

## Running/Debugging the Game

1. Create a run configuration: `Run > Edit Configurations...` → **Application**.
  - `Main class:` `Main`.
  - Program arguments: *(leave empty)*.
2. Click **Run** to launch; the console shows the text-based menu (`startNewGame`, `loadGame`, `watchReplay`, `exit`).
3. For debugging, set breakpoints anywhere in `src/Model` or `src/Pages` and click **Debug Main**. Standard debugger tools (step into/out, evaluate expression, watches) are available.

You may also directly enter class `Main` under `/src` and click the button of the `main` method to run.

# Running Unit Tests (IntelliJ)

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## Import JUnit library

1. Go to `File > Project Structure > Project Settings > Libraries`, click `+` > `From Maven`.
2. Enter `org.junit.jupiter:junit-jupiter:5.8.1` and press `OK`.

## Run Unit Test

1. Right-click the `Test` directory or any specific test class (e.g., `Test/Model/BoardTest.java`) and choose **Run 'Tests in ...'**.
2. IntelliJ's test runner reports pass/fail counts and stack traces. Use **Rerun Failed Tests** for quick iterations.

## Coverage in IntelliJ

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1. Choose **Run 'Tests in ...' with Coverage** to collect coverage data.
2. The IDE displays line and class coverage overlays inside editors.

## Debugging Tips

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- Utilize conditional breakpoints when diagnosing complex move validations in `Model/MovingValidator.java`.
- The textual UI reads from `Scanner`. To simulate scripted inputs during debugging, prepare a `.txt` file with commands and redirect standard input in the run configuration (`Modify options > Redirect input`).

## Launch Checklist

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1. Ensure JDK 21 SDK configured.
2. Import project and mark source/test folders.
3. Create run configuration and add JUnit to the project.
4. Verify tests pass (either via IDE) before committing.