3D Models & Animations

The models are done using Blender. The first model is the grappling hook. After that we decided to animate the tools with arms in a first person way. This armature is done by Erik. All tools and animations are done by Daan, except for the Pogo stick (done by Erik). Erik has done the environment and model of the pogo stick boss and also made the Skybox. Daan did the remaining boss models & animations. He also made the models & animations of the smaller enemies.

Procedurally Generated Meshes

These are incorporated in the procedurally generated level script from the underground environment. This is done by generating a 3dimensional matrix with a binary value: accessible or inaccessible terrain. Between these areas a wall of triangles is generated. This was created by Lieuwe. It took a lot of effort to get the system to work properly, because the triangles had to connect properly.

Animated Textures

An animated texture was made by Erik to impersonate the lava.

SoundFX

The sound effects were done by Daan in FL Studio using synths and modifying samples. Environmental effects are made to give the game a better feel.

Soundtrack

The Soundtracks was also made in FL Studio by Daan. The goal was to give the player a more explorative experience.

Camera Shakes

These effects are added when firing one of the guns. This was done by Dorus to give the guns a realistic way of having recoil. Also Erik implemented a camera shake when the player is hit.

Unsteady Cam

When the player is walking the camera’s y-position is transformed by a sinusoid with an amplitude depending on the speed of the player. This is done by Erik.

Particle Systems

Particles are used to simulate explosions when enemies die and the portal effect. These are done by Daan. Also a few other Particle Systems are used in Pickups and the Pogo Stick Boss, by Erik.

Start/Pause/End Screen

These are made using the Unity UI. The Pause screen contains a lot of nested elements to make the options and other available during the game. These are made by Dorus. This took a long time, because there is little documentation on the internet and the UI is counter-intuitive.

Highscores

The in-game highscore is saved in the Playerprefs. Every pickup and Enemy has it’s own score value. This is done by David.

Options

Options are created by Dorus using the Unity GUI system. Options are made using the Screen-class and AudioListener-class.

Credits

The credits are made by Lieuwe using plain text.

Pathfinding

The helicopter- and bunny-enemy make use of 5 sensors (ray-casts) spread over the 180 degrees in front of the enemy. The sensors detect the space between the enemy and a wall. The fitness is set by the enemy that gets closest to the player.

Group detection (Consciousness)

Particle Swarm Optimization is used containing a random factor, so the enemy won’t be stuck in a local optimum. The rotation is updated using this CI method.

Hazard detection (Consciousness)

Sensors pointing downwards, checking for lava or deep holes. If so the coordinates are saved and the enemy will avoid this point.

Learning Enemies

If the pathfinding sensors detect a wall, it counts the number of detection and it will increase or decrease the sensor’s height or length. All AI parts are doen by Erik

Data Through Play Through

The game keeps a record of how many enemies you’ve killed and beating certain levels gives you achievements.

Data On Server

Dats is saved on your laptop and will also be sent and saved in the SQL database online using your username and password.

Visualize Data & Show Score From server

The site displays highscores of all players and your own achievements. The Web &Database part is done by David.

Procedurally Generated Levels

This done by Lieuwe. A chunk system is used that works like the one in minecraft.

Moving Platforms

A Prefab is made to be placed at the beginning of a game level.

Time Independency

Every timed action or counter in the gameplay itself is done using Time.deltaTime.

Changing Game speed

A Gravity Gun is programmed by Dorus to shoot a ball attracting and reflecting all physics objects near it.

Multiple Cameras

3 cameras are used: 1 for the player’s FPS, one especially for his tool and one for the sniper zoom. These are made by Dorus. It was difficult to get all the elements like the skybox in there .

Unity Triggers

A lot of Collision triggers are used to detect whether an enemy was shot. Everything with a rigidBody-component can be targeted by bullets or the grappling hook.

Multiple Weapons

The grappling hook, including rope physics, is programmed by Erik. The other tools are done by Dorus.

Multiple Enemies

Enemies are programmed by Erik and David. Gravityboss is done by David, Pogostick Boss is done by Erik and GrapplingHook is done by Daan.