TSE

2D TOPDOWN SHOOTER ENGINE

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INTRODUCTION

TSE (Topdown Shooter Engine) is an Unity Asset that allows you to get core mechanics for your topdown shooter without need to write a single line of code.

It contains a total of 20 scripts written in C# with 8 different Editor Scripts for better experience and easier use.

Some of this scripts are :

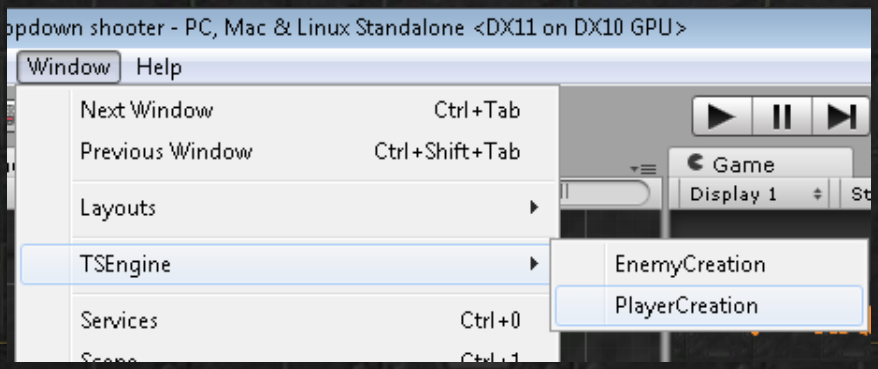
1. **Shooting script which contains advanced shooting mechanics with raycasts**
2. **Player Controller responsible for player movement**
3. **Weapon Scriptable Object**
4. **Enemy script responsible for enemy behaviour**
5. **Player and Enemy Creation Editor Windows**
6. **Audio Manager**

and much more…

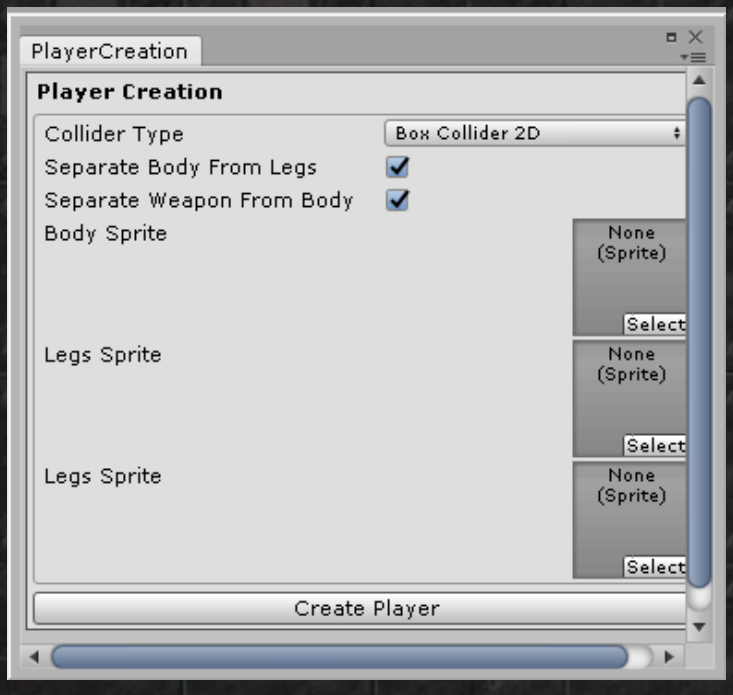
PLAYER CREATION

When you create new project in Unity first thing you would probably want to do is to create a player for your game. TSE contains nice shortcut for that step using Editor Window.In order to acces Player Creation window follow this path:

Window > TSEngine > PlayerCreation



After that you will be provided with the window that looks like this:



Variables description:

Collider Type – Collider that will be assigned to the Player Game Object

Separate Body From Legs – Check this if you want to have Body And Legs Game Objects Separated

Separate Weapon From Body – Check this if you want to have Body And Weapon Game Objects Separated

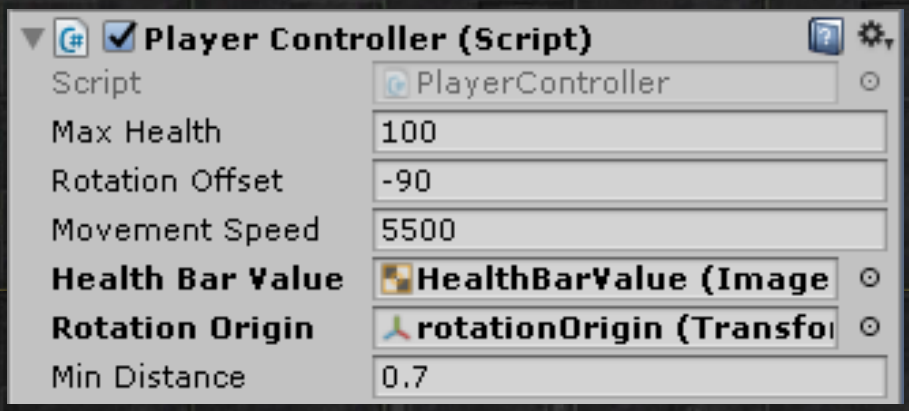
Following Sprite variables will change depending on the values of the Separate Body From Legs and Separate Weapon From Body booleans.

After you assign values to all this variables you can click on Create Player button and after that you should see your Player in the Hierarchy.

PLAYER CONTROLLER

After you have created the player you should configure Player Controller script.It is responsible for player movement as well as player UI.

You can find this script attached to the Player Game Object.



Variables description:

Max Health – Maximum health of the player also the starting health of the player

Rotation Offset – Offset to adjust rotation angle

Movement Speed – Speed of the player(usually high number)

Health Bar Value – Health Bar UI Image with filled Image Type(check HealthBarValue in Demo Scene)

Rotation Origin – Origin of the Player Rotation

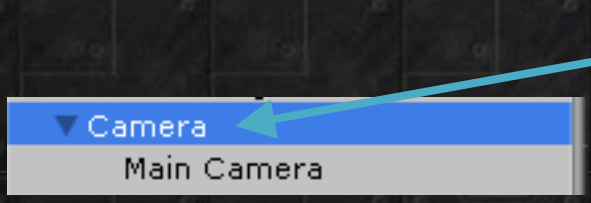
Min Distance – Minimum distance between mouse and player origin so the player can rotate

After you have filled all this fields you can press play and test your player in action.

CAMERA FOLLOW

Before you implement Camera Follow in your game, I suggest you to make Empty Game Object and make it parent of your Main Camera Object.

For Camera Follow you have two options, SimpleCameraFollow and SmoothCameraFollow.You should try both and see which one fits your game better.You should put your Camera Follow script on the Empty Game Object that you have previously made!



CROSSHAIR

For Crosshair you want first to create crosshair game object.You should add Sprite Renderer,as well as Animator if your Crosshair is animated.

After that,in order for crosshair to actually follow the mouse you have to add Follow Mouse Script to the Game Object.

CAMERA SHAKE

Camera Shake Script enables you to have nice shaking effect when shooting.In order to enable this feature you have to add Camera Shake script to you Main Camera.After that you will be able to adjust its variables in the weapon scriptable objects.

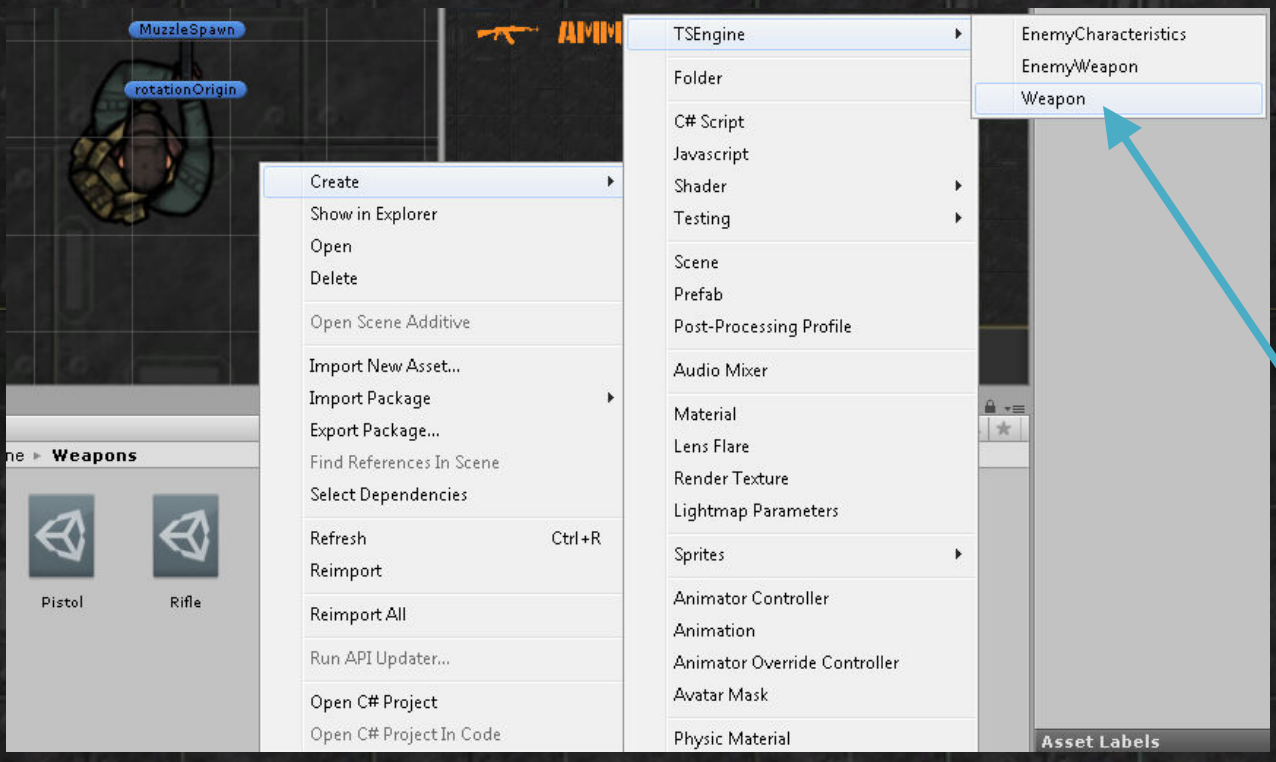
WEAPON

Weapon is the Scriptable Object that contains all informations about created weapon.

In order to create Weapon object follow this path:

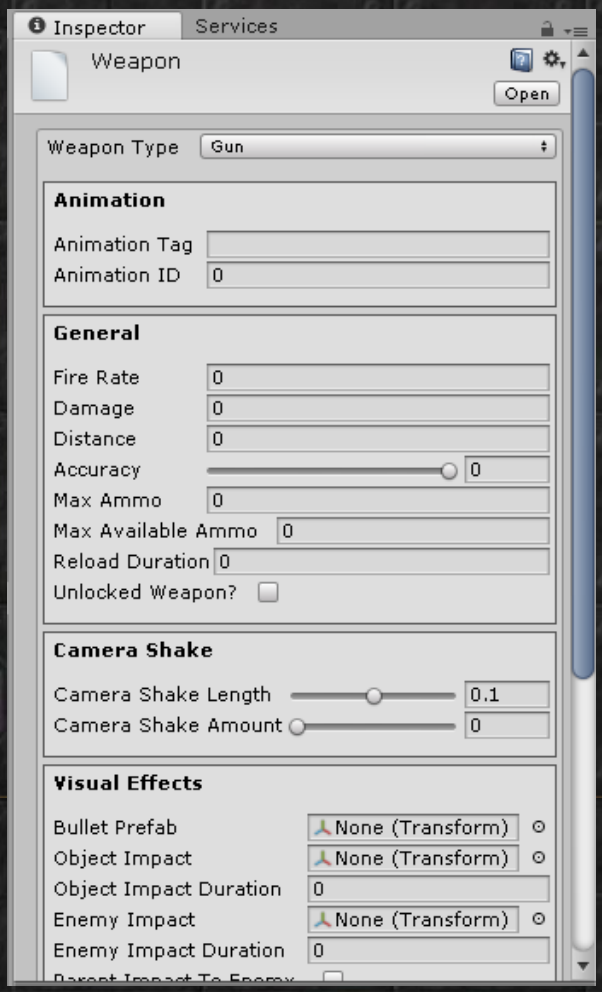
Right Click anywhere on the project window:

Create > TSEngine > Weapon



That way you can create Weapon Scriptable Object for each weapon you want your player to use.

After you have created Weapon Scriptable Object you will be able to see this window:



Variables description:

Weapon Type – Here you can at the moment pick between gun and shotgun.If you pick Shotgun you will have every option that Gun Type has but you will also be able to choose number of bullets that will be shot

Animation Tag – Tag that you will have to use as an Animator State Tag

Animation ID – ID that you will use for transition between other states

***Animator will be described later in this documentation**

Fire Rate – If you set value to 0 you will only be able to shoot if you click the left mouse button,but not if you hold it down;If you increase this value you will get higher amount of bullets shot

Damage – Damage to the enemy per shoot

Distance – Maximum distance that will ray travel

Accuracy – Smaller the value,higher the accuracy is

Max Ammo – Maximum ammo per clip

Max Available Ammo – Maximum ammo available for use

Reload Duration – Duration of the reload of weapon

Unlocked Weapon – Check this if weapon is available for use from start

Camera Shake Length – How long will the camera shake

Camera Shake Amount – How much will the camera shake

Bullet Prefab – Bullet that will be spawned when you shoot

Object Impact – Impact that will be spawned when bullet hits object with Destructible Tag

Object Impact Duration – Duration of an Impact Effect

Enemy Impact – Impact that will be spawned when bullet hits object with Enemy Tag

Enemy Impact Duration – Duration of an Enemy Impact Effect

Parent Impact To Enemy – Would you like Impact to stay on Enemy when shot

Muzzle Flash – Muzzle Flash that will be spawned when you shoot

Weapon Icon – Icon that will be shown on UI Image

Shoot Sound, Reload Sound, No Ammo Sound, Impact Sound, Enemy Impact Sound – String that is the path to the AudioManager Audio Clip

*If you choose grenade as a weapon type Explosion prefab must have Rigidbody2d,CircleCollider2D and Explosion Damage script attached to it.

SHOOTING

Shooting script is responsible for shooting mechanics of the player.When you create new player this script is automatically assigned to Body Game Object under Player Game Object.

Variables description:

Weapons – List of Weapon Scriptable Objects

What To Hit – Layers that will be affected by raycasts

Spawn Point – Bullet spawn point

Muzzle Spawn – Muzzle Flash spawn point

Camera Shake Object – Object that contains Camera Shake script

Ammo Text – UI text that will show Ammo

Weapon Icon – UI image that will show current weapon Icon

BARREL EXPLODE AND BARREL EXPLOSION SCRIPTS

Barrel Explode script is attached to objects that can explode if they are being shot,or other objects explode on them.Typical use case is for explosive barrels.

Explosive object must have Collider and Barrel Explode attached to it and must have Explosive tag.

Variables Descrition:

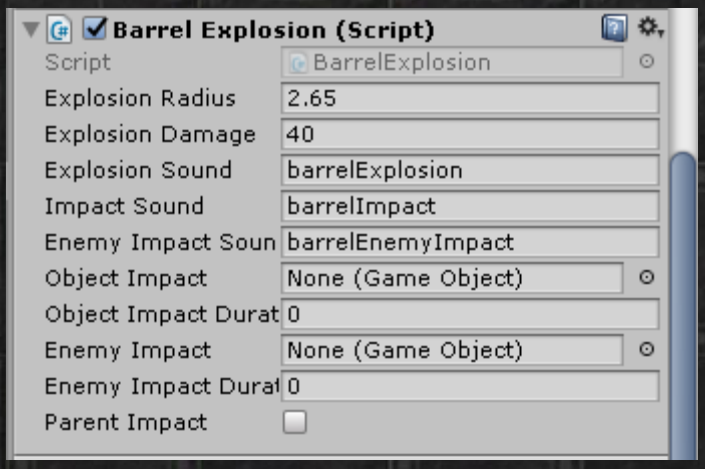
Health – Health of explosive object

Explosion Prefab – Prefab that will be instantiated when object is destroyed(This field is required)

Explosion Duration – Amount of time the explosion will last

After the object is destroyed,Explosion prefab is spawned. It must have **CirceCollider2D, Rigidbody2D and Barrel Explosion** attached to it.

Variables Description:



Explosion Radius – Radius of the circle collider, area of damage

Explosion Damage – Damage to the objects that are in the explosion area

Explosion Sound – Name of the sound of explosion configured in the AudioManager

Impact Sound – Name of the impact sound configured in the AudioManager

Enemy Impact Sound – Name of the enemy impact sound configured in the AudioManager

Object Impact – Object(with Destructible tag) Impact Effect

Object Impact Duration – Amount of time the object impact will last

Enemy Impact – Enemy Impact Effect

Enemy Impact Duration – Amount of time the enemy impact will last

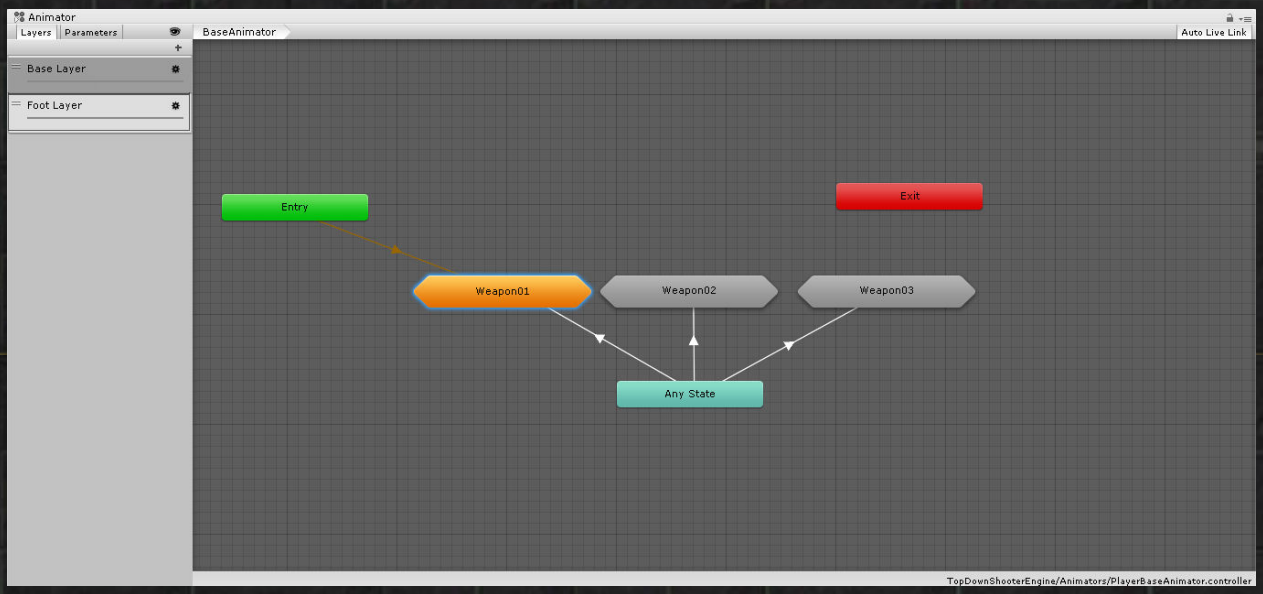
Parent Impact– Would you like Impact to stay on Enemy when shot

PLAYER ANIMATOR

If you follow the next path in the Project window:

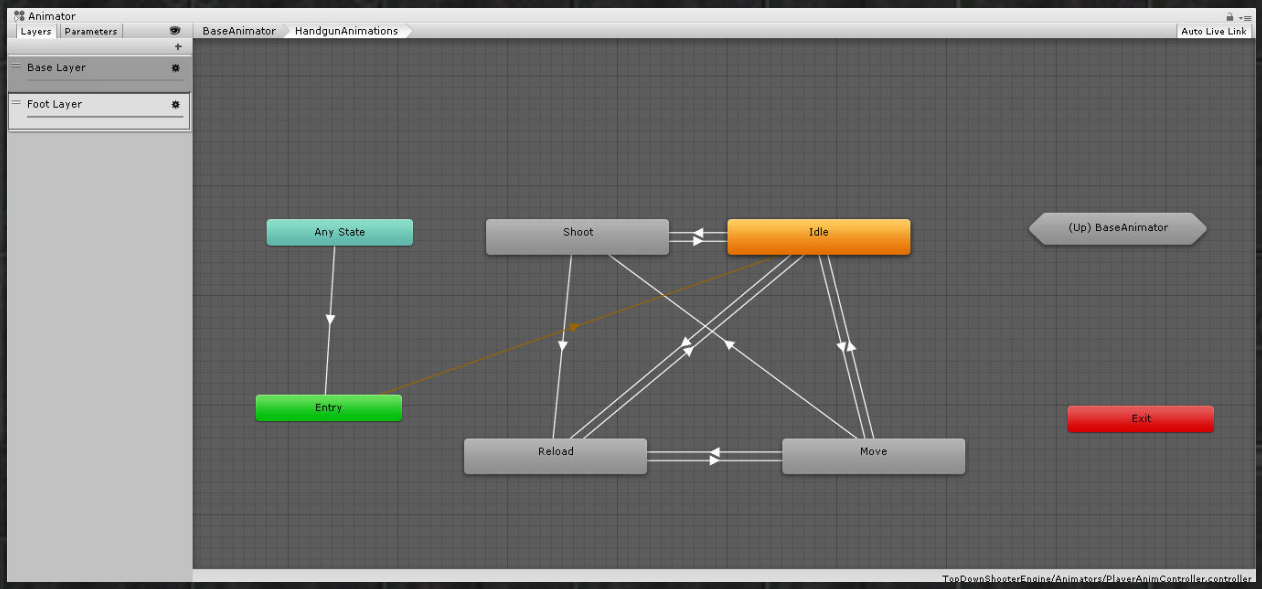
Assets > Animators

You will be able to see PlayerBaseAnimator Animator Controller.This is the animator you should use as a base.If you open it up you should be able to see this screen:

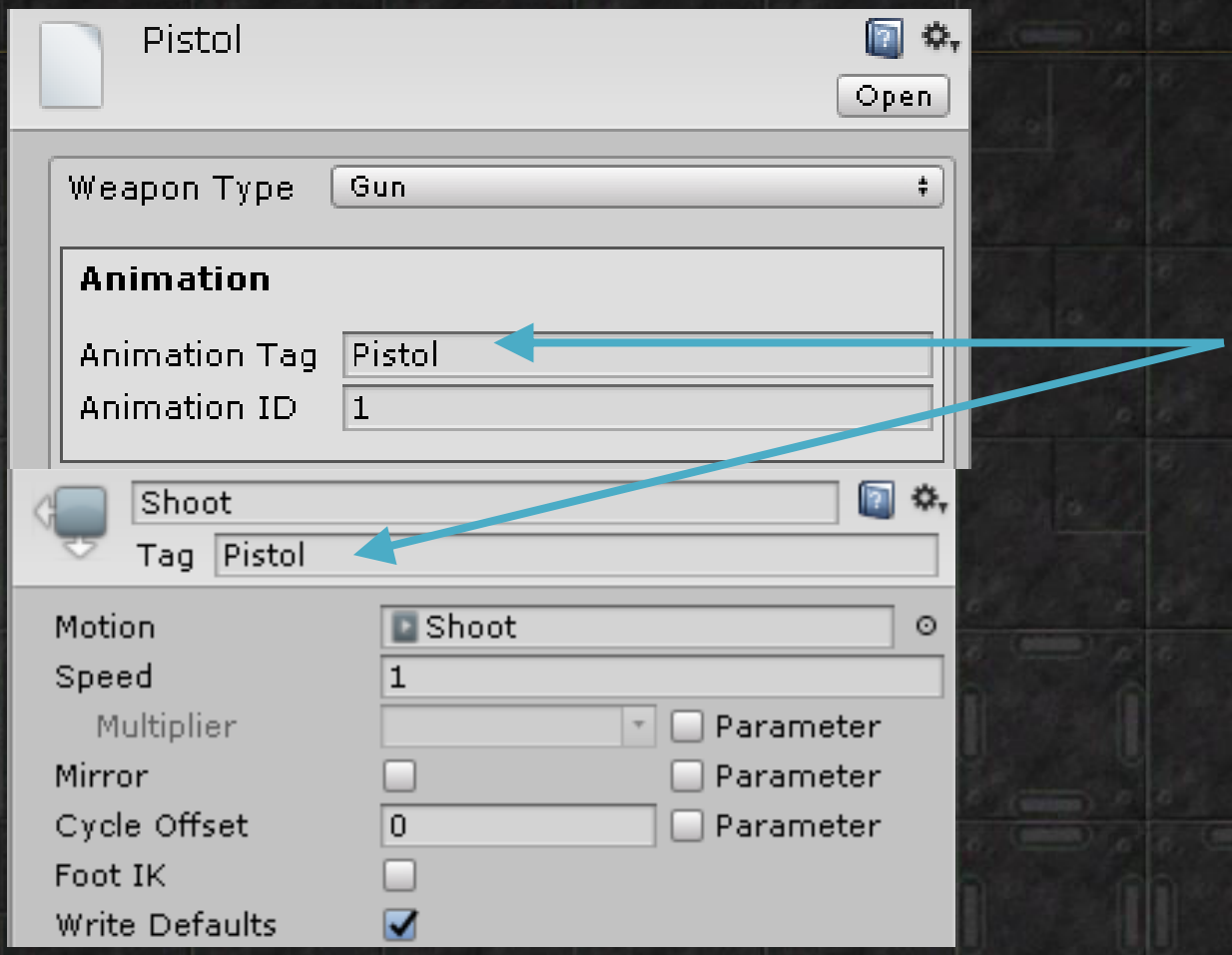


You can see 3 sub-state machines each representing group of animations for certain weapon. If you add more weapons you can simply copy one of these sub-state machines.

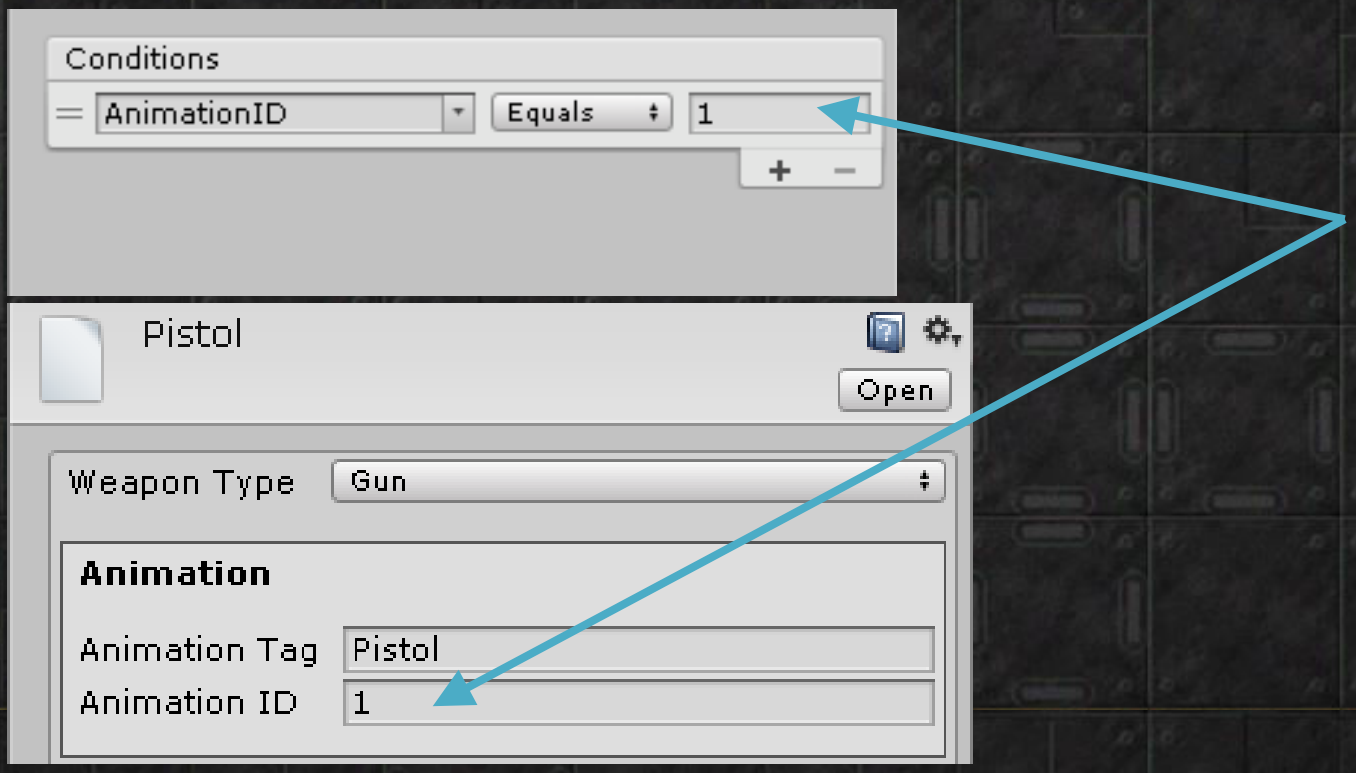
If you double-click one of these state machines you will be able to see this screen:



For a tag of each state you have to type exactly same tag as a one you have typed on weapon tag:



Also for each transitition between any state and weapons you have to set Animation ID condition value to the one from weapon Scriptable Object:



BULLET PREFABS

First step when creating bullet prefab is of course creating new empty game object.You have to add at least 3 components to it:

2D Collider of your choice,Rigidbody 2D and either Move Trail or Move Enemy Trail depending on the object you are creating bullet for.

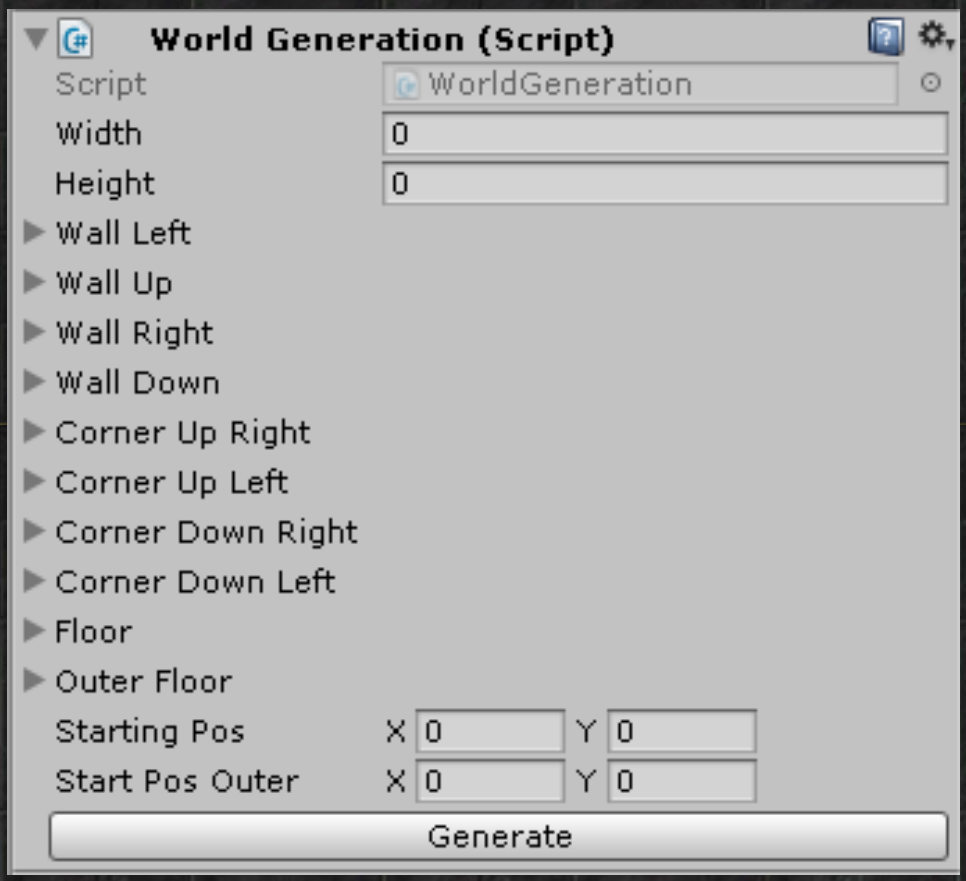
***Speed of the Move Trail script is usually between 1000 and 3000,while speed of Move Enemy Trail is usually between 50 and 200**

You can find bullet samples in :
TSEngine > Prefabs > Bullets

WORLD GENERATOR

World generator script allows you to create rectangular shaped terrain.

First off, you should create new Empty Game Object.After that you can add WorldGeneration script to newly created Object.



Variables description:

Width and Height – Width and Height of a playable terrain

Wall Left – Tile prefabs of the left wall

Wall Up – Tile prefabs of the top wall

Wall Right – Tile prefabs of the right wall

Wall Down – Tile prefabs of the bottom wall

Corner Up Right – Tile prefabs of the top right corner

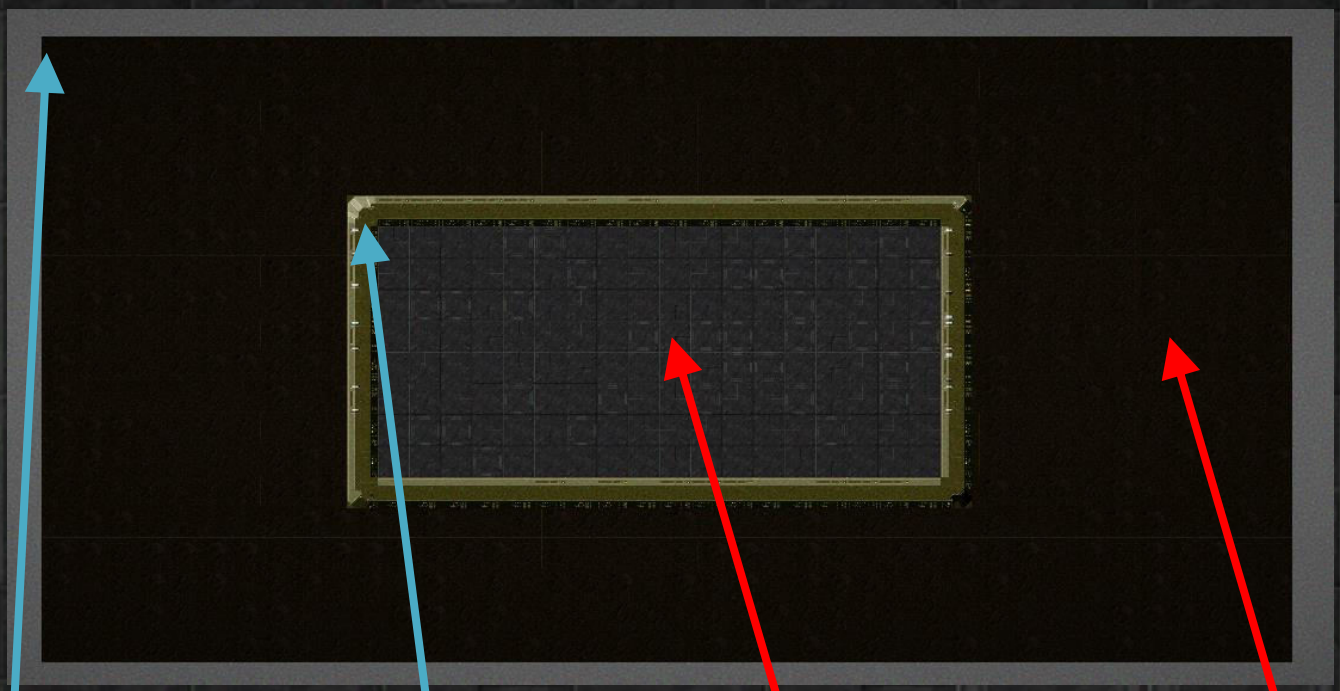
Corner Up Left – Tile prefabs of the top left corner

Corner Down Right – Tile prefabs of the bottom right corner

Corner Down Left – Tile prefabs of the bottom left corner

Floor – Tile prefabs of the floor

Outer Floor – Tile prefabs of the unreachable floor

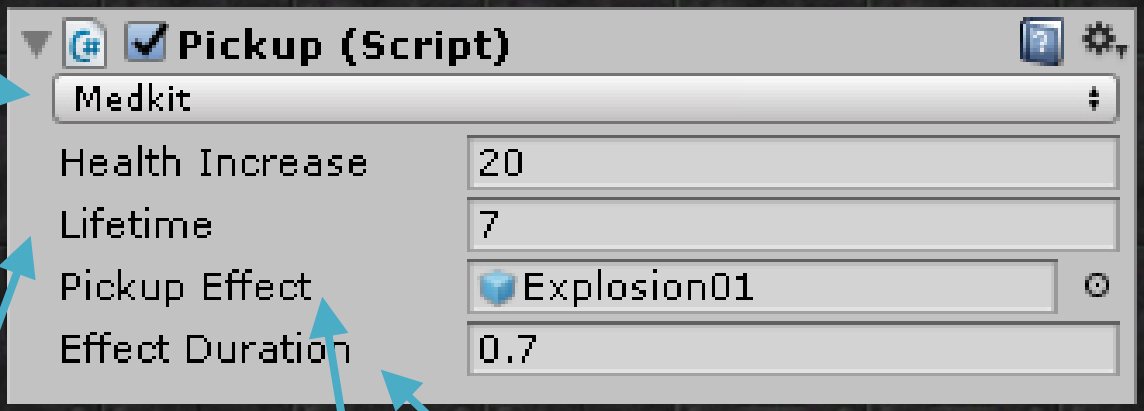


*You can find samples of tiles in:

Assets > TSEngine > Prefabs > World Generator > Tiles

PICKUPS

In order to create Pickup Object, create empty Game Object, and add Collider and Pickup script to it.



Pickup Type

Duration of an Pickup if its not picked up

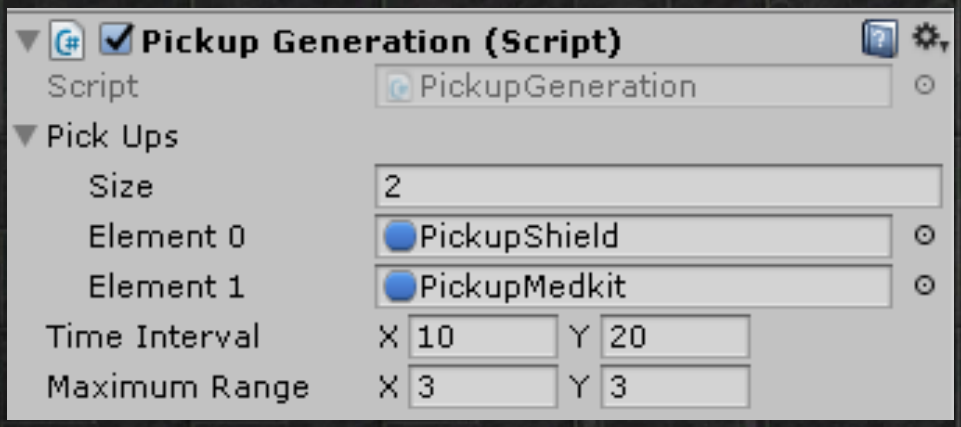
Effect when it is picked up

Duration of an Pickup effect

After you have finished setting up your pickup you should make a prefab of it.

PICKUP GENERATION

Firstly you have to create a new Game Object and add Pickup Generation script to it.You should also add Sprite Renderer so you have visual representation of your Generator.



Variables description:

Pick Ups – All the pickups that can be spawned

Time Interval – Minimum and maximum amount of seconds after which another pickup will be spawned

Maximum Range – Maximum range on x and y axis

ENEMY SETUP

Before you create your first enemy Game Object you have to import A* pathfinding to your project.

In order to do that, download A* pathfinding project from this link:
https://arongranberg.com/astar/download

Free version will be enough, but i suggest you to buy pro version because it is really worth the money.

After you import this to your project open the following scripts:

EnemyEditor,EnemyCreationWindow,Enemy.

For the EnemyEditor remove the comment starting from the line 56.

For the EnemyCreationWindow remove the comment starting from the line 115.

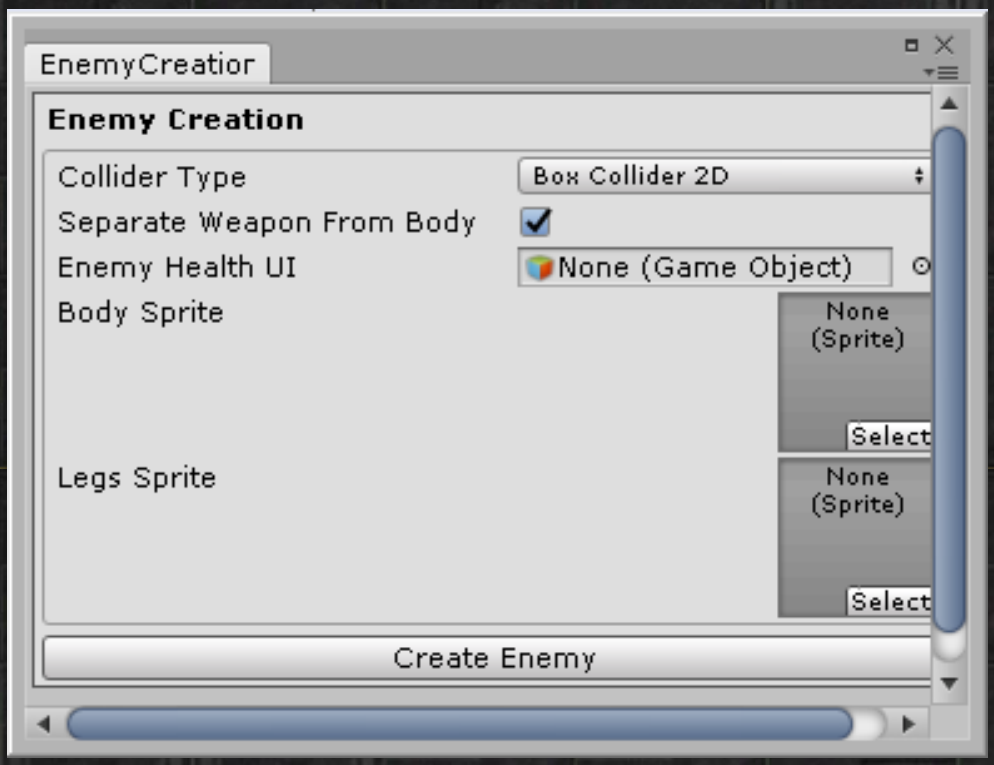
For the Enemy script remove the comment starting from the line 130.

ENEMY CREATION

In order to access Enemy Creation window follow this path:

Window > TSEngine > Enemy Creation

After that you will be able to see this window:



Variables description:

Collider Type – Collider that will be assigned to the Enemy Game Object

Separate Weapon From Body – Check this if you want to have Body And Weapon Game Objects Separated

Enemy Health UI – Health UI Prefab

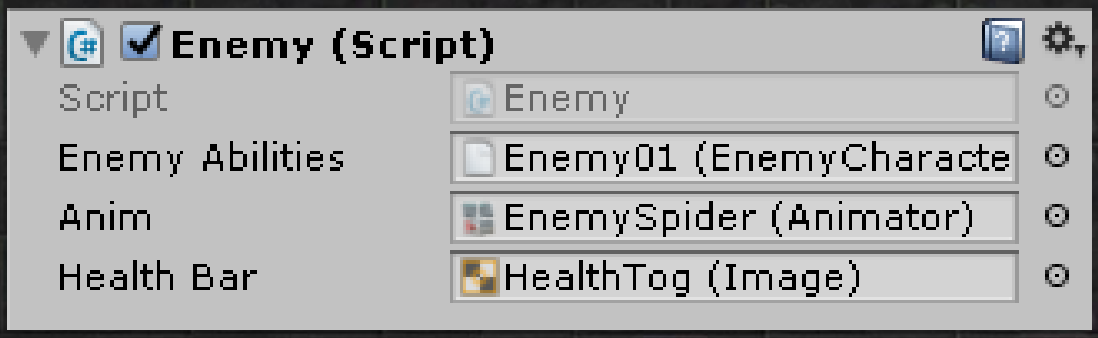
After you assign values to all this variables you can click on Create Enemy button and after that you should see your Enemy in the Hierarchy.

After that you should set up A* pathfinding.If you don’t know how,you can visit this page:

https://arongranberg.com/astar/docs/pathfinding-2d.php

ENEMY

After you have created Enemy Game Object you can find Enemy Script on Enemy Object.



Variables description:

Enemy Abilities – Enemy Characteristics Scriptable Object

Anim – Enemy Animator

Health Bar – Health Bar UI which value can be changed(filled Image Type)

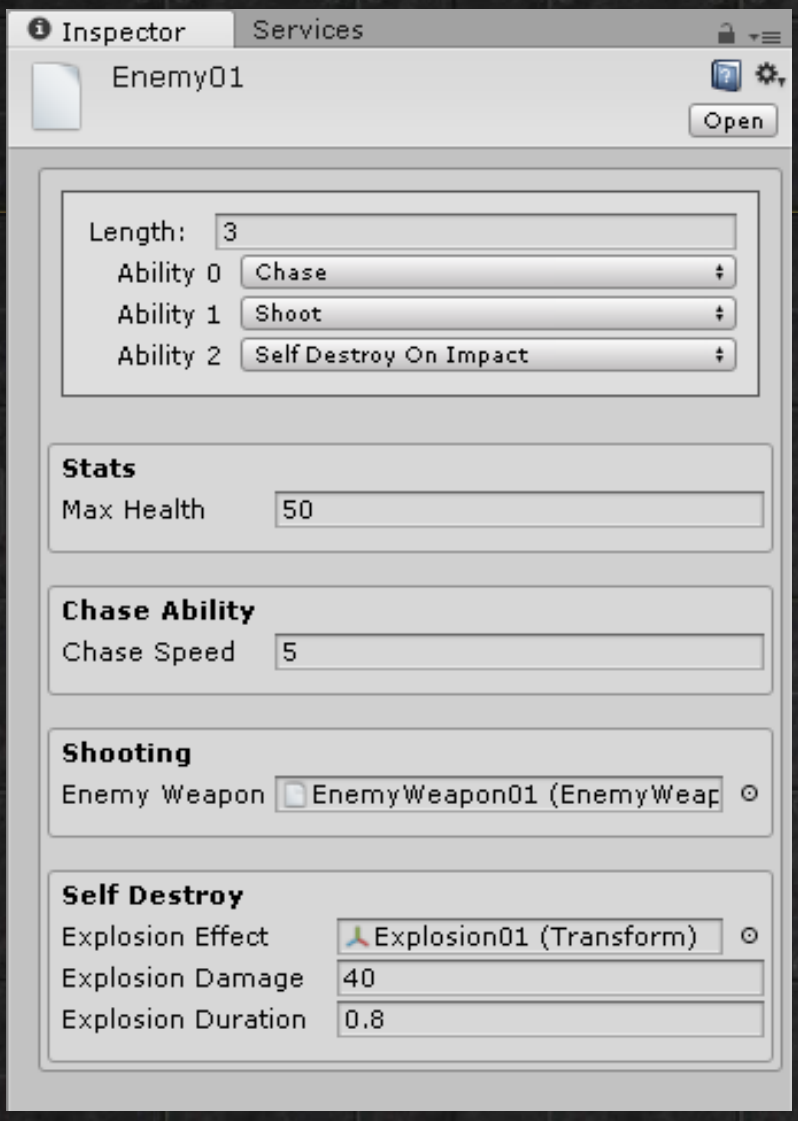
ENEMY CHARACTERISTICS

In order to create Enemy Characteristics Scriptable Object follow the next path:

Right Click anywhere on the project window:

Create > TSEngine > EnemyCharacteristics

You should be able to see window similar to this:



Variables description:

Length – Number of abilities

Max Health – Maximum health of an enemy

Chase Speed – Speed of an enemy

Enemy Weapon – Enemy Weapon Scriptable Object

Explosion Effect – Effect when enemy explodes

Explosion Damage – Damage to the player when enemy explodes

Explosion Duration – Duration of an explosion effect

ENEMY WEAPON

Enemy Weapon, similar to the Weapon Scriptable Object, is the Scriptable Object that contains all informations about created weapon.

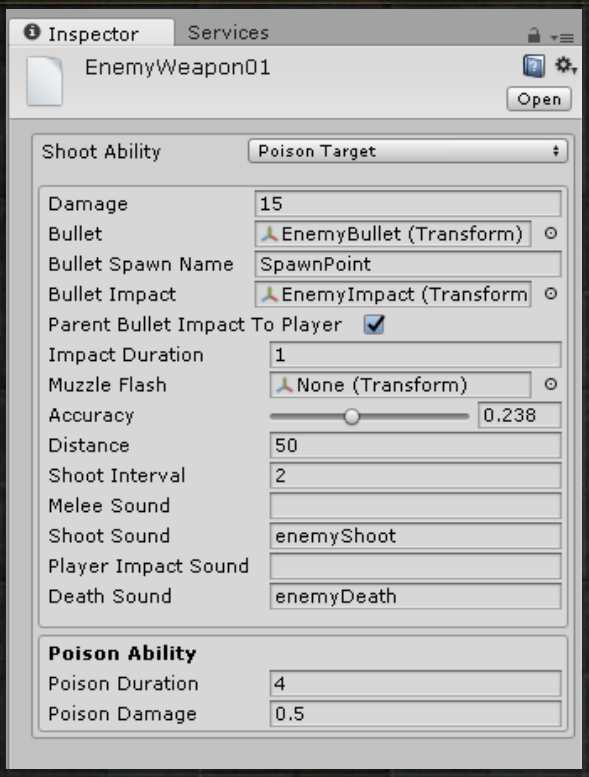
In order to create Enemy Weapon object follow this path:

Right Click anywhere on the project window:

Create > TSEngine > Enemy Weapon

You should get a window similar to this:

You should be able to see window similar to this:



Variables description:

Shoot Ability – Special Ability of the current weapon

Damage – Bullet Damage to the Player

shake

Bullet – Bullet prefab that will be spawned when you shoot

Bullet Spawn Name – Name of the object that represents spawn point of a Bullet

Bullet Impact – Impact that will be spawned when bullet hits object with Player Tag

Parent Impact To Player – Would you like Impact to stay on Player when shot

Impact Duration – Duration of an Player Impact Effect

Muzzle Flash – Muzzle Flash that will be spawned when you shoot

Distance – Maximum distance that will ray travel

Accuracy – Smaller the value,higher the accuracy is

Shoot Sound, Reload Sound, No Ammo Sound, Impact Sound, Enemy Impact Sound – String that is the path to the AudioManager Audio Clip

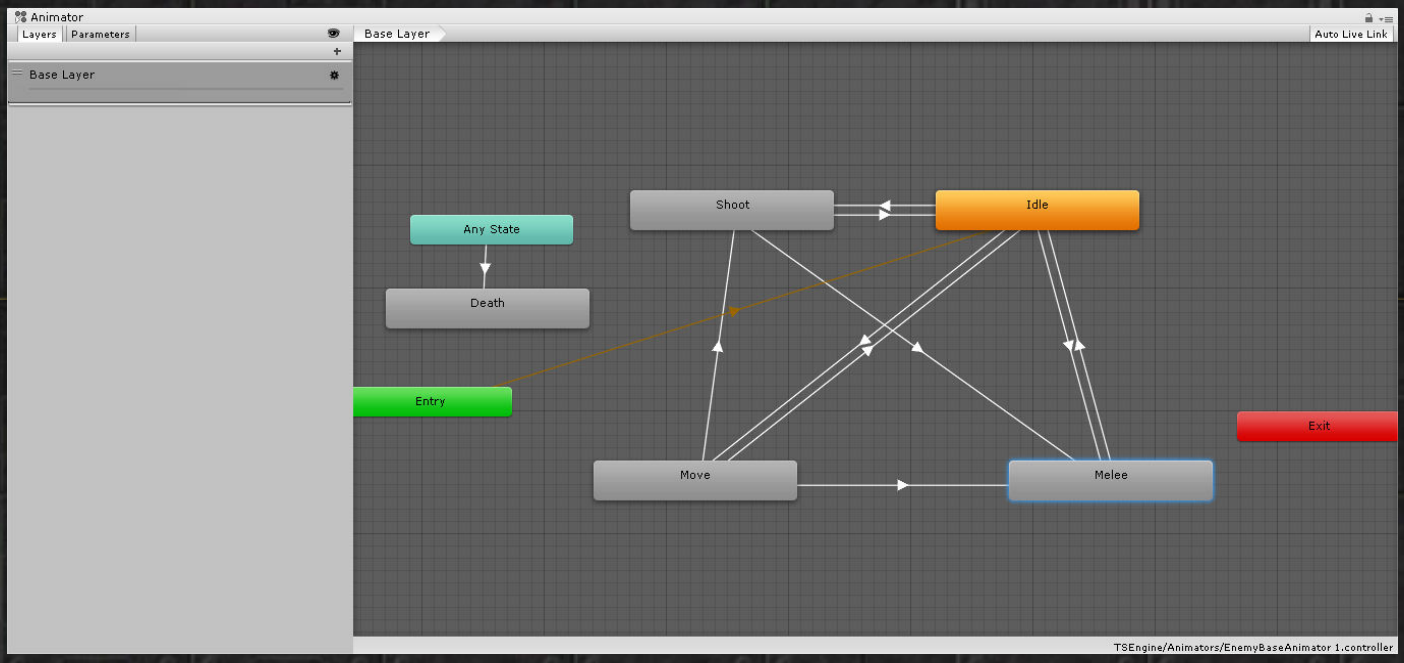
ENEMY ANIMATOR

If you follow this path in the Project window:

Assets > Animators

You can see EnemyBaseAnimator Animator Controller.This is the animator you should use as a base Animator for your Enemy.

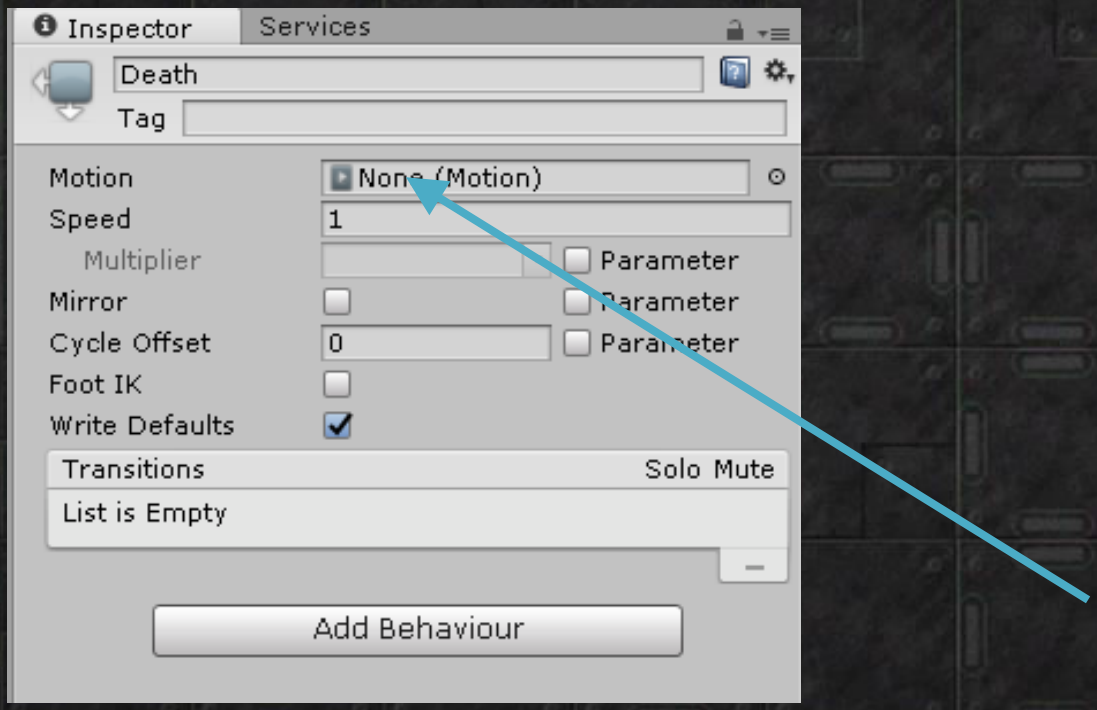
When you open it up you can see this window:



You can see five states there:

Shoot,Idle,Melee,Move and Death

All you have to do in order to make your animator work is to assign right animations in the state properties:

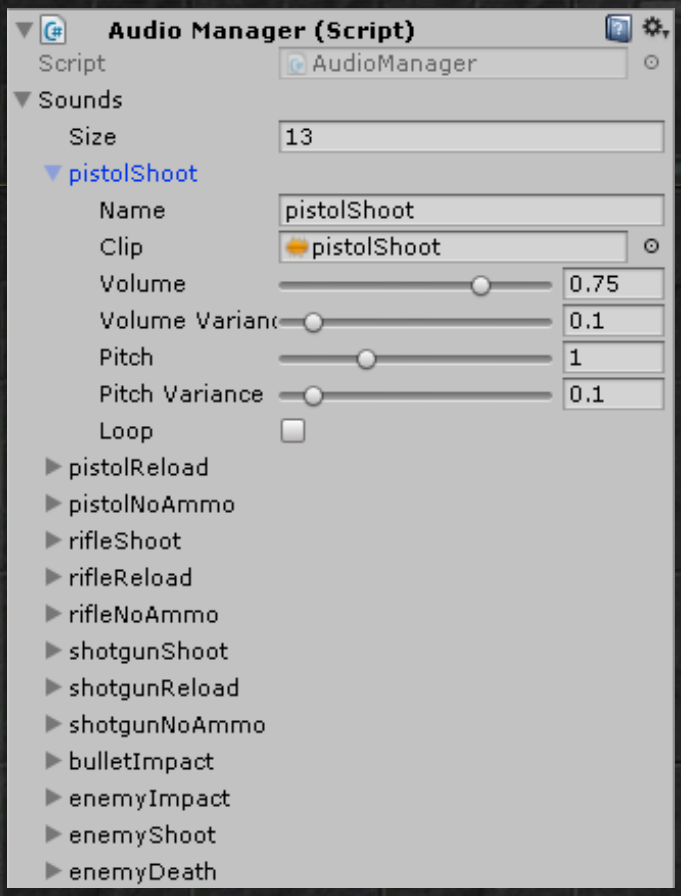


AUDIO MANAGER

For adding sound to your game you can use Audio Manger Script. First off,you should create empty Game Object and name it Audio Manager.After that you should add Audio Manager script to that Object.

If you don’t want to create everything from scratch you can use Audio Manager Prefab in the Prefabs folder.

You will be able to see this:



Variables description:

Size – Number of sounds

Name – Name of the sound,it has to be same as one you defined in the Weapon Scriptable Object

Clip – Audio Clip for that sound

Volume – Volume of the sound

Volume Variance – Amount of randomness in volume

Pitch – Pitch of the sound

Pitch Variance – Amount of randomness in pitch

Loop – Check this if you would like to loop the sound

Credits

Weapon Sound Effects obtained from :
https://www.zapsplat.com

Environment sprites obtained from :

www.zingot.com

TopDown survivor sprites obtained from :

https://opengameart.org/content/animated-top-down-survivor-player