Bala Game Engine

User Manual

2025 SYPG

For the Bala: A 2D Bullet Heaven Game Engine

OVERVIEW

What is Bala?

Bala is a 2D Bullet Heaven Game Engine that is designed to make game making easier for the game developers. The game engine is focused on its simplicity, and usability. You can create games without deep knowledge about programming, with its drag-and-drop interface and built-in procedural generation tools. Bala is built specifically for creating bullet heaven games. These are a genre games where the player attacks automatically with it's projectives while maneuvering through swarms of enemies, an example of this genre is the game Vampire Survivors.

The name BALA takes it's name from the Filipino word "bala" which directly translates to "bullet". The name reflects both the engines cultural identity and specialization.

Bala is developed in Java using Lightweight Java Game Library(LWJGL) which gives Open AL for audio, OpenGL for 2D graphics, and Graphics Library Framework(GLFW) for the inputs.

Supported Operating Systems

- Windows 10 or later
- macOS Monterey or later
- Linux (Ubuntu 22.04 LTS or compatible distributions)

System Requirements

Category	Minimum	Recommended
Processor	Dual-core 2.0 GHz	Quad-core 3.0 GHz
Memory	4 GB RAM	8 GB RAM
Graphics	Integrated GPU (OpenGL 3.3+)	Dedicated GPU (2 GB VRAM)
Storage	500 MB free space	2 GB free space
Java	Version 11	Version 11
Gradle	Version 8.14	Version 8.14 and above

What Makes It Unique

Unlike traditional 2D engines, BALA emphasizes procedural design and AI-based behaviors. Key distinguishing features include:

- Specifically made for the Bullet Heaven Genre
- Procedural Generation: Generates levels dynamically using Perlin and Simplex noise algorithms.
- Flocking AI System: Enables enemies to move intelligently in groups.
- Collision Optimization: Combines Circle-Circle and AABB collision detection for smooth performance.
- Modular Structure: Allows developers to integrate or extend features easily.

Docker

Before starting make sure Docker Desktop or Docker Engine is installed and running on your computer.
Run this command:

```
docker --version
```

If Docker returns a version number, you're ready to proceed.

Creating and Running the Docker image of the Bala website.

Step 1: open command line interface

- You can use the Command Prompt on windows, Terminal on macOS or Linux

Step 2: Clone the repository

```
git clone https://github.com/aiaiaiex/bala.git
```

- This command downloads the Github repository

Step 3: Navigate to the directory

```
cd bala-frontend
```

- This directory contains the Dockerfile and frontend source needed to build the image

Step 4: Build the Docker image

```
docker build . -t "bala-frontend:v1.0"
```

- The build process may take a few minutes. When finished, you'll see a confirmation message.

Step 5: Run the Docker Container

```
docker run -p 5796:5796 bala-frontend:v1.0
```

- When the container starts, it will initialize the frontend. Open your browser open the link shown in the Command Prompt

Step 6: Stopping and Managing the Container

- To stop the running container press “Ctrl + C”. this command safely end the active session

- To check if there are any container running:
  `docker ps`

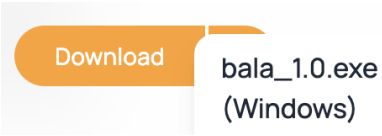
- To remove unused containers, images, and cache
  `docker system prune -a`

Installing BALA

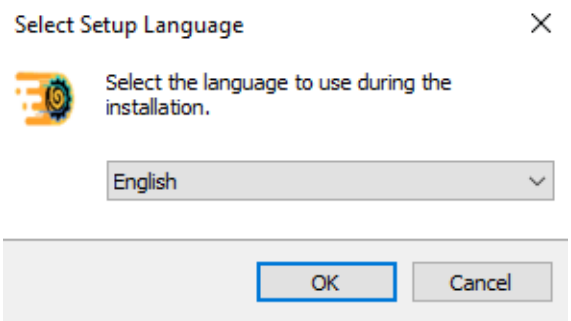
Bala through .exe installer

Step 1: click download in the Bala Website

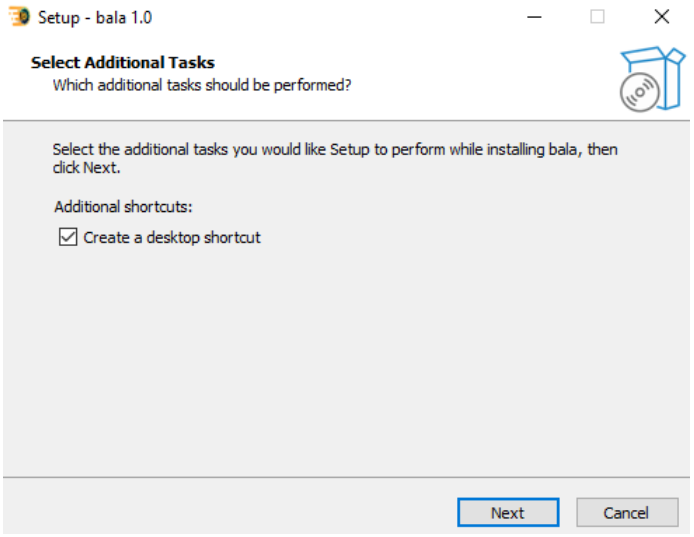
Step 2: Select the OS (in this case Windows is selected)



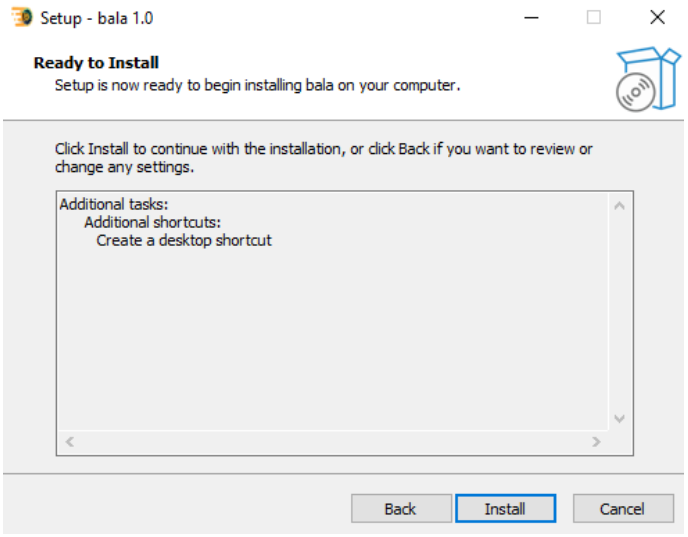
Step 3: click ok



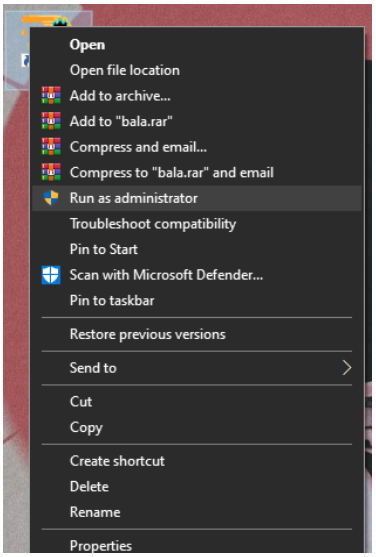
Step 4: check the “Create a desktop shortcut” and click next



Step 5: click install



Step 6: click the created shortcut and run as administrator



“Also, instead of building the docker image, you can download bala-frontend-image.tar from the provided Google Drive link then run the following commands in the directory where you downloaded it

```
docker load -i bala-frontend-image.tar
docker run -p 5796:5796 bala-frontend:v1.0
```

then open

http://localhost:5796/ “

Bala through github repository(need java and git beforehand)

Step 1: open command line interface

- Use Command Prompt for Windows

Step 2: Clone the repository

```
git clone https://github.com/aiaiaiex/bala.git
```

Step 3: Navigate to the project folder.

```
cd bala
```

Step 4: Run BALA using Gradle

```
gradlew run
```

Common installation issues and fixes

If the scene view is not visible:

Run the app as an administrator

If your Computer detected Bala as a virus you can proceed with the installation.

This is the Virus Total scan of the .exe file showing no Virus is attached to the installer

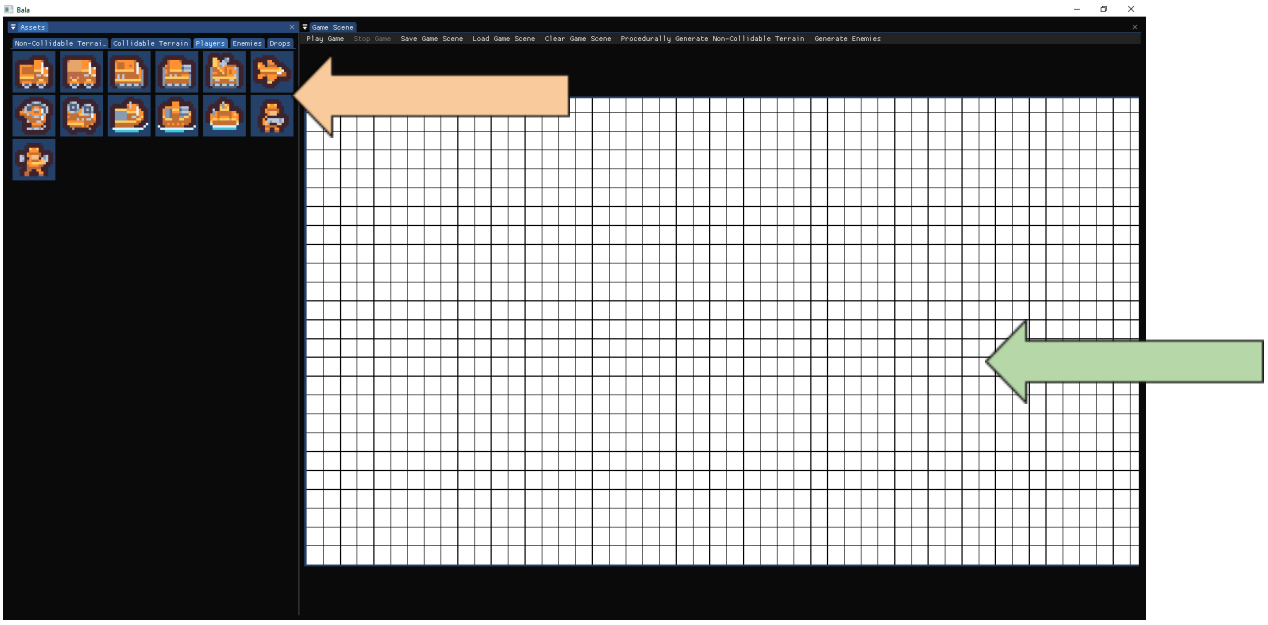
https://www.virustotal.com/gui/file/827d96b71e7438dbfc5068da49954140e57b1254c01460ed94de74fc29dc556a/detection

USING BALA

Main Interface

Scene View: Displays the 2D workspace and entities.

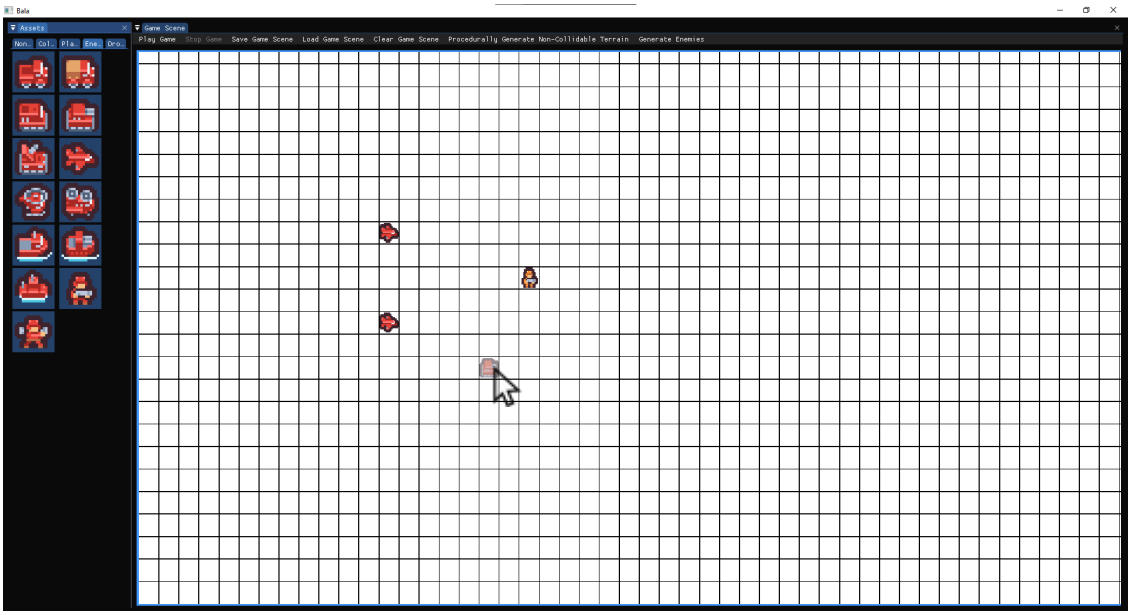
Asset Browser: Provides access to project files and resources.



Drag and Drop

BALA supports drag-and-drop editing for intuitive object placement.

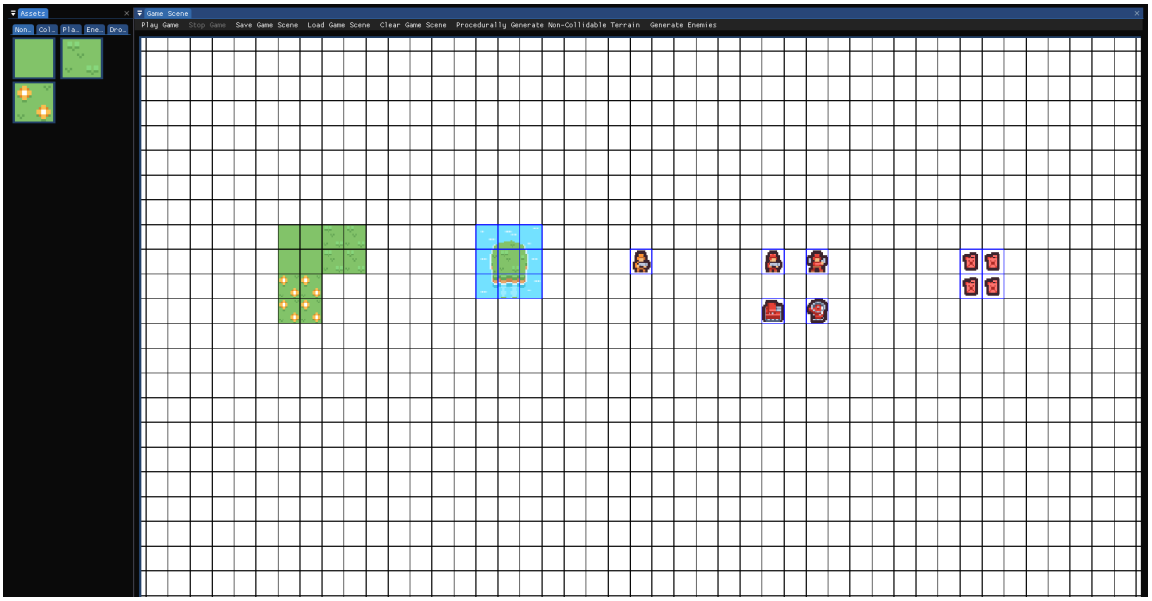
- Drag sprites or prefabs from the Asset Browser into the Scene View.
- Objects can be repositioned directly using mouse control



Object Types

Objects in BALA are classified into several categories:

- Static Objects: Background elements or terrain that do not move.
- Dynamic Objects: Entities capable of movement and interaction (e.g., player, enemies).
- Projectiles: Bullets or energy attacks generated during gameplay.
- Interactive Objects: Items that trigger events or power-ups.



Procedural Generation of Terrain

BALA integrates **procedural noise algorithms** to automate terrain creation.

Supported methods:

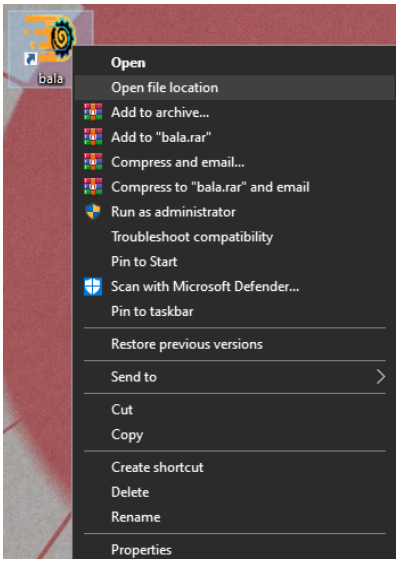
- **Perlin Noise:** Smooth gradients ideal for organic landscapes.
- **Simplex Noise:** Optimized for larger maps with faster computation

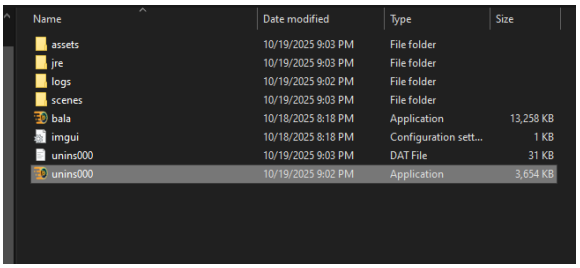
To generate terrain:

1. Open the **EngineSettings**.java
2. Adjust the **Noise Scale** and **Seed** values.
3. Click **Generate Terrain** to preview results in the Scene View.
4. This feature allows unique level creation with minimal manual design work.

Uninstalling BALA

Step 1: right click the app and find the open location





Step 2: click uninstall