Game Development Test

Simple game evaluating Unity programming skills.

Instructions

- Carefully read the game specification and the coding standard.

- Install the lastest stable version of **Unity**.

- Create a **GameDevelopmentTest** 3D project.

- Import the following assets (and nothing else) :

  - https://assetstore.unity.com/packages/3d/environments/fantasy-landscape-103573
  - https://assetstore.unity.com/packages/3d/characters/humanoids/sci-fi-hero-handpainted-demo-106154
  - https://assetstore.unity.com/packages/3d/characters/humanoids/mini-legion-footman-handpainted-86576
  - https://assetstore.unity.com/packages/3d/characters/humanoids/mini-legion-grunt-handpainted-98187
  - https://assetstore.unity.com/packages/3d/characters/humanoids/mini-legion-lich-handpainted-91497
  - https://assetstore.unity.com/packages/3d/characters/humanoids/mini-legion-rock-golem-handpainted-94707
  - https://assetstore.unity.com/packages/vfx/particles/cartoon-fx-free-109565
  - https://assetstore.unity.com/packages/tools/particles-effects/lowpoly-water-107563
  - https://assetstore.unity.com/packages/essentials/beta-projects/textmesh-pro-84126
  - https://assetstore.unity.com/packages/2d/fonts/bubble-font-free-version-24987
  - https://assetstore.unity.com/packages/audio/music/six-styles-of-bgm-35941

- https://assetstore.unity.com/packages/audio/sound-fx/fantasy-sfx-32833
- https://assetstore.unity.com/packages/audio/sound-fx/horror-sfx-32834
- https://assetstore.unity.com/packages/audio/sound-fx/sci-fi-sfx-32830
- https://assetstore.unity.com/packages/audio/sound-fx/foley/fantasy-sfx-for-particle-distort-texture-effect-library-42146

- Try to implement as much as you can of this game in maximum two days, preferably in the following order :

  - The hero camera
  - The hero aiming, shooting and death.
  - The footman/grunt/golem/lich patrolling, chasing, attack and death.
  - The level-played panel
  - The level-loaded panel.
  - The level-started panel.
  - The level-paused panel.
  - The mission-failed panel.
  - The mission-complete panel.
  - The game-loaded panel.
  - The game-started panel.
  - The game-options panel.

- Do your best to apply the programming conventions explained in the coding standard document, especially the following rules :

  - Write your types in **UPPER_CASE** : TANK_SHELL.
  - Write your type members in **PascalCase** : Tank.ShootShell().
  - Write your local variables and method parameters in **snake_case** : enemy_index.
  - Don't use acronyms, abbreviations or single-letter variables.
  - Include the class name in the attribute and variable names.
  - Align braces vertically.
  - Use braces even for single statement blocks.

- On the last evening, simply send us back a pack or archive of your work in progress using a file transfer web service like **wetransfer.com** or **transferbigfiles.com**.

Description

The player uses a gamepad to control a futuristic hero equipped with a fully automatic laser gun.

The hero must survive in a forestial area with many aggressive enemies.

They can be of four different types :

- The footman, a small knight holding a spear.
- The grunt, a fierce goblin holding an axe.
- The golem, a rock creature with deadly fists.
- The lich, an undead magician shooting fireballs with his staff.

To win the game, the hero must eliminate all the enemies with his gun in only 3 minutes, without being killed.

Game entities

The game

- Has several panels.
- Has a language.
- Has an instance.
- Has a state.

The game input

- Uses a mouse for the menus, and an X360 gamepad for the gameplay.

- Provides :

    - 4 axes :

        - Left stick down/up : **Move Down/Up axis**.
        - Left stick left/right : **Move Left/Right axis**.
        - Right stick down/up : **Aim Down/Up axis**.
        - Right stick left/right : **Aim Left/Right axis**.

    - 2 buttons :

        - Right trigger : **Shoot button**.
        - Start button (or Escape key) : **Pause button**.

The game-loaded panel

- Has a game name title.
- Has a loading progress bar.

The game-started panel

- Has a game name title.
- Has a **Start** button, to start a single-player game.
- Has an **Options** button, to change the game options.
- Has an **Exit** button, to exit the game.
- Plays the **Chrono Storm background music** in a loop.

The level-paused panel

- Has a **Resume** button, to resume the level.
- Has a **Restart** button, to restart the level.
- Has a **Quit** button, to go back to the game-started panel.
- Appears by pressing the **Pause** button during a game.
- Suspends the game.
- Can be left by pressing the **Pause** button again.

The game-options panel

- Has a **Music** volume slider
- Has a **Sound** Volume slider
- Has a **Language (English/French)** pull down menu.
- Has a **Back** button, to go back to the game-started panel.

The level-loaded panel

- Has a level name title.
- Has a loading progress bar.

The level-started panel

- Has a **5-seconds countdown**.
- Plays a beep sound on each second.

The level-played panel

- Has a **score counter** starting at **0** near the upper right corner.
- Has a **remaining time counter** starting at **3:00** near the middle of the upper edge.
- Has a **health bar** near the lower left corner.
- Has a **circular minimap** near the lower right corner.
- Plays the **Car Race background music** in a loop.

The mission-complete menu

- Has a **Mission complete** message.
- Has a **Restart** button, to restart the level.
- Has a **Quit** button, to go back to the game-started panel.
- Plays a **Jingle Win music** once.
- Appears when the score is superior or equal to 1000 or all enemies have been killed.

The mission-failed panel:

- Has a **Mission failed** message.
- Has a **Restart** button, to restart the level.
- Has a **Quit** button, to go back to the game-started panel.
- Plays a **Jingle Lost music** once.
- Appears when the hero is killed or there is no more remaining time.

The level

- Has a maximum duration.

- Has a hero spawn.

- Has a hero.

- Has a hero camera.

- Has an enemy spawn array.

- Has an enemy array :

    - **10** footmen.
    - **10** golems.
    - **10** grunts.
    - **10** liches.

- Has a state.

- Has an instance.
- Uses the default landscape of the **Fantasy Landscape** asset with its outermost borders lowered to remain under the sea surface.
- Is surrounded by a large sea plane at zero height.
- Uses the meter as the distance unit.

The character

- Can stand idle.
- Can turn at **120** degrees per second (without animation).
- Can walk.
- Can attack.
- Can die.
- Has a health.
- Has an attack delay.
- Has a maximum forward walking speed.
- Has a maximum forward running speed.
- Has a maximum sideways walking speed.
- Has a maximum turning speed.
- Has a capsule collider.
- Has a locomotion blend tree.
- Has a state

The hero

- Is a character.
- Is **2** meters tall.
- Has an initial health of **100**.
- Has an initial score of **0**, which is incremented by the initial health of the enemies he kills.
- Can walk forward and backward at **4.5** meters per second.
- Can walk sideways at **3** meters per second.
- Can hit enemies using his laser gun ray.
- Walks or runs when the Move axis is used.
- Rotates to point his gun toward the hero camera target.
- Has a laser gun.

The hero camera

- Aims above the hero head.
- Remains a few meters behind the hero character,
  so that we can see his feet in the bottom of the screen when looking horizontally.
- Can turn laterally and vertically at **120** degrees per second.
- Can look down at **-5** degrees.
- Can look up at **+10** degrees.
- Immediately gets closer to the hero if there is an obtacle between them.
- Quickly gets back to its default distance otherwise.
- Rotates when the Aim axis is used.

The hero laser gun muzzle

- Can shoot a laser ray **5** times per second toward the hero camera target when the Shoot button is used.

The hero laser gun ray

- Is a thin stretched capsule.
- Has a speed of **50** meters per second.
- Has a direct damage of **10** on enemies once per shot.
- Is shot from the gun tip toward what is pointed by the center of hero camera along its axis.

The enemy

- Is a character.
- Can't hurt the other enemies.
- Can turn at **120** degrees per second.
- Can walk forward at **4.5** meters per second.
- Chases the hero if :
    - the hero is near and in front of him.
    - the hero has hit him.
    - a nearby enemy is chasing the hero.
    - a nearby enemy has been killed.
- Randomly attacks the hero when it's close enough, at a maximum frequency of once per **4** seconds.

The enemy minimap

- Has a circular shape.
- Shows the active enemies within a 50 meters radius around the player.

The footman

- Is an enemy.
- Has an initial health of **50**.
- Can walk forward at **4.5** meters per second.
- Can hit the hero with his spear.

The footman spear tip

- Has a direct damage of **100** on the hero once per attack.

The grunt

- Is an enemy.
- Has an initial health of **100**.
- Can walk forward at **4.5** meters per second.
- Can hit the hero with his axe blade.

The grunt axe blade

- Has a direct damage of **100** on the hero once per attack.

The golem

- Is an enemy.
- Has an initial health of **200**.
- Can walk at **2** meters per second.
- Can hit the hero using his fists.

The golem fist

- Has a direct damage of **100** on the hero once per attack.

The lich

- Is an enemy.
- Has an initial health of **75**.
- Can walk forward at **4.5** meters per second.
- Can hit the hero using his staff fireball.

The lich staff tip

- Can shoot a fireball every 2 seconds.

The lich fireball

- Has a diameter of **0.5** meters.
- Has a flame particle effect.
- Has an initial speed of **10** meters per second.
- Has a direct damage of **25** on the hero once per shot.

Version

1.3

Author

Eric Pelzer (ecstatic.coder@gmail.com).

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