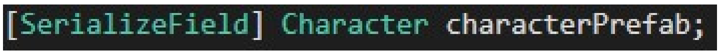
2D Platformer Documentation

2018

Contents

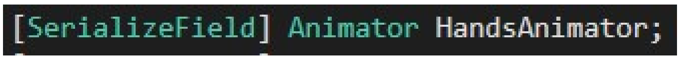
1. Code style.

Variables that need to be changed from the editor are labeled as private and with “SerializeField” attribute.

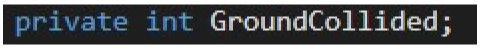


```
[SerializeField] Character characterPrefab;
```

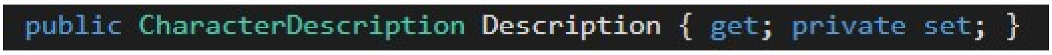
Private and public variables belonging to the class begin with a capital letter:



```
[SerializeField] Animator HandsAnimator;
```

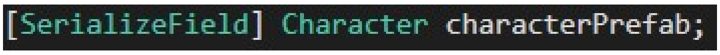


```
private int GroundCollided;
```

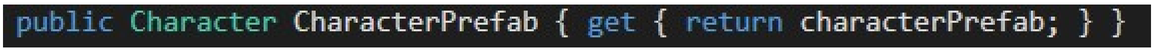


```
 public CharacterDescription Description { get; private set; }
```

In the event that a variable has a property, the variable begins with a small letter, the property with a large.

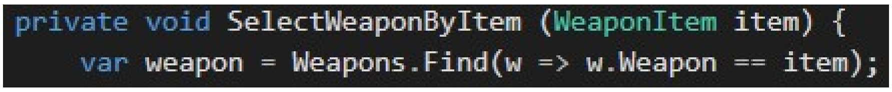


```
[SerializeField] Character characterPrefab;
```



```
public Character CharacterPrefab { get { return characterPrefab; } }
```

Parameters of the method and variables declared in the body of the method begin with a small letter.



```
private void SelectWeaponByItem (WeaponItem item) {
    var weapon = Weapons.Find(w => w.Weapon == item);
```

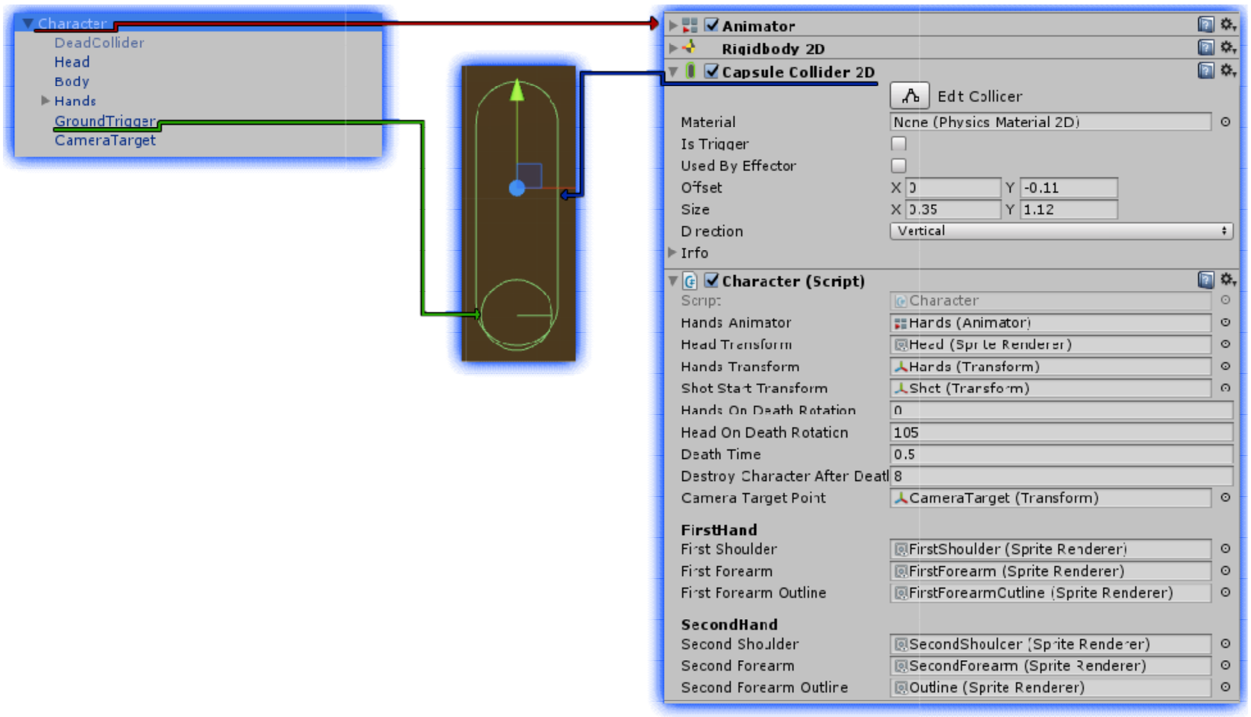
All variable names and method names are chosen to maximize the destination.

2. Character creation.

2.1 Prefab creation.

Creation of the character begins with the creation of a prefab, it needs to add the necessary components: Colliders, RigidBody2D, script Character.cs.

You should get the following:



```
▼ Character
    DeadCollider
    Head
    Body
  ▶ Hands
    GroundTrigger
    CameraTarget
```

▶ ☑ Animator

▶ Rigidbody 2D

▼ ☑ Capsule Collider 2D

Edit Collider

Material	None (Physics Material 2D)
Is Trigger	□
Used By Effector	□
Offset	X 0 Y -0.11
Size	X 0.35 Y 1.12
Direction	Vertical
▶ Info	

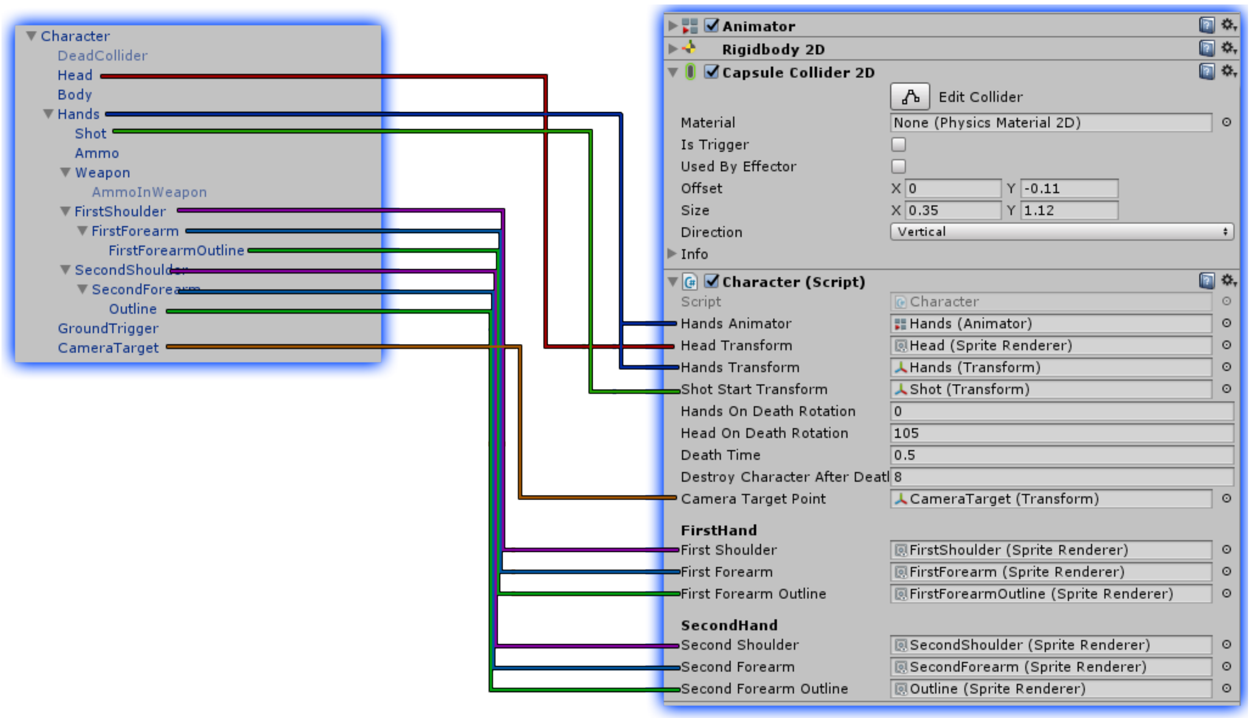
▼ ☑ Character (Script)

Script	Character
Hands Animator	Hands (Animator)
Head Transform	Head (Sprite Renderer)
Hands Transform	Hands (Transform)
Shot Start Transform	Shot (Transform)
Hands On Death Rotation	0
Head On Death Rotation	105
Death Time	0.5
Destroy Character After Deatl	8
Camera Target Point	CameraTarget (Transform)
FirstHand	
First Shoulder	FirstShoulder (Sprite Renderer)
First Forearm	FirstForearm (Sprite Renderer)
First Forearm Outline	FirstForearmOutline (Sprite Renderer)
SecondHand	
Second Shoulder	SecondShoulder (Sprite Renderer)
Second Forearm	SecondForearm (Sprite Renderer)
Second Forearm Outline	Outline (Sprite Renderer)

- Character: The main object on it are (Is on the layer: "Ally" or "Enemy"):
    - Animator for visual display.
    - RigidBody2d.
    - Collider for interaction with the game world.
    - Script Character.ch.
- DeadCollider: When a player dies, the main collider turns off and DeadCollider turns on (Is on the layer: "Dead").
- Head: SpriteRenderer for displaying and animating the character's sprite head (Refers to the visual part).

- Body: SpriteRenderer for displaying and animating the character's sprite body (Refers to the visual part).
- Hands: For the animation of the character's hands, this object will be described later in the section "TODO".
- GroundTrigger: Trigger for determining the ground under the feet of the hero.
- CameraTarget: The point at which the camera is watching.

Links in Character.cs



Material: None (Physics Material 2D)
Is Trigger: □
Used By Effector: □
Offset: X 0 Y -0.11
Size: X 0.35 Y 1.12
Direction: Vertical
Info

Script: Character
Hands Animator: Hands (Animator)
Head Transform: Head (Sprite Renderer)
Hands Transform: Hands (Transform)
Shot Start Transform: Shot (Transform)
Hands On Death Rotation: 0
Head On Death Rotation: 105
Death Time: 0.5
Destroy Character After Deatl: 8
Camera Target Point: CameraTarget (Transform)

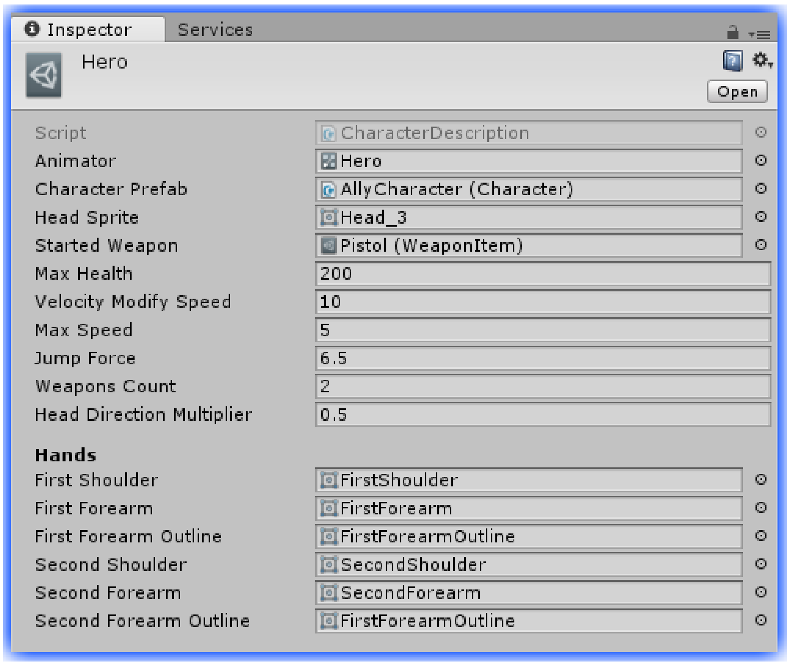
FirstHand
First Shoulder: FirstShoulder (Sprite Renderer)
First Forearm: FirstForearm (Sprite Renderer)
First Forearm Outline: FirstForearmOutline (Sprite Renderer)

SecondHand
Second Shoulder: SecondShoulder (Sprite Renderer)
Second Forearm: SecondForearm (Sprite Renderer)
Second Forearm Outline: Outline (Sprite Renderer)

The project already has 2 ready prefabs "AllyCharacter" and "EnemyCharacter".

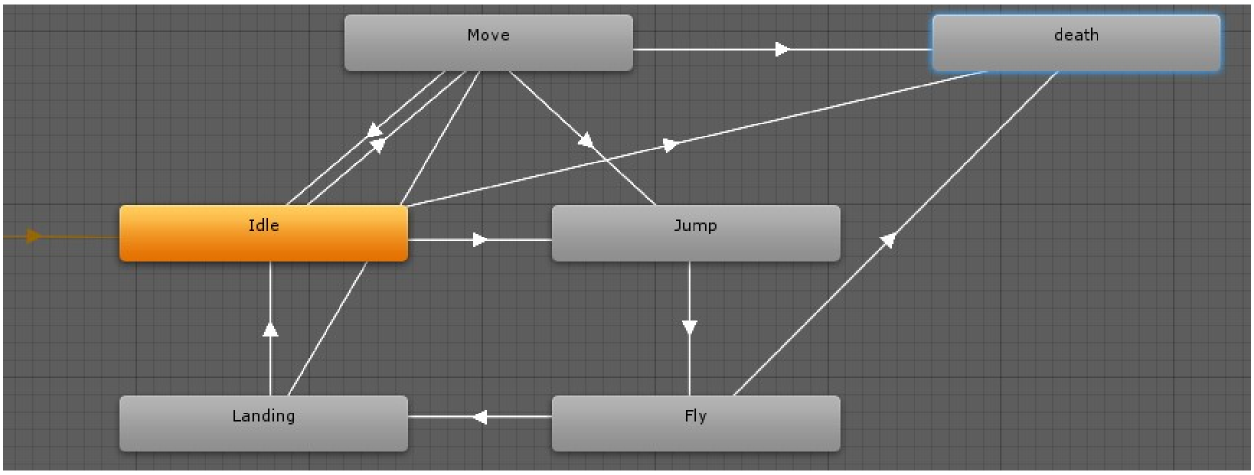
2.2 CharacterDescription creation.

Character settings are configured in Assets character "CharacterDescription". To create an asset, right-click in the desired folder and select the menu item "Create/Game Balance/CharacterDescription".



Script	CharacterDescription
Animator	Hero
Character Prefab	AllyCharacter (Character)
Head Sprite	Head_3
Started Weapon	Pistol (WeaponItem)
Max Health	200
Velocity Modify Speed	10
Max Speed	5
Jump Force	6.5
Weapons Count	2
Head Direction Multiplier	0.5
Hands	
First Shoulder	FirstShoulder
First Forearm	FirstForearm
First Forearm Outline	FirstForearmOutline
Second Shoulder	SecondShoulder
Second Forearm	SecondForearm
Second Forearm Outline	FirstForearmOutline

- Animator: Animations are created and configured using prefab already prefab, section "Character Creation", contains animations: Idle, Move, Jump, Fly, Landing, Death.



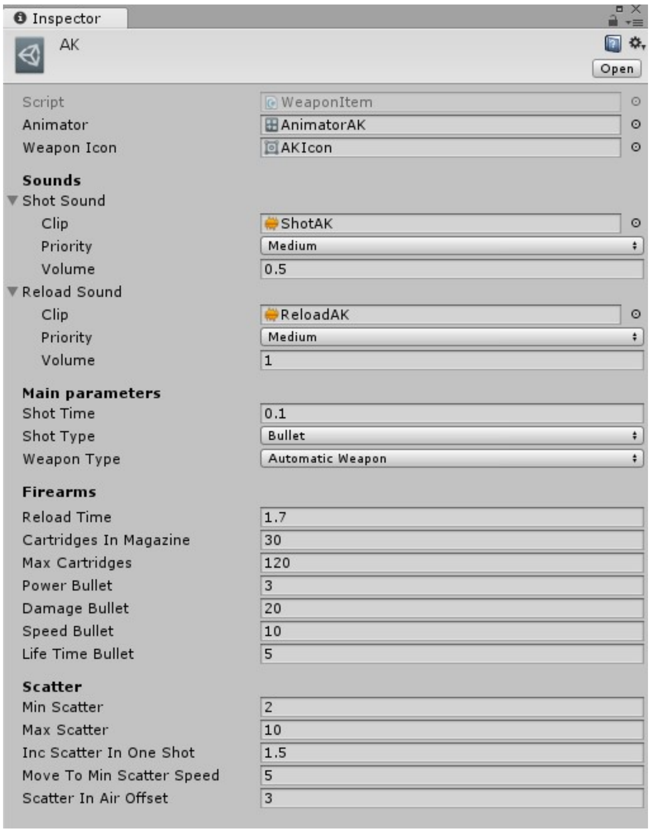
- Character prefab: link to "Character prefab".
- Head sprite: link to head sprite.
- Started weapon: link to weapon issued when the character is initialized.

- Max health.
- Velocity modify speed: Rate of change of "Velocity" per second.
- Jump force.
- Weapons count: Number of weapon slots.
- Head direction multiplier: To reduce the angle of rotation of the head towards the aim.
- Hands: links to hands sprites.

The project already has ready descriptions " Hero", " Enemy_1", " Enemy_2", "Enemy_3".

3. Weapon creation.

Weapon settings are configured in Assets weapon "WeaponItem". To create an asset, right-click in the desired folder and select the menu item "Create/Game Balance/WeaponItem".



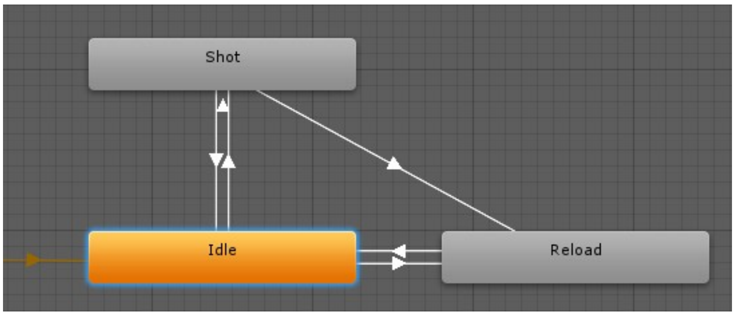
Inspector

AK

Open

Script	WeaponItem
Animator	AnimatorAK
Weapon Icon	AKIcon
Sounds	
Shot Sound	
Clip	ShotAK
Priority	Medium
Volume	0.5
Reload Sound	
Clip	ReloadAK
Priority	Medium
Volume	1
Main parameters	
Shot Time	0.1
Shot Type	Bullet
Weapon Type	Automatic Weapon
Firearms	
Reload Time	1.7
Cartridges In Magazine	30
Max Cartridges	120
Power Bullet	3
Damage Bullet	20
Speed Bullet	10
Life Time Bullet	5
Scatter	
Min Scatter	2
Max Scatter	10
Inc Scatter In One Shot	1.5
Move To Min Scatter Speed	5
Scatter In Air Offset	3

- Animator: Animations are created and configured using prefab already prefab, section "Character Creation", contains animations: Idle, Shot, Reload.



!!! The shot point is also set in the animator.

- Sounds: links to sounds of weapons.

- Shot time: The duration of the shot in seconds determines the rate of fire of the weapon.
- Shot type: Type of projectile.
- Weapon type: SemiAutomaticWeapon, AutomaticWeapon, MeleeWeapon.

For the MeleeWeapon while there is no logic, in the nearest updatings it will appear.

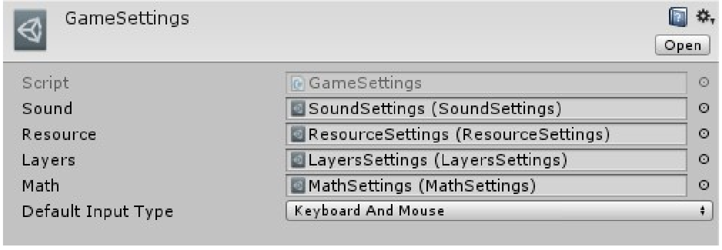
- Reload time: The duration of the reload in seconds.
- Cartridges in magazine.
- Max cartridges.
- Power bullet: The strength with which the bullet pushes the object out of contact.
- Damage bullet: Damage caused by a bullet if it hits a damaged object.
- Speed bullet: Measured in units passed in a second.
- Life time bullet: in seconds.
- Min scatter.
- Max scatter.
- Inc scatter in one shot.
- Move to min scatter speed.
- Scatter in air offset.

The project already has ready weapons " Pistol", " M", " AK", " GrenadeLauncher".

4. Game Settings.

4.1 Asset GameSettings.

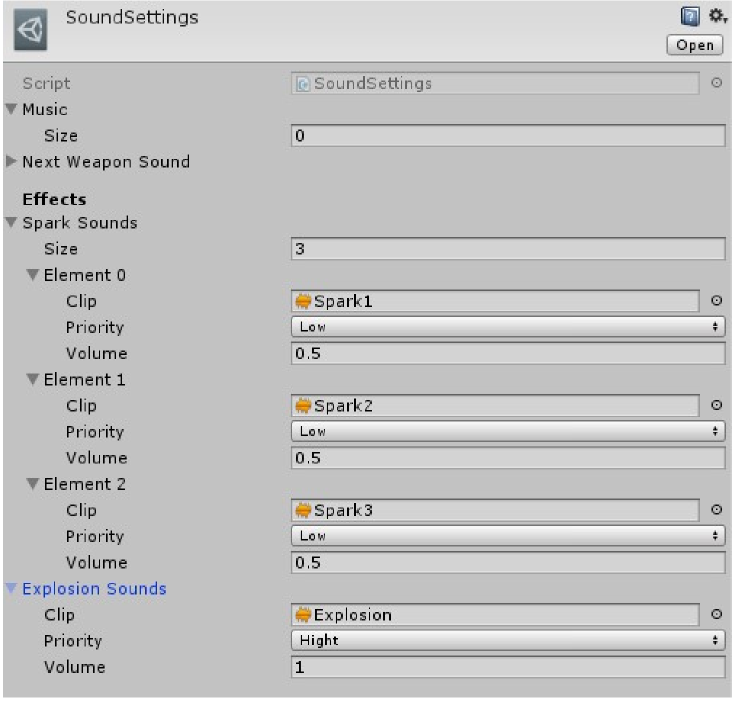
In asset "GameSettings" has all the necessary links for quick access.



Script	GameSettings
Sound	SoundSettings (SoundSettings)
Resource	ResourceSettings (ResourceSettings)
Layers	LayersSettings (LayersSettings)
Math	MathSettings (MathSettings)
Default Input Type	Keyboard And Mouse

4.2 Asset SoundSettings.

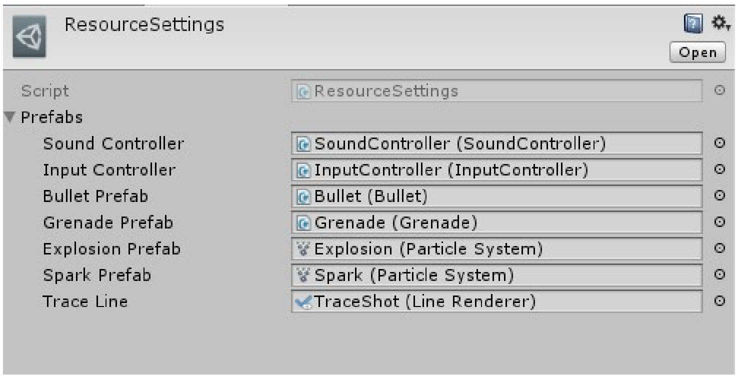
In asset "SoundSettings" has links on sounds for quick access. There are also links to music, if you add a few sounds they will be played in random order.



Script	SoundSettings
Music	
Size	0
Next Weapon Sound	
Effects	
Spark Sounds	
Size	3
Element 0	
Clip	Spark1
Priority	Low
Volume	0.5
Element 1	
Clip	Spark2
Priority	Low
Volume	0.5
Element 2	
Clip	Spark3
Priority	Low
Volume	0.5
Explosion Sounds	
Clip	Explosion
Priority	Hight
Volume	1

4.3 Asset ResourceSettings.

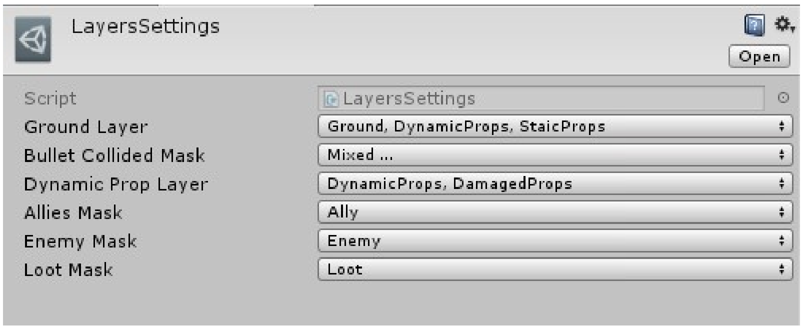
In asset "RecourceSettings" has links on prefabs for quick access.



Script	ResourceSettings
Prefabs	
Sound Controller	SoundController (SoundController)
Input Controller	InputController (InputController)
Bullet Prefab	Bullet (Bullet)
Grenade Prefab	Grenade (Grenade)
Explosion Prefab	Explosion (Particle System)
Spark Prefab	Spark (Particle System)
Trace Line	TraceShot (Line Renderer)

4.4 Asset LayersSettings

In asset "LayersSettings" are the settings for layers.

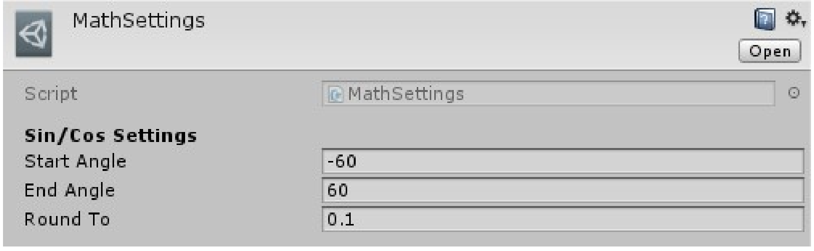


Script	LayersSettings
Ground Layer	Ground, DynamicProps, StaicProps
Bullet Collided Mask	Mixed ...
Dynamic Prop Layer	DynamicProps, DamagedProps
Allies Mask	Ally
Enemy Mask	Enemy
Loot Mask	Loot

- Ground layer: Layers that are considered to be earth. If the character is on this layer, then he can make a jump.
- Bullet collided mask: Layers in which a bullet can hit.
- Dynamic prop layer: The layers on which the dynamic props.
- Allies mask: Layers that determine the belonging of the faction.
- Enemy mask: Layers that determine the belonging of the faction.
- Loot mask: Layers that define an object as loot.

4.5 Asset MathSettings

Now in the setup there is a setting for the sine and cosine, after changing the settings, right-click and select the "GenerateValues" menu item, then the values will be counted and saved to the list.



MathSettings

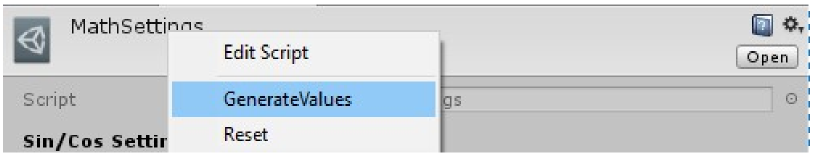
Script: MathSettings

Sin/Cos Settings

Start Angle: -60

End Angle: 60

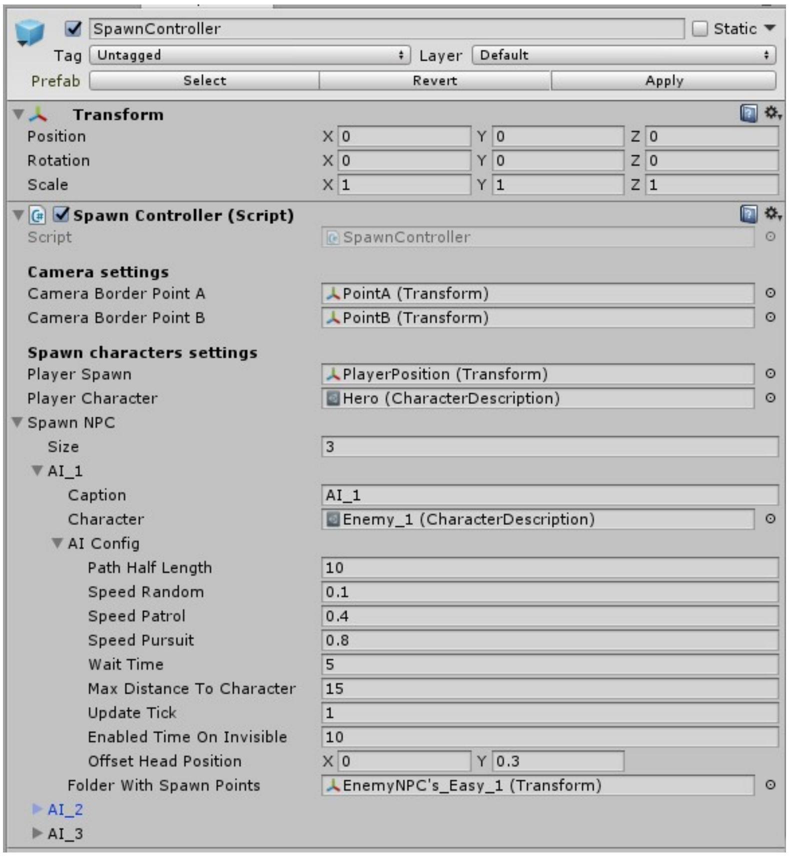
Round To: 0.1



If you do not need exact values of the sine or cosine, you can refer to the list from this assembly to optimize the hard calculations.

5. SpawnController.

SpawnController need to create complex objects such as a character. Now he creates a hero for the player, and all enemies.



```
☑ SpawnController                                   □ Static
Tag Untagged                      Layer Default
Prefab   Select   Revert   Apply

Transform
Position          X 0     Y 0     Z 0
Rotation          X 0     Y 0     Z 0
Scale             X 1     Y 1     Z 1

☑ Spawn Controller (Script)
Script                          SpawnController

Camera settings
Camera Border Point A           PointA (Transform)
Camera Border Point B           PointB (Transform)

Spawn characters settings
Player Spawn                    PlayerPosition (Transform)
Player Character                Hero (CharacterDescription)
▼ Spawn NPC
  Size                          3
  ▼ AI_1
    Caption                     AI_1
    Character                   Enemy_1 (CharacterDescription)
    ▼ AI Config
      Path Half Length          10
      Speed Random              0.1
      Speed Patrol              0.4
      Speed Pursuit             0.8
      Wait Time                 5
      Max Distance To Character 15
      Update Tick               1
      Enabled Time On Invisible 10
      Offset Head Position      X 0     Y 0.3
    Folder With Spawn Points    EnemyNPC's_Easy_1 (Transform)
  ▶ AI_2
  ▶ AI_3
```

- Camera Border Point A: The camera will not move out of bounds.
- Camera Border Point B: The camera will not move out of bounds.
- Player spawn: spawn player position.
- Player Character: Asset of CharacterDescriotion.
- Spawn NPC: Spawn settings of all NPC on level.
  - Caption: For naming item of list.
  - Character: Asset of CharacterDescriotion.
  - AIConfig:
    - PathHalfLength: Half length of path, for create path.
    - SpeedRandom: Random speed borders.
    - SpeedPatrol: Speed at rrest.
    - SpeedPursuit: Speed in the excited state.
    - WaitTime: Wait time in target point of path.
    - MaxDistanceToCharacter: Length of ray to enemy character.
    - UpdateTick: Update tick for optimization.
    - EnabledTimeOnInvisible: The time through which the update will turn off if the character is not visible.

    - OffsetHeadPosition: Offset for start point of ray.
- Folder with spawn point: An object in the positions of the child elements of which will create character instances.

6. Input Settings

There are 3 types of input: Keyboard + mouse, Gamepad, touchscreen. The type of input can be changed in the game when you press a key on the keyboard "Spacebar", when you click on the gamepad button "A" or when you touch the touchscreen. The default is set in the "GameSettings". The purpose of the buttons is now hardcoded, in the future updates when the main menu is made, the purpose of the buttons can be adjusted from the settings.

Keyboard + mouse input:

MoveToLeftKey = "A".

MoveToRightKey = "D".

Interaction = "E".

Jump = "Space".

NextGun = "Tab".

Reload = "R".

Shot = "Left mouse button".

AimPos = "Mouse position".

Gamepad input:

MoveToLeftKey = "Left stick".

MoveToRightKey = " Left stick ".

= "B".

Jump = "A".

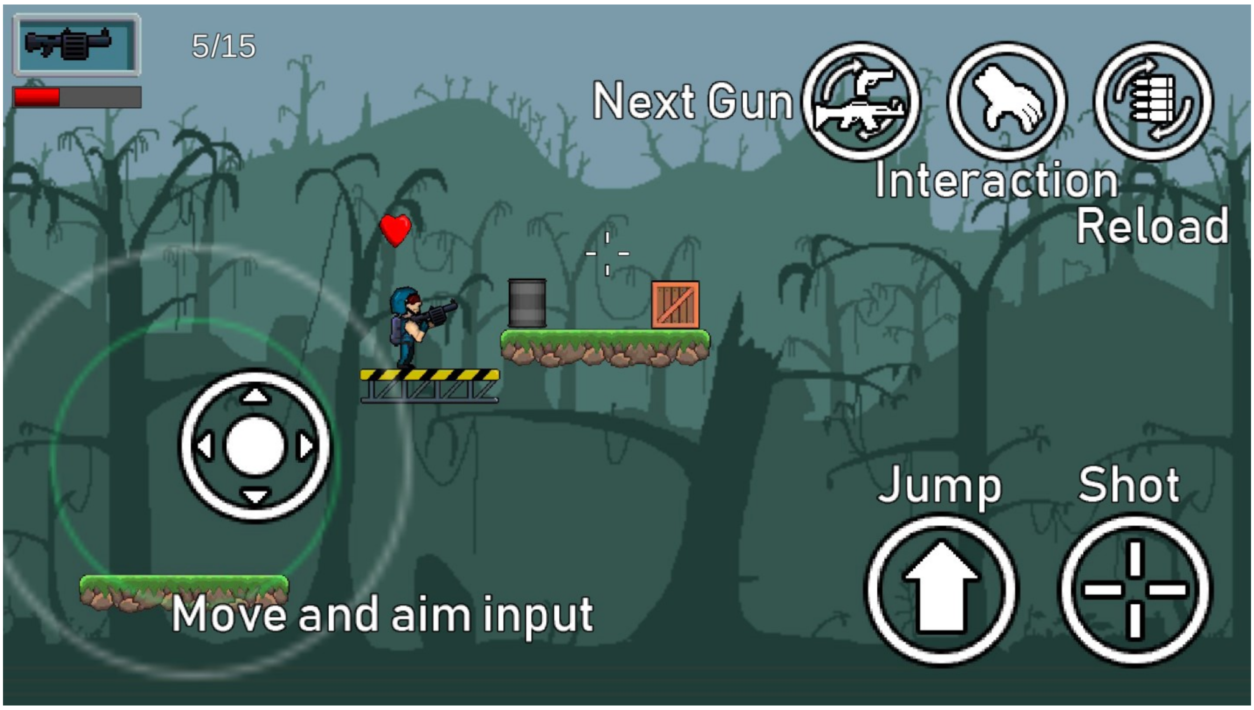
NextGun = "Y".

Reload = "X".

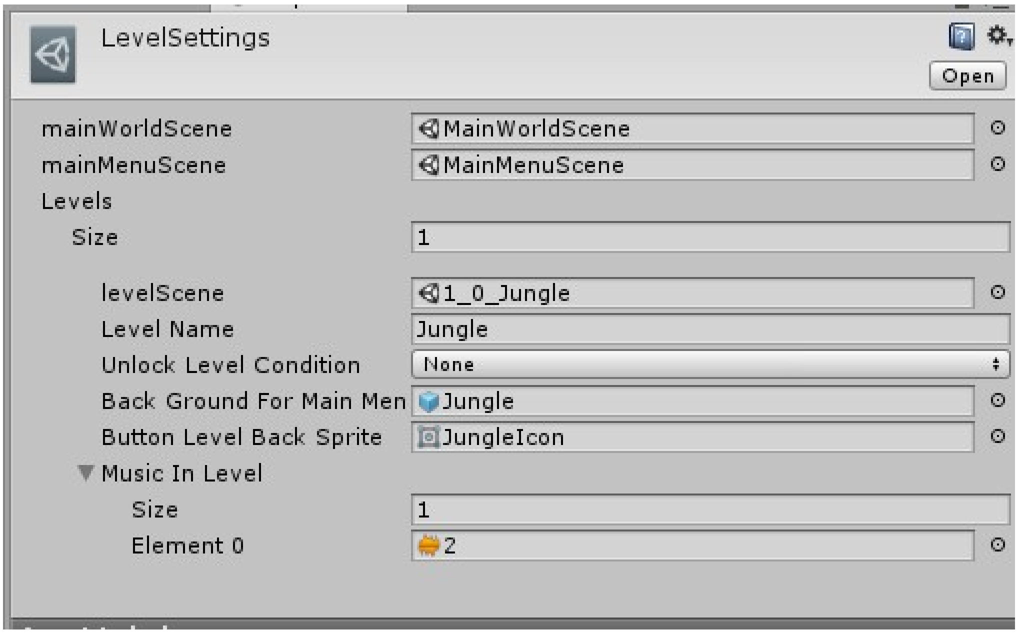
Shot = "RB".

AimPos = "Right stick".

Touchscreen input:



7. Levels settings



LevelSettings

mainWorldScene: MainWorldScene
mainMenuScene: MainMenuScene
Levels
Size: 1
levelScene: 1_0_Jungle
Level Name: Jungle
Unlock Level Condition: None
Back Ground For Main Men: Jungle
Button Level Back Sprite: JungleIcon
Music In Level
Size: 1
Element 0: 2

The level is loaded from 2 scenes:

- mainWorldScene, the scene on which are all the necessary controllers for the game.
- LevelScene, the scene on which are: level prefabs, spawn points and background

level setting:

- levelScene: Link on level Scene (Saving of passing level takes place by scene name).
- LevelName: Displayed in the level selection menu.
- UnlockLevelCondition: It can have 3 states:
    - None: always unlocked,
    - PrevLevelCompleted: unlocked if the previous level is completed,
    - ConcreteLevelCompleted : unlocked if a certain level is completed.
- BackGroundForMainMenu: The prefab that is displayed in the main menu. The prefab is always the last completed level.
- ButtonLevelBackSprite: The sprite that is displayed on the level button in the level selection menu.
- MusicInLevel: The playlist will turn on when loading the level. If the playlist is empty, the previous playlist will play.

8. Main menu

The main menu is divided into 3 windows:

- Main Buttons window:
  - Continue: Loading last unlocked level.
  - Select level: Open window "Select level window".
  - Settings: Open window "Settings window".
  - Quit: Quit from application or exit from play mode in editor.
- Select level window: Display of all levels from asset "LevelSettings".
- Settings: You can mute the sound or music, and customize the key binding for the keyboard or gamepad.

9. Contacts

On all questions you can contact by e-mail:

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Bugrov1990@gmail.com