Sound Effects And Audio Concepts

Sound Effects And Audio Concepts

Unity Audio Listeners And Audio Sources

- Unity uses Audio Source and Audio Listener components.
- Sounds are created by Audio Sources and are heard by an Audio Listener in the scene.

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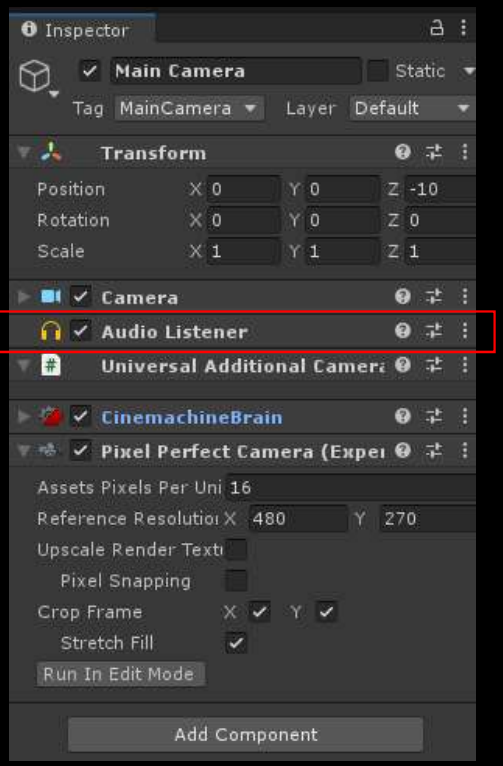
Unity Audio Listeners And Audio Sources

- Only one AudioListener component is allowed in a scene, and this is often found by default on the gameobject with the Camera component on it.



- You can place the AudioListener component on any gameobject in the scene. Sometimes you may not want it on your main Camera, especially if you have multiple cameras in the scene and you want to disable the main camera at some point.

- In the above example if you disabled the gameobject containing the AudioListener component, your game audio would be muted.

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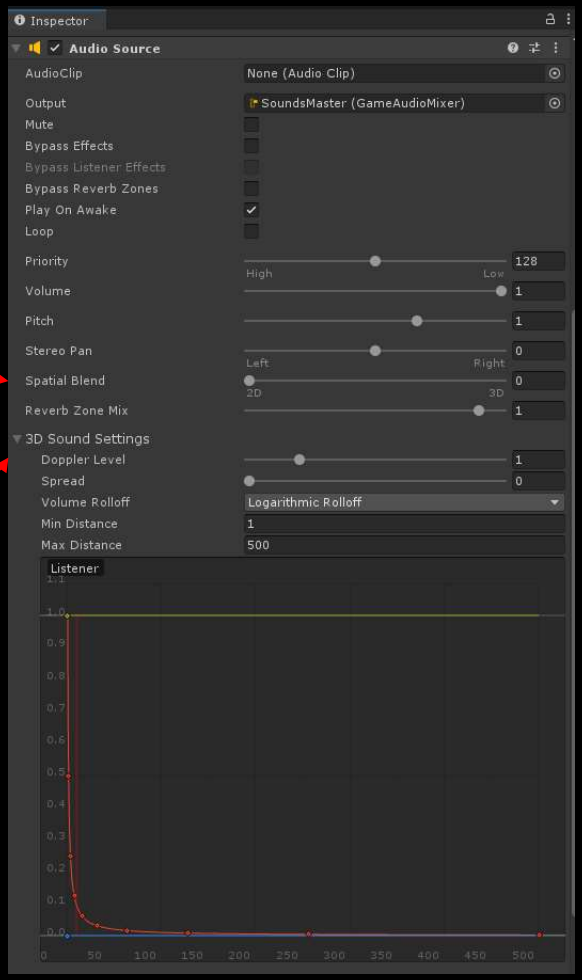
Unity Audio Listeners And Audio Sources

AudioListeners react to a number of different settings that you can control in the AudioSource components.

For example you can adjust the Spatial Blend of sounds between 2D (constant volume regardless of the distance from the AudioListener) and 3D (the AudioListener adjusts the sound based on distance and direction).

AudioSource components also have a number of other properties you can set for 3D sounds, for example the Volume Rolloff based on distance, Doppler Effect and the Sound Spread.



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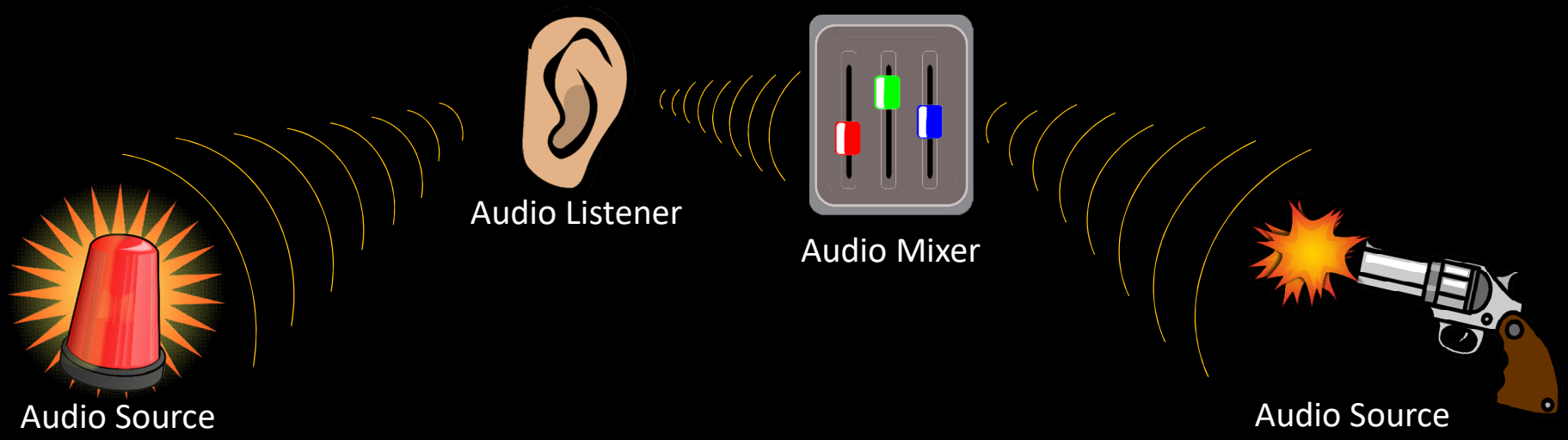
Unity Audio Mixers

Audio Sources can ‘output’ in 2 different ways .....



By default they output directly to the audio listener.

Alternatively they can output through an Audio Mixer which processes the sound before it sends it to the audio listener.

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What Is An Audio Mixer?

The Unity Audio Mixer is an audio asset that can be created in the Project assets (Assets -> Create -> Audio Mixer). The supplied Course Assets already includes an Audio Mixer to use in the project.

The Audio Mixer asset is a bit like the physical audio mixers you have probably seen. You can feed in audio inputs from multiple Audio Sources, add effects to them, and control their volume etc.

These inputs can be arranged in a hierarchy of mixers which all eventually feed into the 'Master Mixer' which feeds into the Audio Listener.

As you would expect you can control mixers from within code. You can 'expose' values from the mixers as parameters, for example the mixer volume, and these parameters can be used to change their values.

You can also create things called 'Snapshots'. A Snapshot is a particular combination of settings in a mixer that has been saved as a 'snapshot'. Like exposed parameters you can access snapshots from within code, and transition between them, for example to transition between a low volume snapshot and a high volume snapshot.

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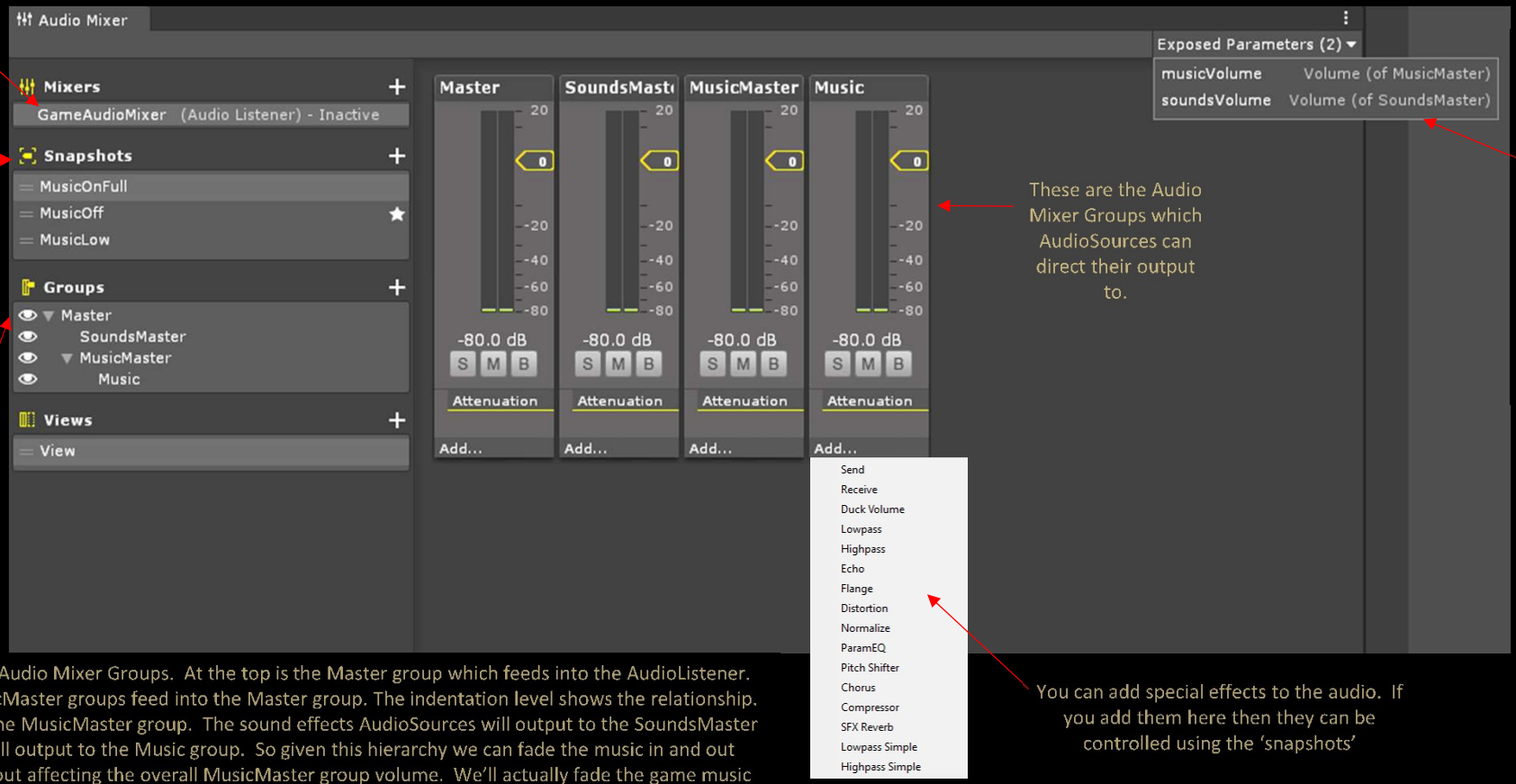
The Audio Mixer Supplied With The Course Assets Viewed In The Audio Mixer Tab

This is the asset name of the Audio Mixer

These are the Snapshots – they capture a specific configuration of an Audio Mixer Group (the Music group in this case)



These are the Audio Mixer Groups which AudioSources can direct their output to.

These are exposed parameters – so here we can see that the volume of both the MusicMaster and SoundsMaster Audio Mixer Groups are exposed to code (using the parameter names musicVolume and soundsVolume). You actually expose the parameters in the Project Assets through the inspector.

In the future, we'll develop a menu to allow us to control the game music volume level by changing the MusicMaster volume level, and the game sound effects volume level by changing the SoundsMaster volume level.

This is the 'hierarchy' of the Audio Mixer Groups. At the top is the Master group which feeds into the AudioListener. The SoundsMaster and MusicMaster groups feed into the Master group. The indentation level shows the relationship. The Music group feeds into the MusicMaster group. The sound effects AudioSources will output to the SoundsMaster group. The game music will output to the Music group. So given this hierarchy we can fade the music in and out using the Music group, without affecting the overall MusicMaster group volume. We'll actually fade the game music in and out using the Snapshots we've defined, and transitioning between them in the code.

You can add special effects to the audio. If you add them here then they can be controlled using the 'snapshots'

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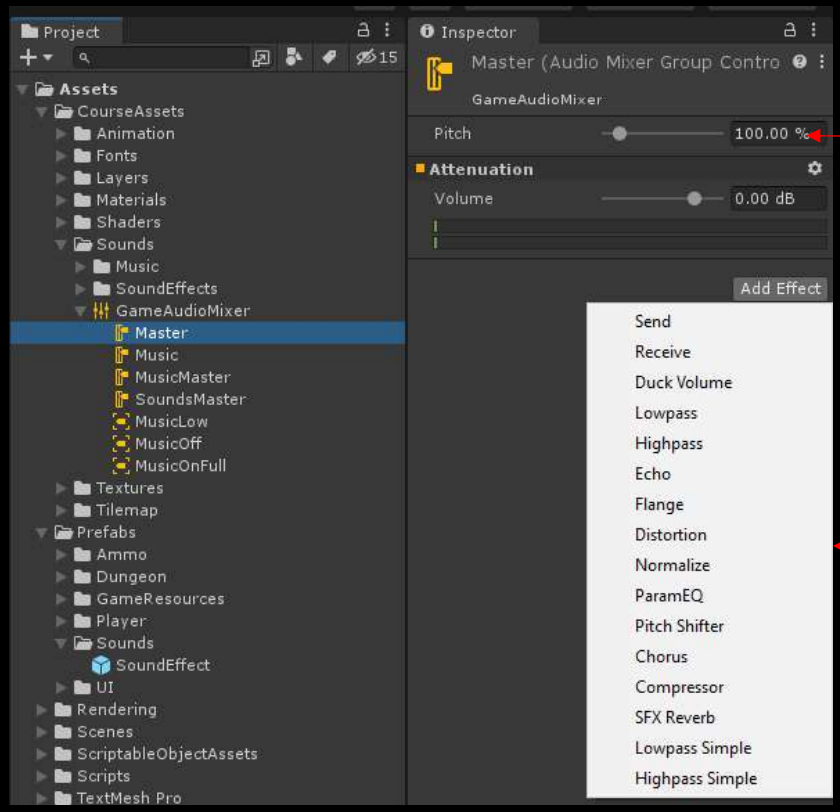
The Audio Mixer Supplied With The Course Assets As Viewed In The Project Assets



You can 'expose' values to code through parameters by Right Clicking and selecting the expose option.

You can add special effects to the audio in the inspector. If you add them here then you need to 'expose' them through parameters if you want to set them in code. If you set them in code they will override any snapshot settings.

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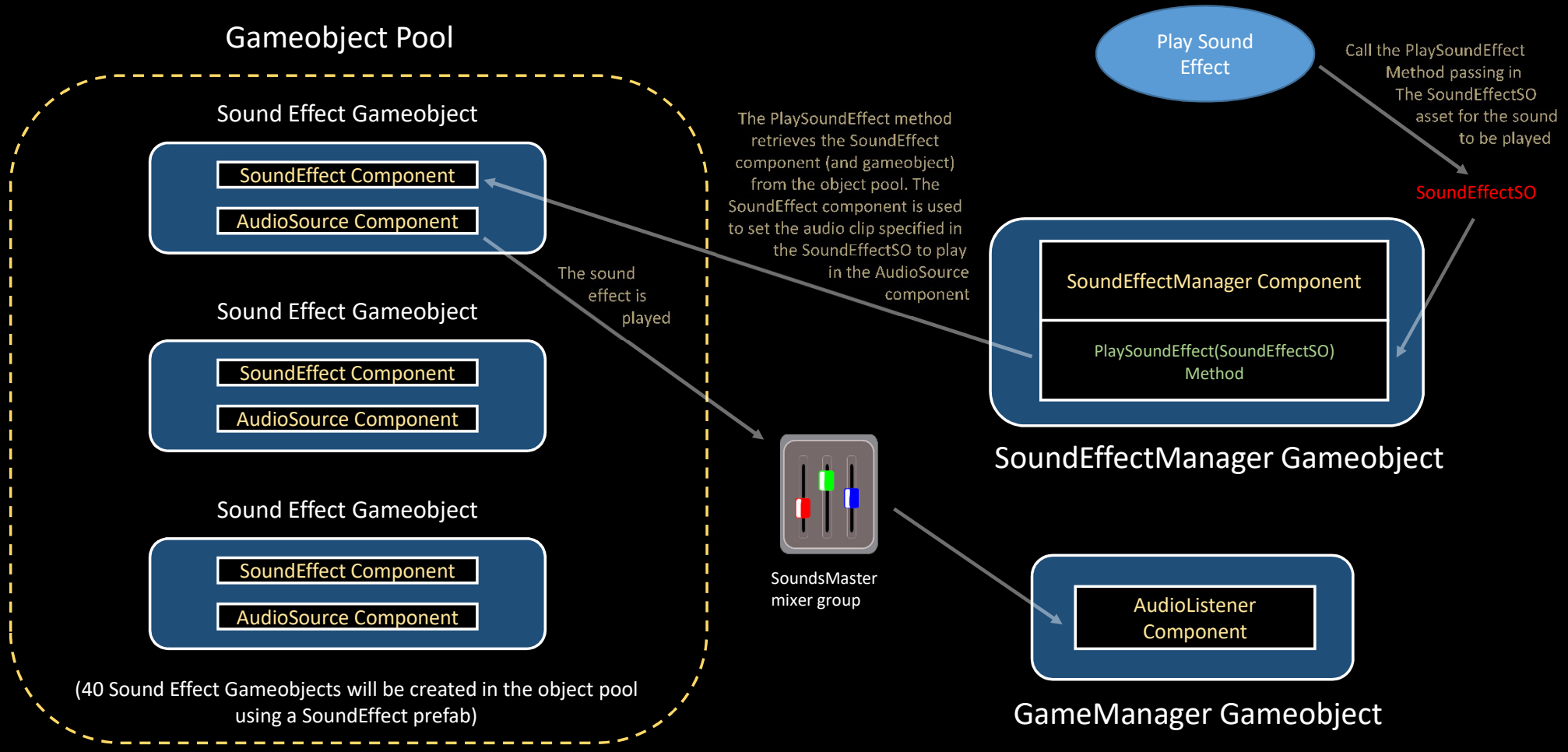
Game Object And Component Structure



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Sound Effect Sound Classes - SoundEffectSO

SoundEffectSO

```
public string soundEffectName;
public GameObject soundPrefab;
public AudioClip soundEffectClip;
[Range(0.1f, 1.5f)]
public float soundEffectPitchRandomVariationMin = 0.8f;
[Range(0.1f, 1.5f)]
public float soundEffectPitchRandomVariationMax = 1.2f;
[Range(0f, 1f)]
public float soundEffectVolume = 1f;
```

- A scriptable object asset will be created for each sound effect.
- The SoundEffectSO will contain details of the Audio Clip to be played and all the sound effect parameters we want to control.

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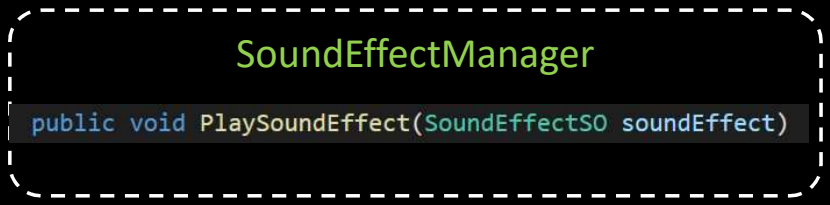
Sound Effect Sound Classes – Sound Effect Manager



- The SoundEffectManager class is a Singleton component that will be added to the SoundEffectManager in the scene. This singleton can be accessed through a static instance variable.
- It has one publicly facing method to play a sound effect. This method will retrieve a SoundEffect component (and gameobject) from the object pool. It uses the SoundEffect component to set the audio clip specified in the SoundEffectSO to play in the AudioSource component.
- The PlaySoundEffect method then sets the sound effect gameobject from the pool to active to play the sound.

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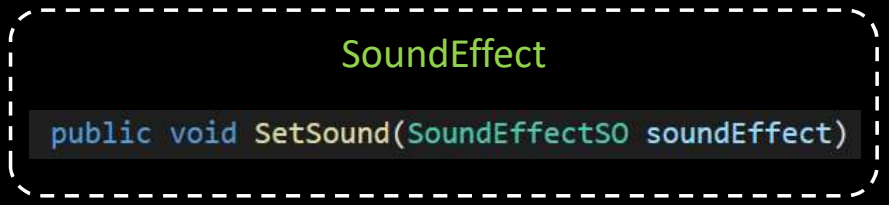
Sound Effect Sound Classes - SoundEffect



- The SoundEffect class and AudioSource class are added as components on the SoundEffect prefab. This prefab is used to create SoundEffect game objects in the object pool.
- The SoundEffect class has one publicly facing method to SetSound.
- This method is invoked by the SoundEffectManager, after it retrieves a SoundEffect game object from the object pool, to populate the AudioSource component with the clip to be played, the volume and the pitch.
- The SoundEffectManager then sets the SoundEffect gameobject to active to play the sound.