

Learn Unity

Free eBook: Creating 3D games



By
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This is an ebook that teaches 3D game programming with Unity.

We build a terrain and add there trees, grass, water, wind, clouds and other objects

Later we use 3D constructions and add there different kinds of objects...

We also add dancers to the project and use personal camera...

Feedback is welcome!

Thank you!

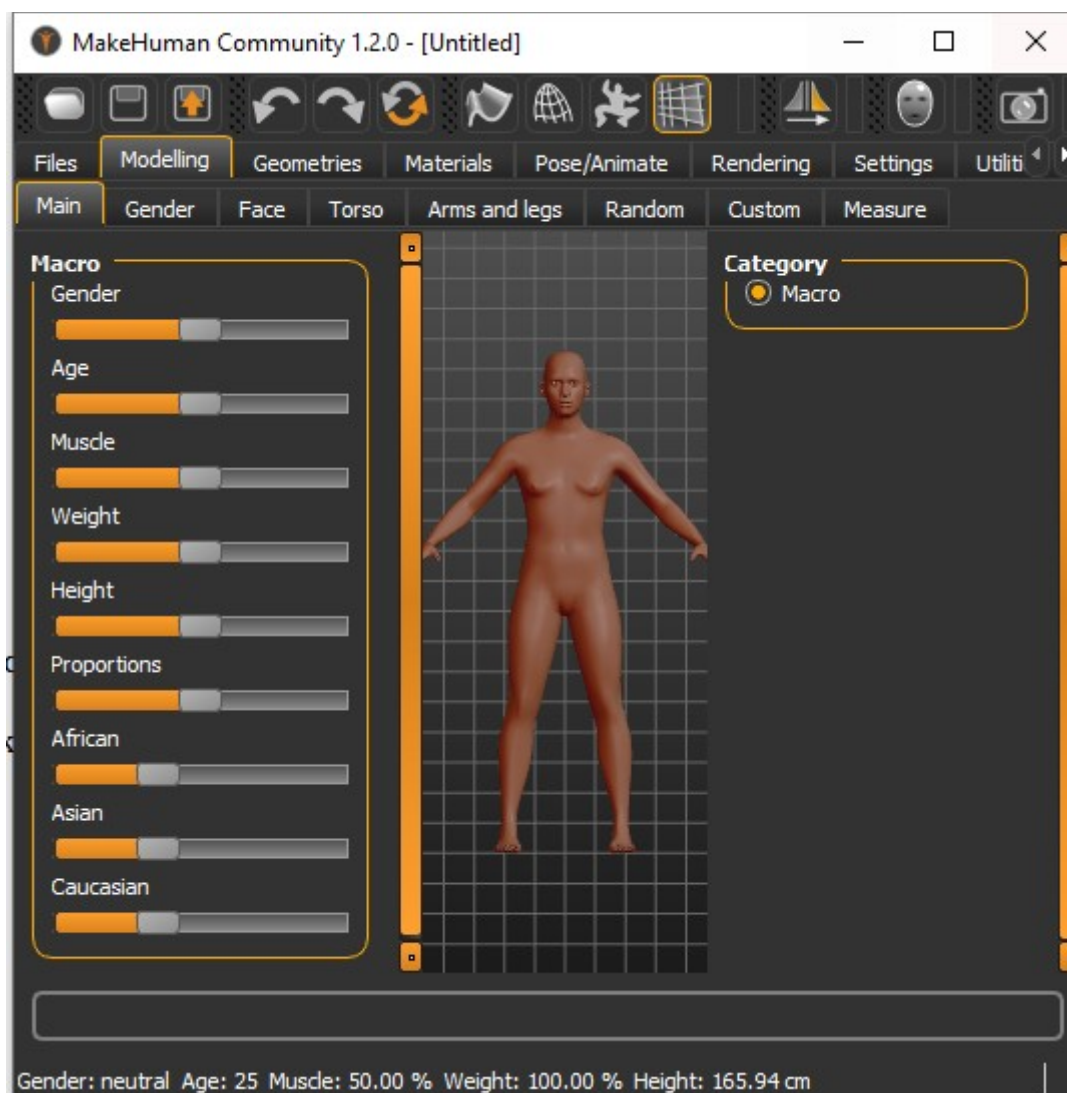
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Characters

Take a look at tools like MakeHuman and Mixamo.

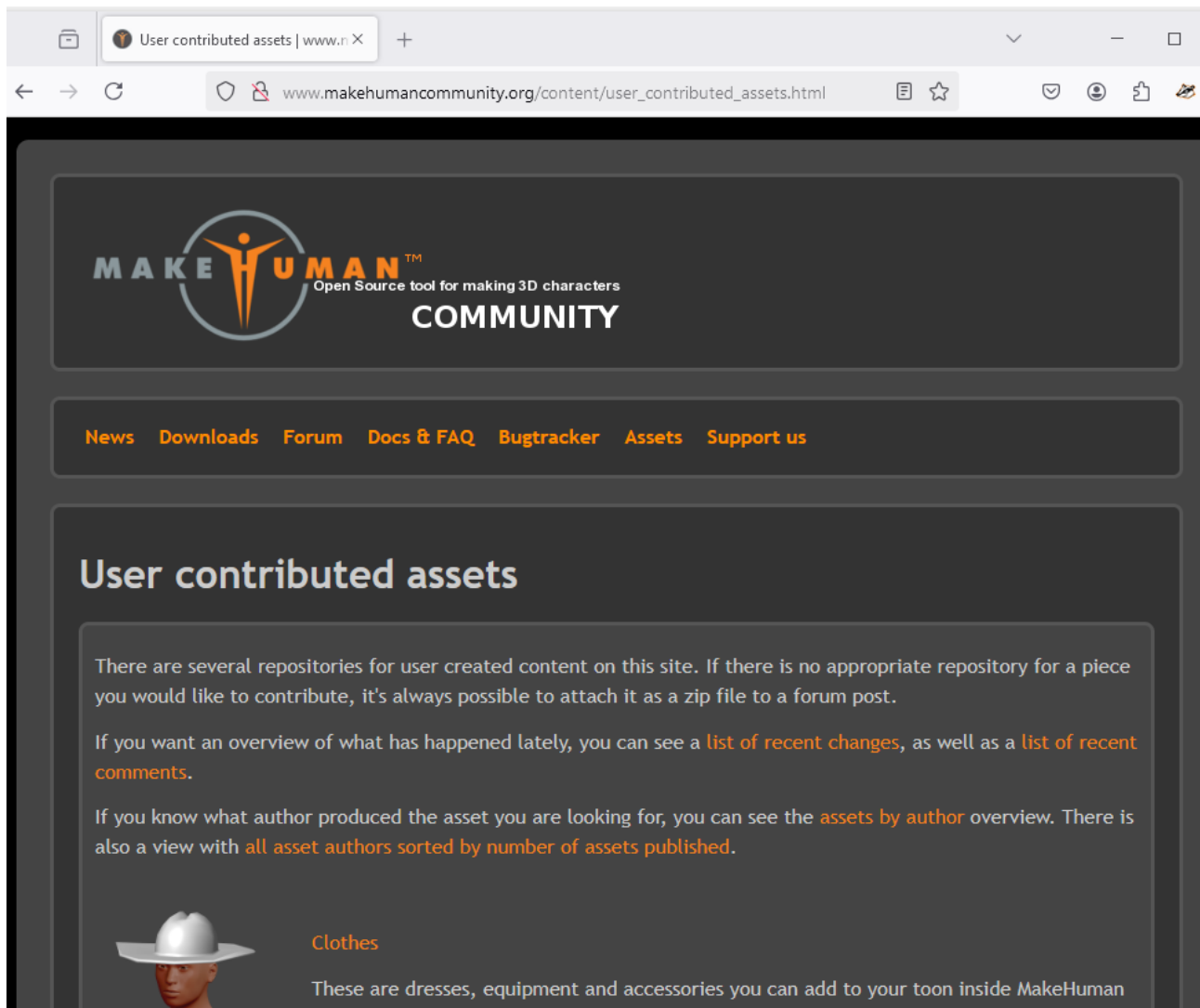
MakeHuman



With this tool you can create characters that can be taken to Unity project.

You can download makehuman and install it.

From makehuman web site you can also download new assets.



Add properties to the character, e.g. here is one example:



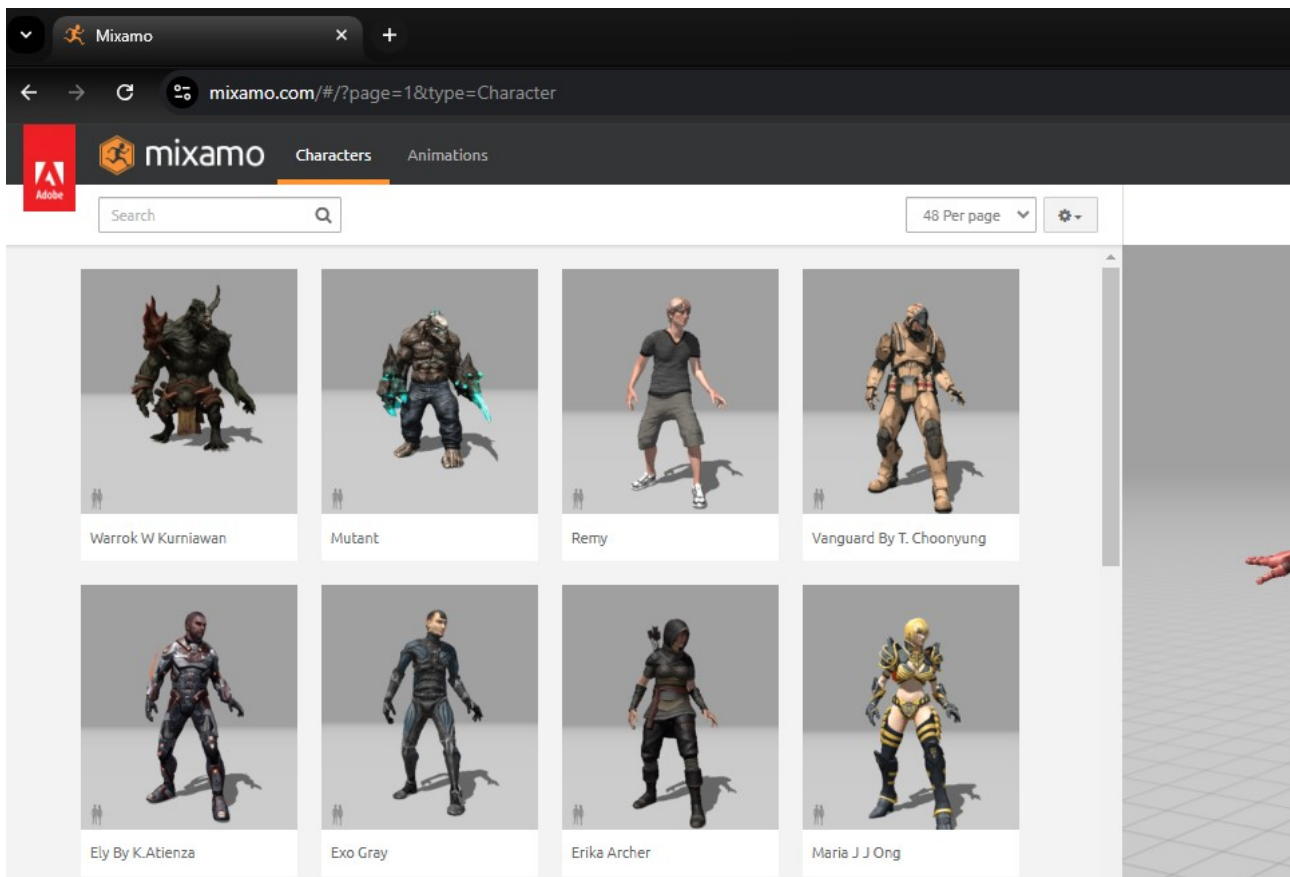
When you are ready, download the result in right format:



You can upload makehuman character e.g. to Mixamo and add animation to it.

Mixamo

Mixamo is an online tool



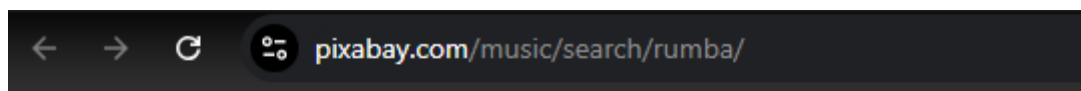
How to get free dance music?

Let's try Youtube AudioLibrary...

There are also other good sites to get free music...

We can try also to generate sounds with some free online tool...

Example



pixabay

62+ Rumba no copyright music

Starting 3D project

Create a 3D project: now we can create e.g. 3D core project.

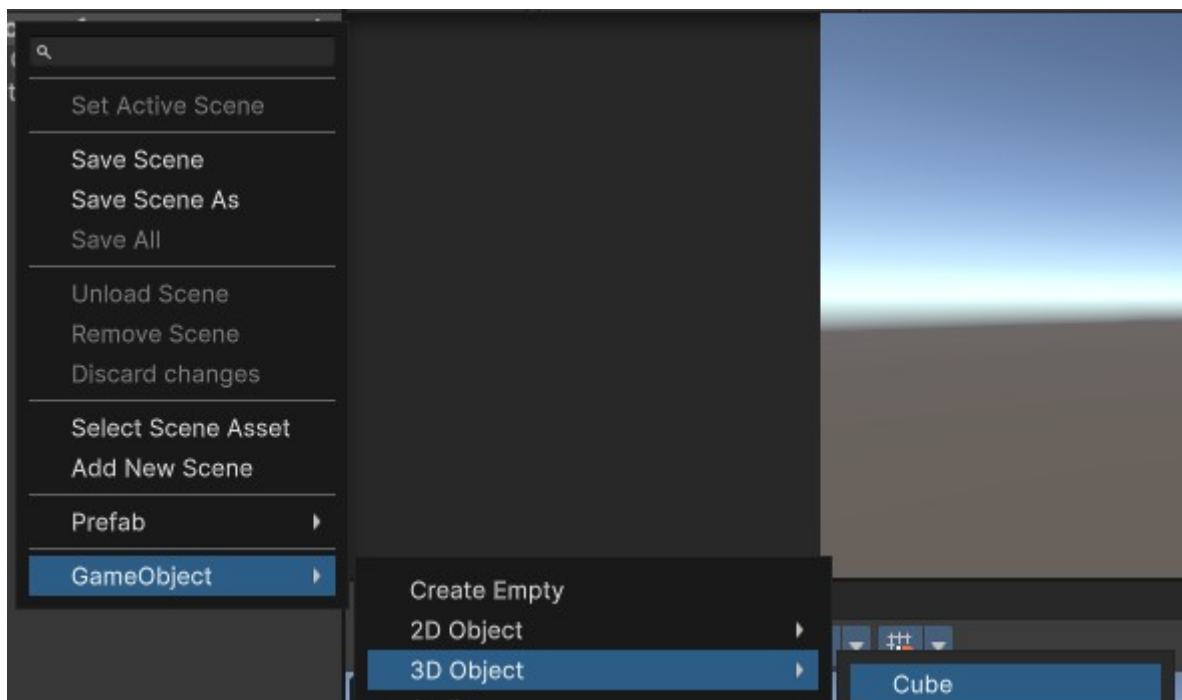
Orientation

Normally I use this orientation:

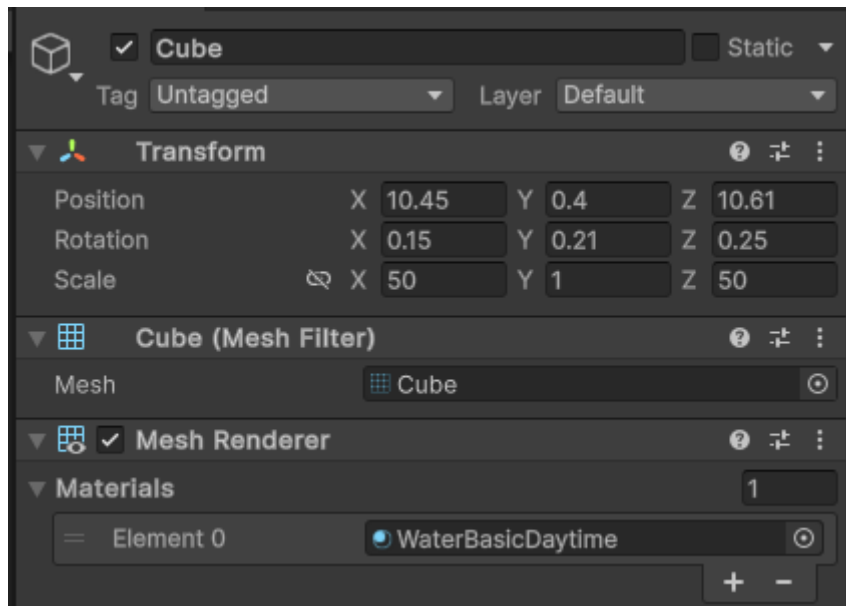


Example: basics and simple platform

We add first the floor: it can be 3D Object, Cube.



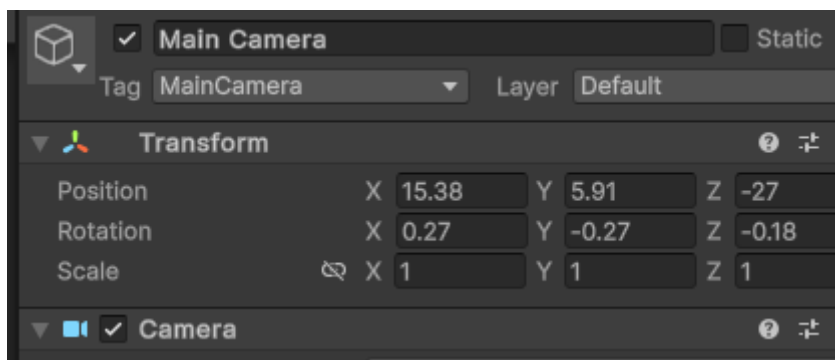
I have these field values added to cube



Try to find values for coordinates and scale so that floor is seen well in Scene part and in Game part...

Note: I have changed floor colour - it is now blue. You may have some colours to be used in your project - check by choosin Mesh Renderer and Materials!

You can also change camera values if needed. I have these values:

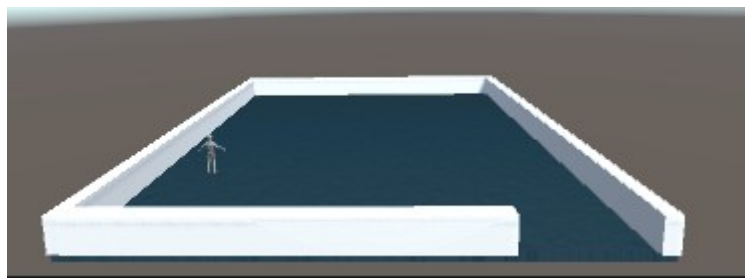


Now you can add walls: just cubes. Adjust their values.
Here is one wall:



Make one wall ready and then copy and edit it...

Final arena looks like this.



In this first example we just put there an object that we can move with arrow keys or maybe with mouse...

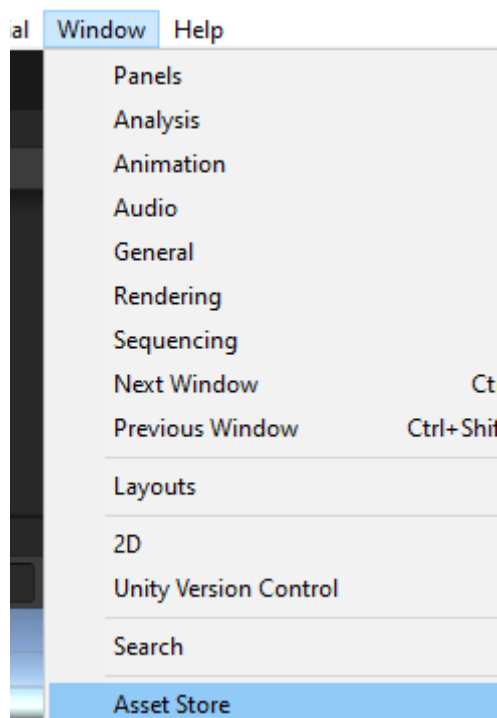
Then we add there objects that have to be pushed to some defined place.

Example 2: player in the project

Now we take a look at the player.

You can get it easiest by importing Starter Assets to your project.

Open Windows menu and choose Asset Store:

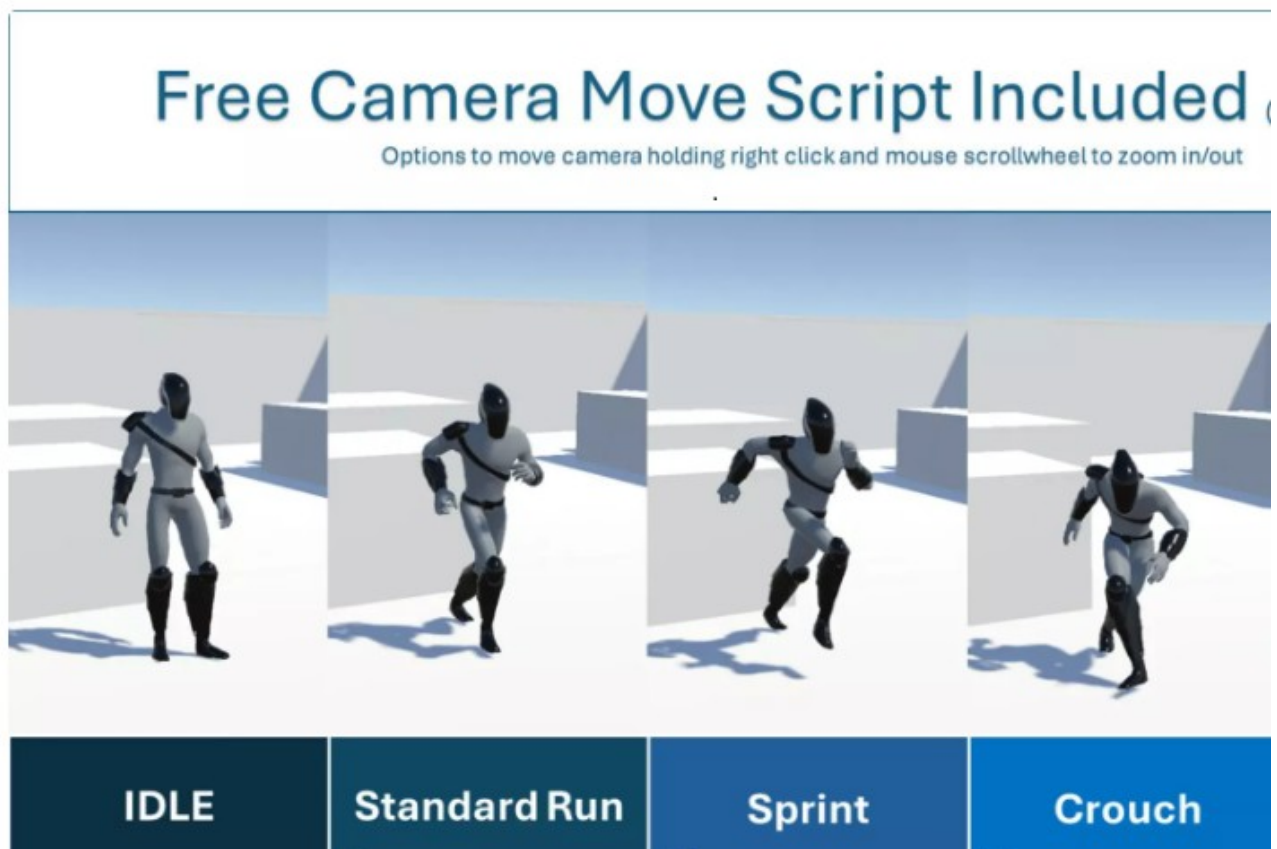


You can search for Starter Assets and there 1. or 3. person character.

Add free 3. person character

There are also other choices. Here is one smaller package:

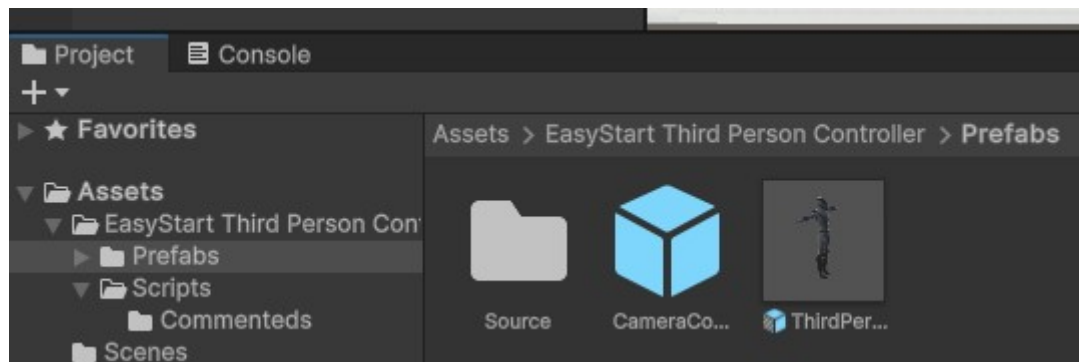
assetstore.unity.com/packages/tools/game-toolkits/easystart-third-person-controller-278977

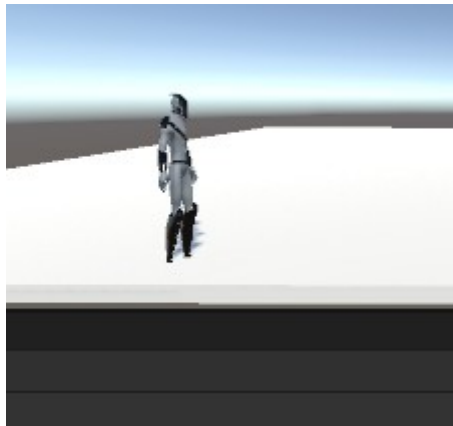


You can download, import and open it in Unity project.

First you can create a platform: 3d cube is ok in this case. Just add it and change size and position...

Then you can add the person to your project.



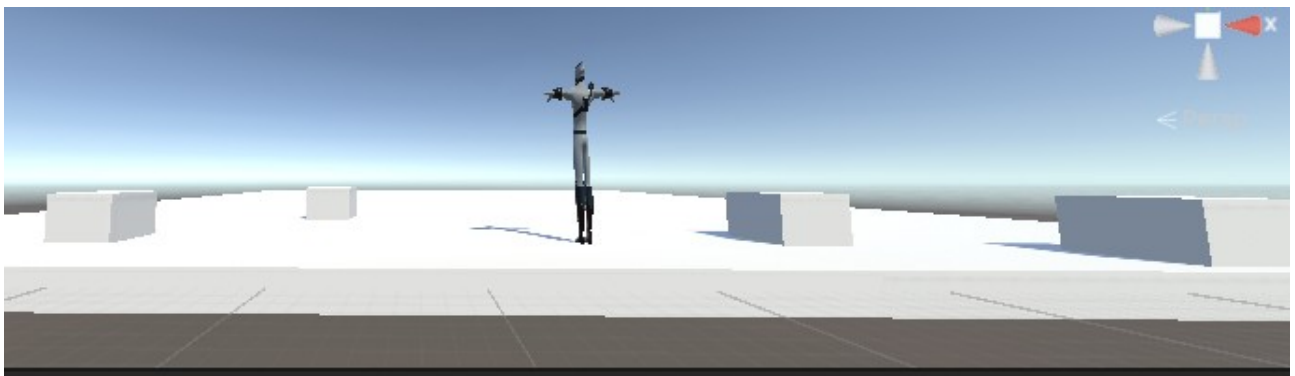


Add basic objects

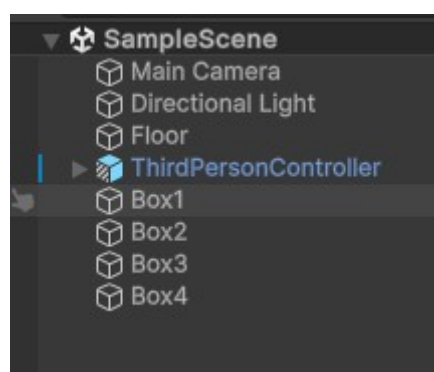
Add there some 4 smaller cubes.

Then add rigidbodies and colliders.

Idea is to push smaller cubes away from the floor.



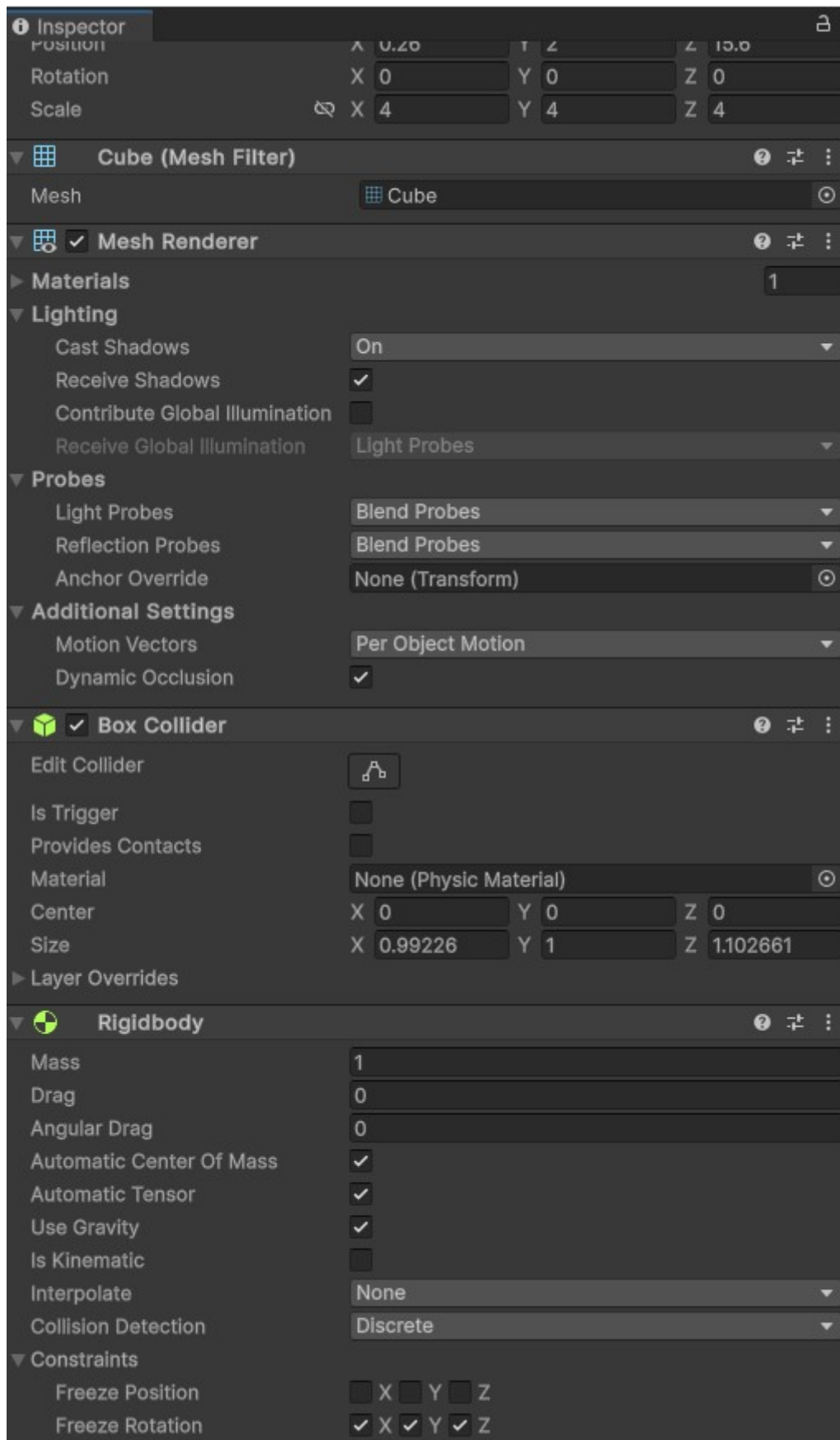
Here you see objects in my scene's hierarchy:



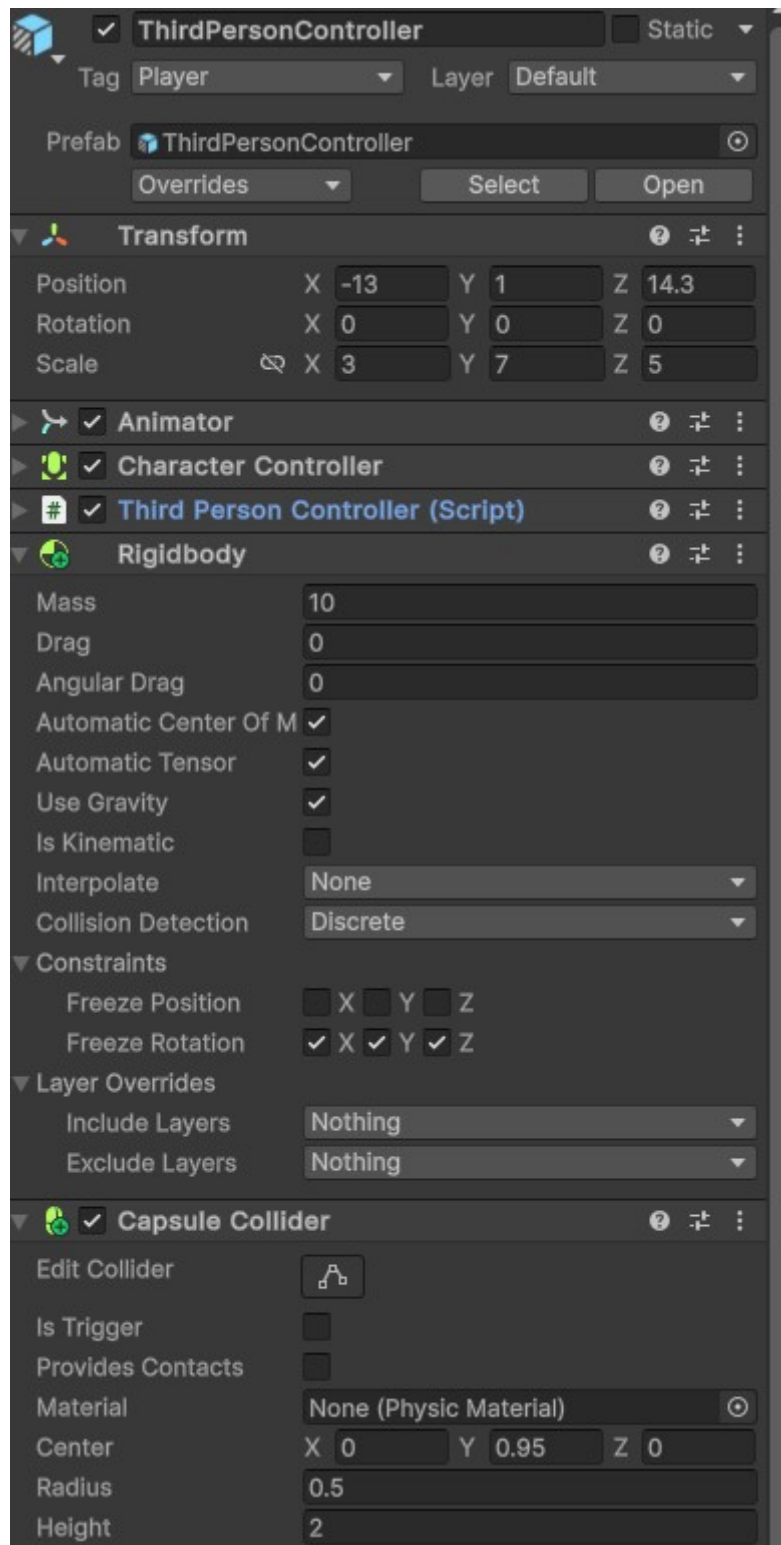
Floor settings



Box settings



Third person settings

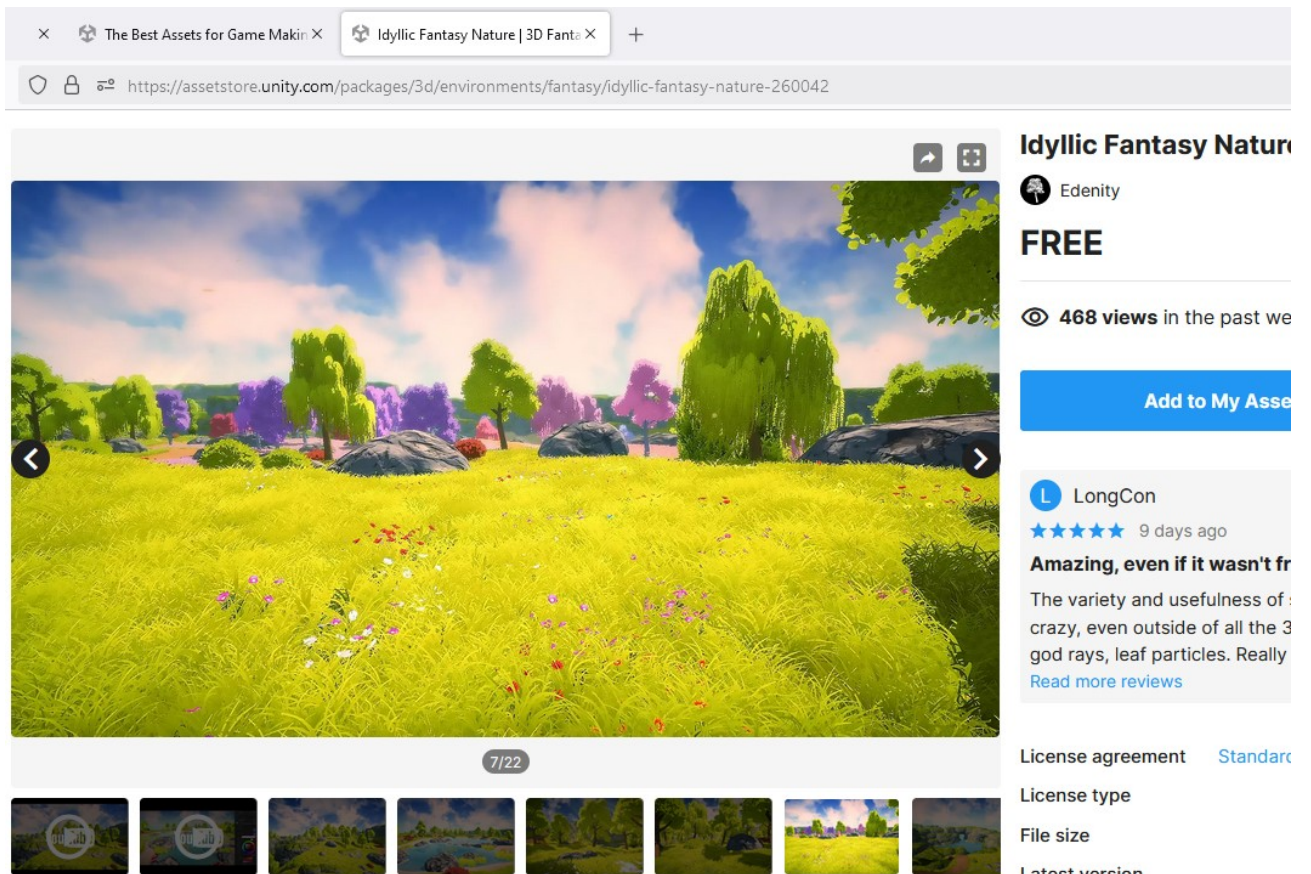


You can try with own values...

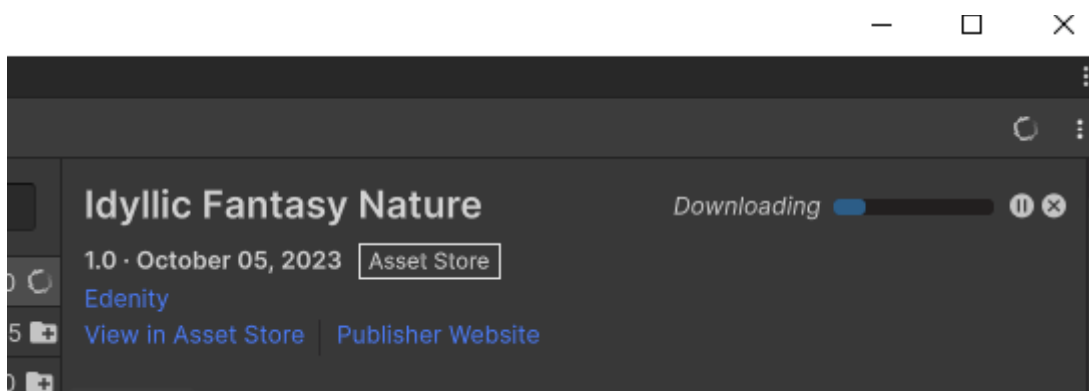
Let's make the game world a bit richer!

Skybox

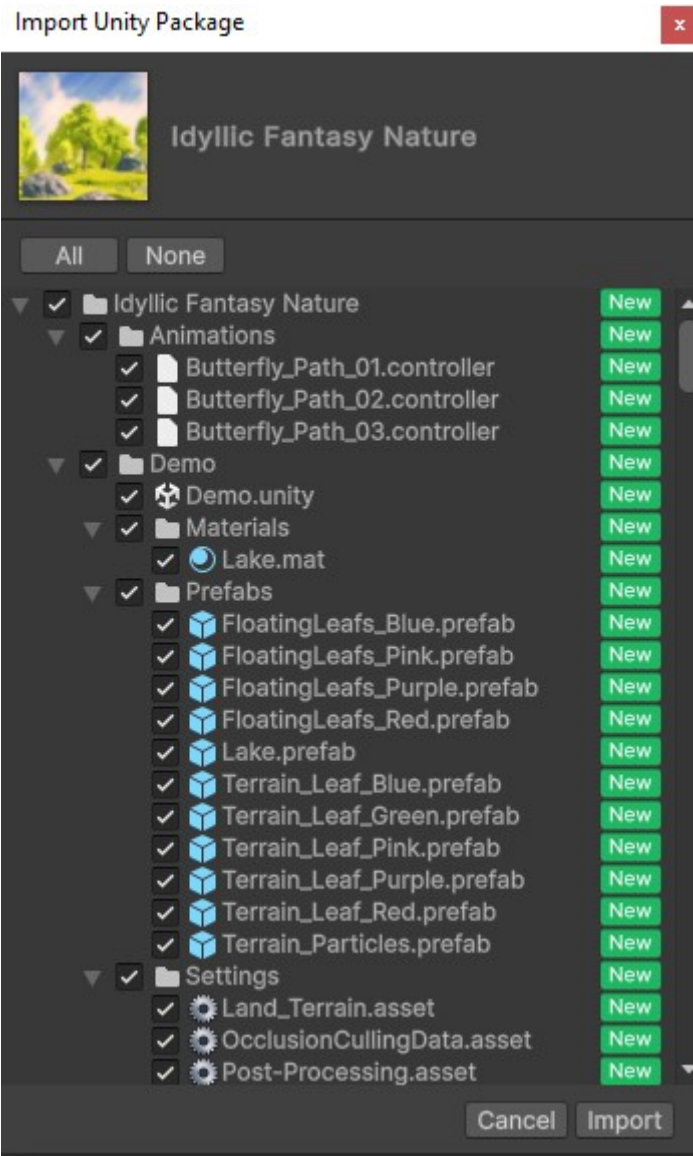
Here is one example: skybox



Download



Then Import

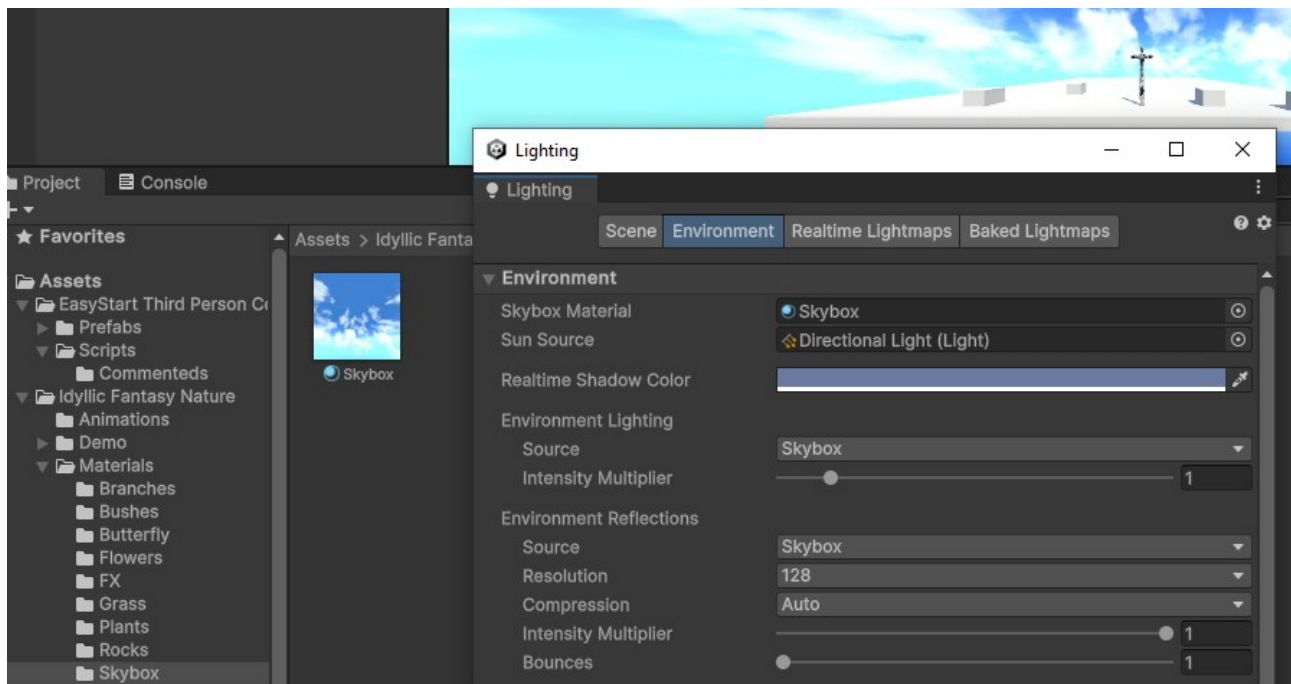


Let's try to change default skybox.

Choose

Window -> Rendering -> Lighting -> Environment

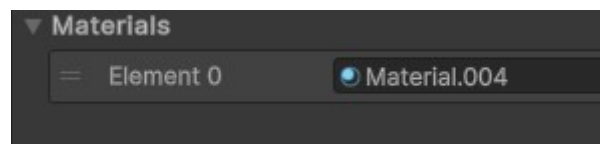
We just imported assets to our project. Search for skybox and replace the default!



Scene looks better now (I think)



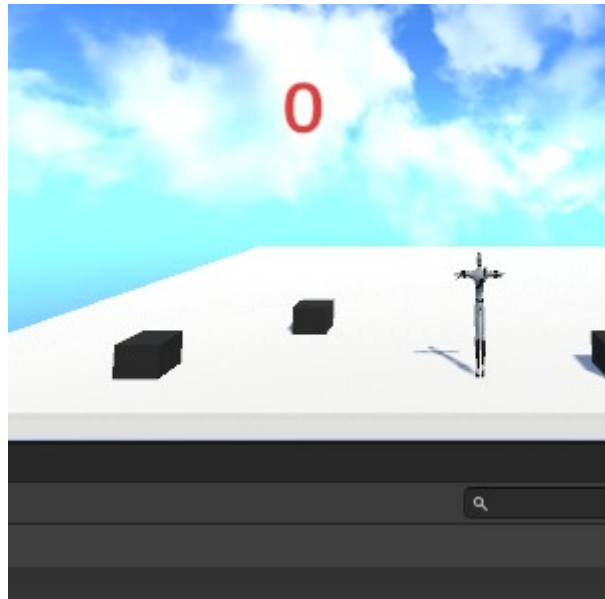
I also changed the material of boxes: when we added new assets we got also many materials that we can now use for boxes.



The game is not so funny yet: we can add there time taking first.

Add text component

Add there a text component:



Add code 1

```
using UnityEngine.UI;
using TMPro;

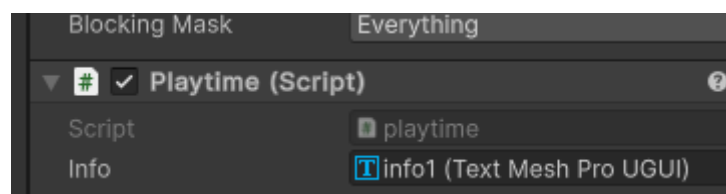
public class playtime : MonoBehaviour
{
    public TMP_Text info;
    void Start()
    {
    }

    float timer = 0.0f;

    void Update()
    {
        timer += Time.deltaTime;
        int seconds = (int)(timer % 60);
        info.text = "" + seconds;
    }
}
```

Add code to Canvas object.

Then drop your text component to script's field.



A bit better game?


Let's go on!

Add free trees from Assets

Nature needs something: let's add trees

We can create own hills, trees, grass and so on with Unity's own tools.

Now we take some trees from Assets.



Free Trees

Ada_King 🇺🇦

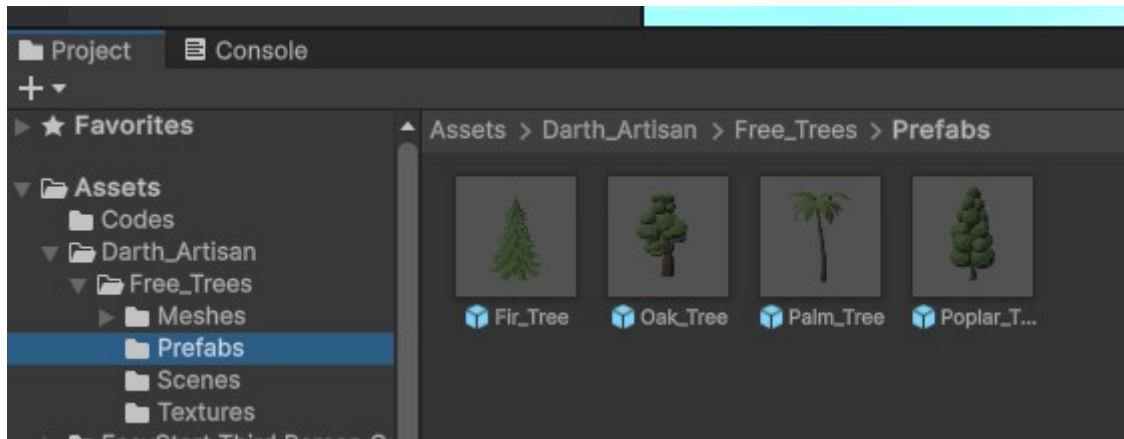
FREE

👁 999 views in the past week

[Add to My Assets](#)

>

- License agreement [Standard](#)
- License type
- File size
- Latest version
- Latest release date
- Original Unity version ⓘ



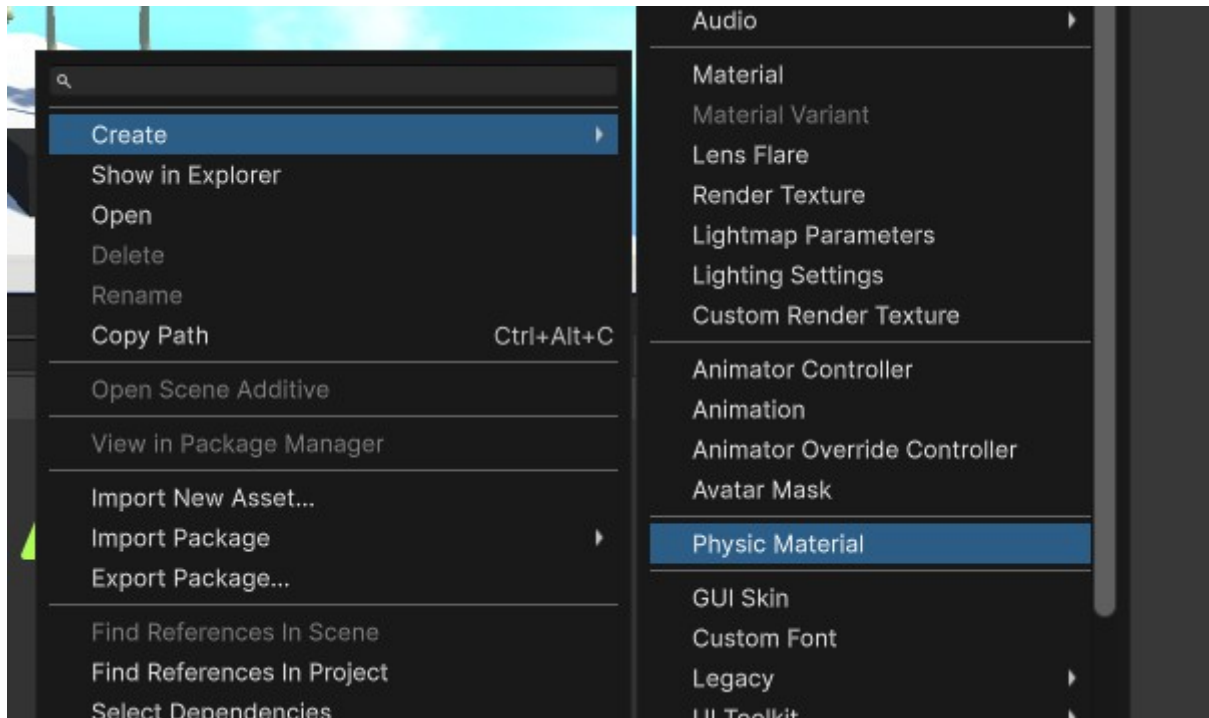
A bit better



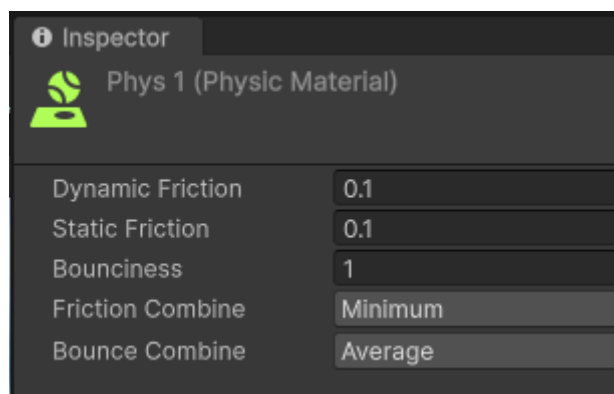
Add jumping balls

Then we add more features: spheres that are deleted when player touches them.

We can add there 4 balls that are jumping. To get balls jumping we have to create physical material and add it to balls.



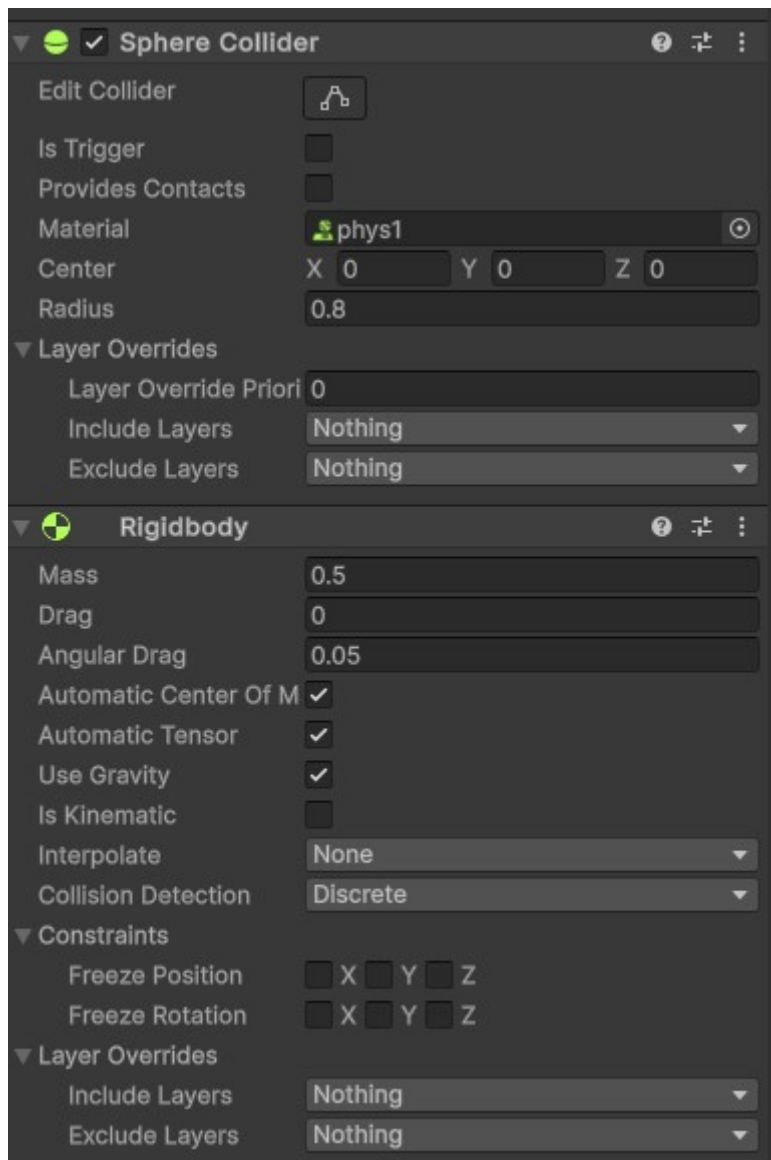
Bounciness is taken into account here



Add spheres:



Then materials and rigidbody



Test: balls are jumping!

Add collision detection

Now we add collision detection

When collision is detected, ball is deleted.

So, we need code now!

It easier to see how code works when we make balls public:

```
public GameObject ball1, ball2, ball3, ball4;
```

So, we have to add real objects to those public variables before running the code.

Collision detection is here:

```
private void OnCollisionEnter(Collision collision)
{
    if (collision.collider.name == "Ball1")
    {
        GameObject.Destroy(ball1);
    }
    if (collision.collider.name == "Ball2")
    {
        GameObject.Destroy(ball2);
    }
    if (collision.collider.name == "Ball3")
    {
        GameObject.Destroy(ball2);
    }
    if (collision.collider.name == "Ball4")
    {
        GameObject.Destroy(ball4);
    }
}
```

So, just to make all more visible we have these if-statements for every ball. We could also be able to use Tag-property...


Deleting balls

Now we add script to our player: when player touches some of those balls, ball is deleted.

We take a new 3. person character from assets first.


Search for Starter Assets - here is again one choice!!

Let's now go on first by using starter assets 3. person scene.


 Investor


★★★★★ (428) | ❤️ (11348)

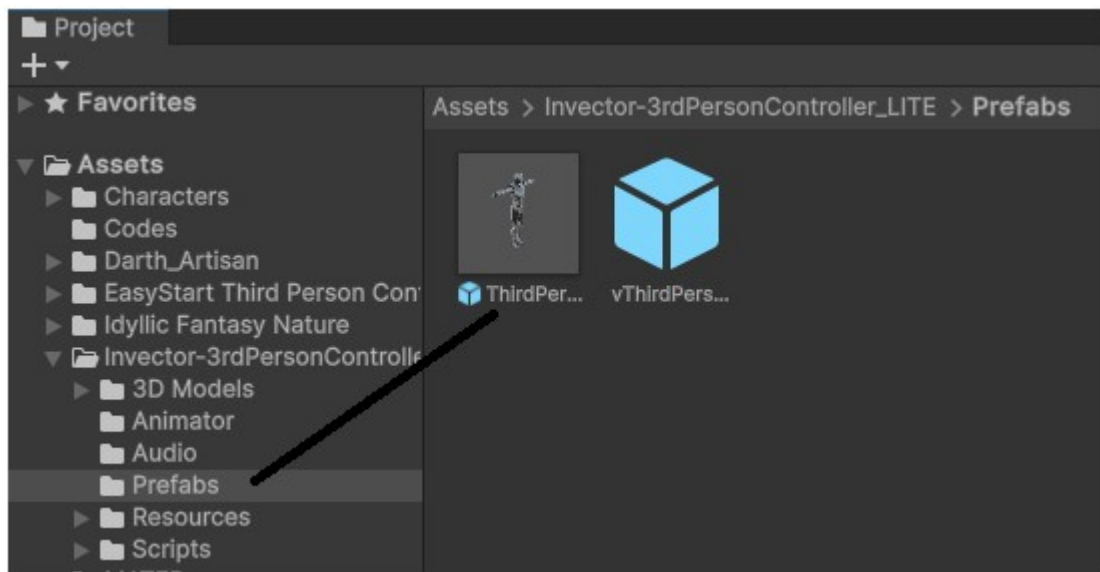
FREE

 **1377 views** in the past week

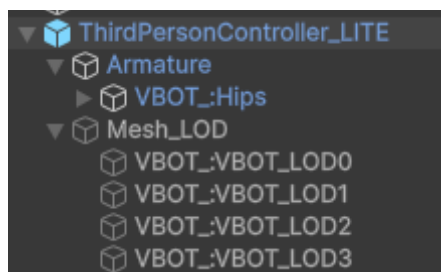
Open in Unity



License agreement	Standard Unity Asset Store EULA
License type	Extension Asset
File size	57.8 MB
Latest version	2.0
Latest release date	Jan 20, 2020
Original Unity version 	2018.4.12 or higher
Support	Visit site



Here character is inside Hierarchy:

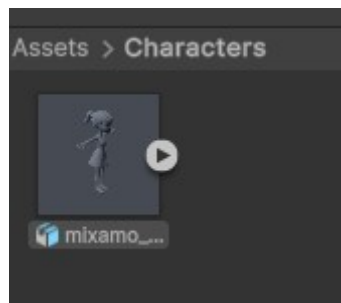


Add Mixamo character

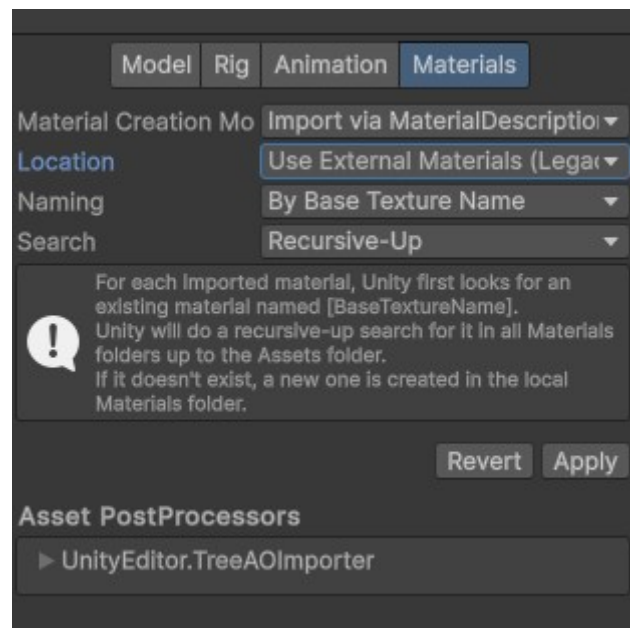
Now we add a new character to the project. It comes from Mixamo.



Here it is first inside assets

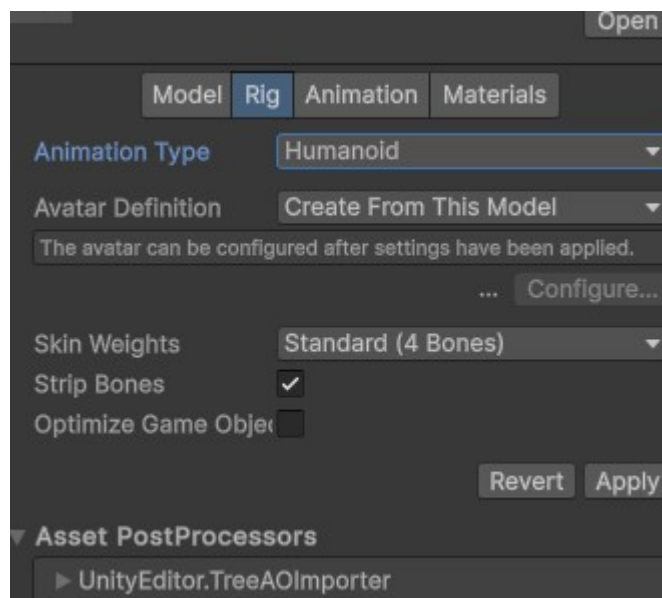


Settings 1

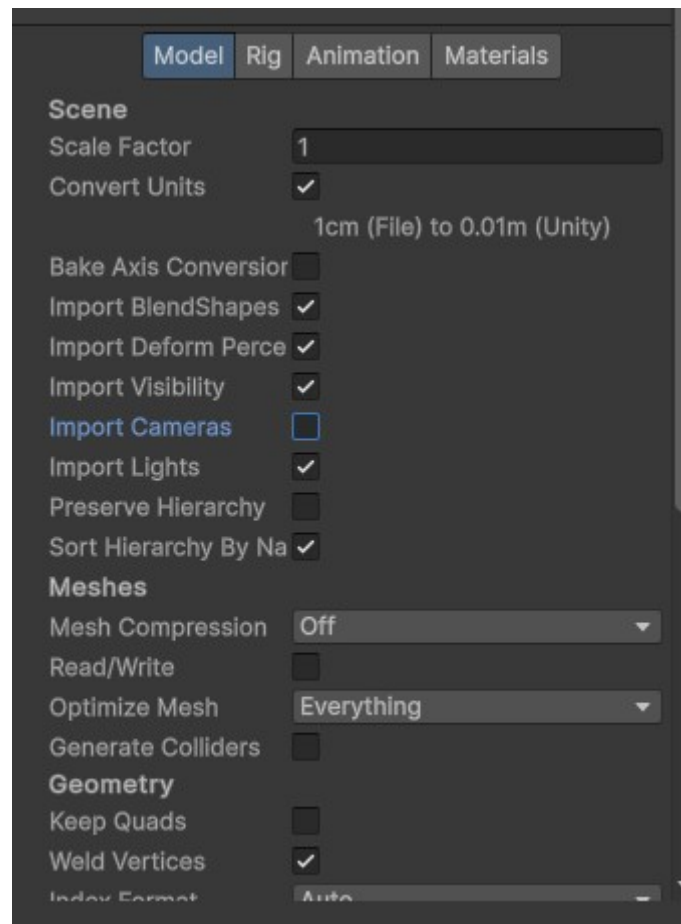


Remember **apply...**

Settings 2



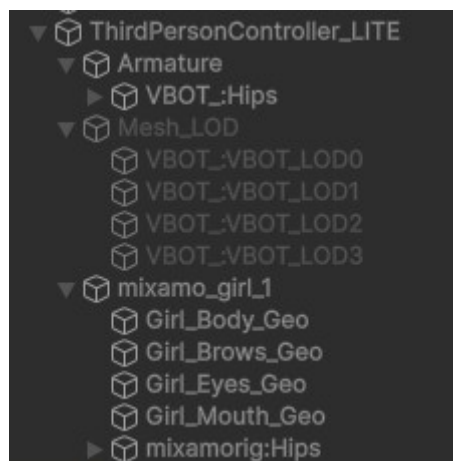
Settings 3



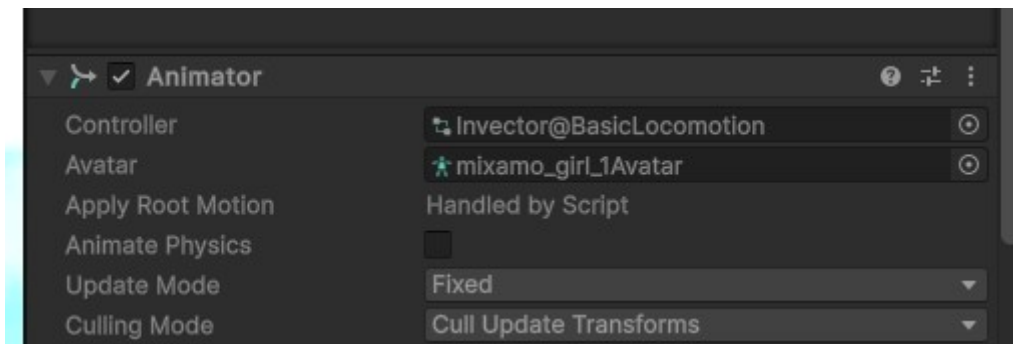
Now add new character to our previous 3. person character.

Result is seen!

Mixamo is added to ThirdPersonController.



Avatar has to be changed, too.



Try it.



Try to move Mixamo-character!

Create stairs

Oh no, there is a problem: player has to work a lot and is getting hungry: we have to find food!

Fortunately, there are coconuts! How to catch them?

Now we add a new feature to our project: player has to build stairs to be able to pick a coconut from the palm.

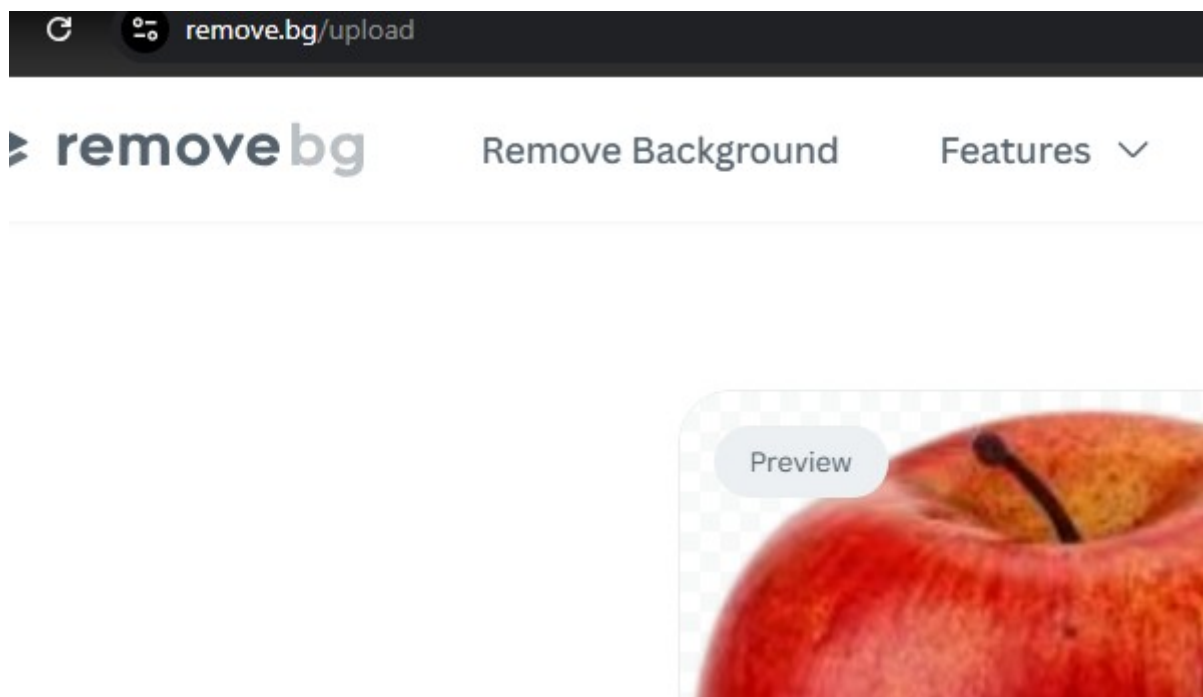
We have to find coconut or draw it ourselves. We try assets first.

For stairs we have some cubes. their heights vary and you can move them so that it is possible to reach the coconut!

We take apple now:

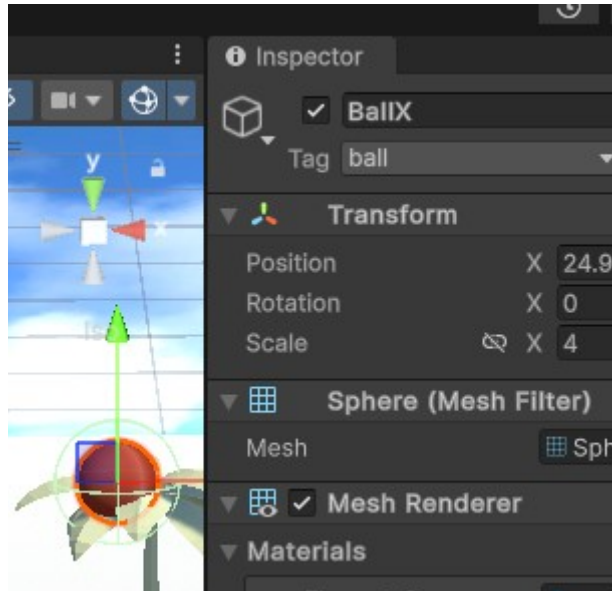
find apple image and remove background color.

Here is one place.



Add an apple object

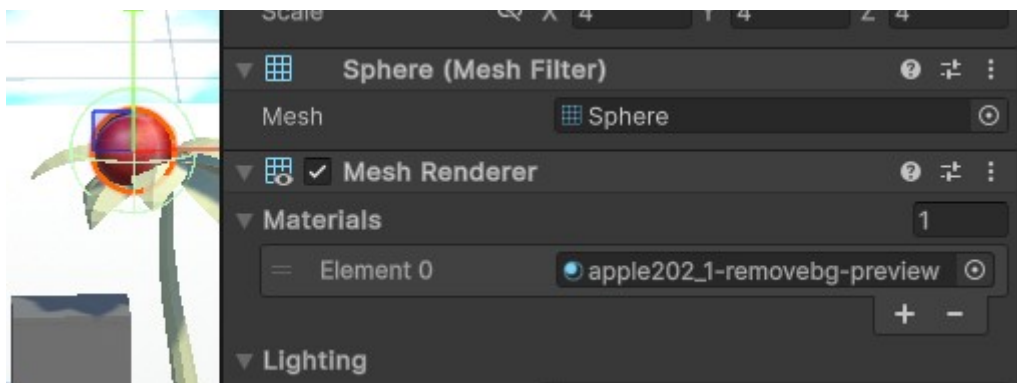
Add extra ball to you project first.



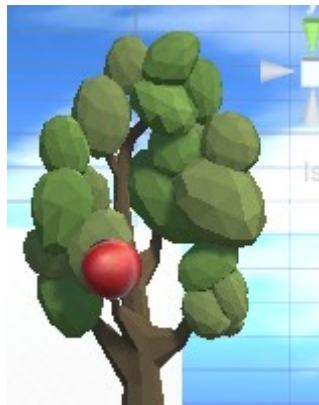
Make it kinematic - it does not fall down as other balls ..

Then take apple to Unity project and replace material.

Assign apple image to box:



Now the apple is in the tree:



Add apple collision to the code, too.

Add some 4 cubes that then form a stairs.

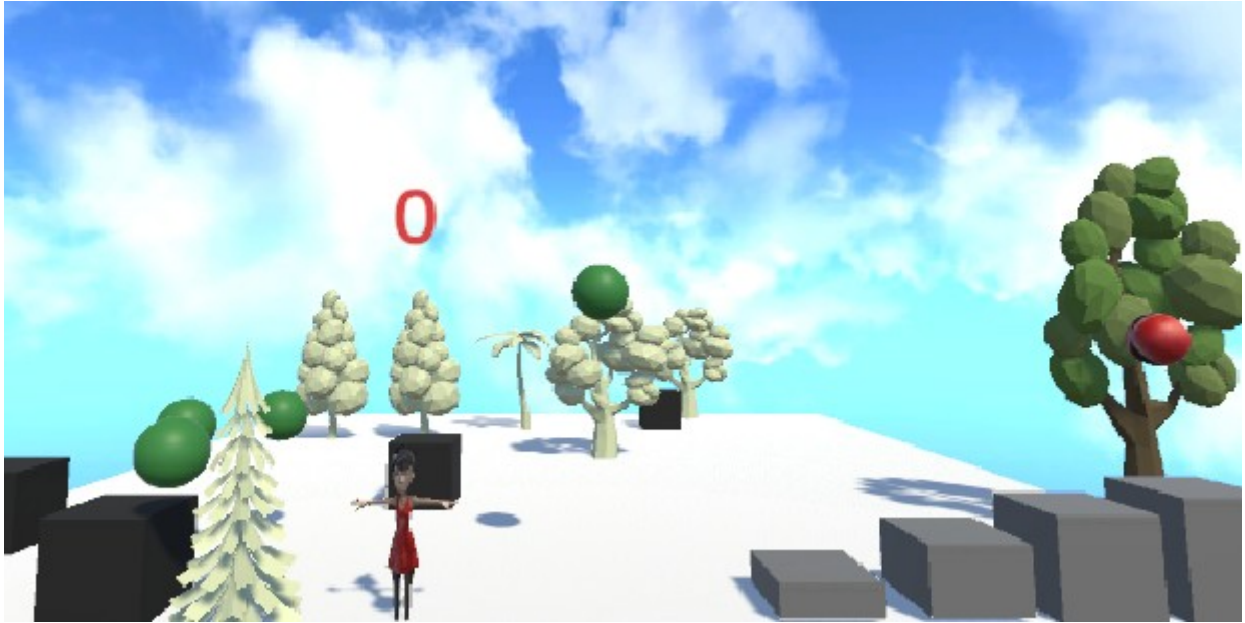


Player has to move cubes so that it is possible to catch the apple!

Check cubes heights and weights!

When player touches the apple, it is deleted.

Now this version 2 is ready.



Version 3 now

Adding audio and cannon

We have to have at least one `AudioListener` in the project: it is normally as default in `Camera` object.

Then you can add one or more `AudioSource`s to objects and those `AudioSource`s have a field for a real audio clip.

Then you have to decide when audio clip is played - often by code.

Add cannon first: we can find it from Assets.

Here is one choice:

You purchased this item on Jan 13, 2025.



Stylized Cannon (Hand Painting

 Infinity3DGame (not enough ratings)

FREE

👁 31 views in the past week

Open in Unity

License agreement [Standard Unity Asset Store](#)

License type [Extens](#)

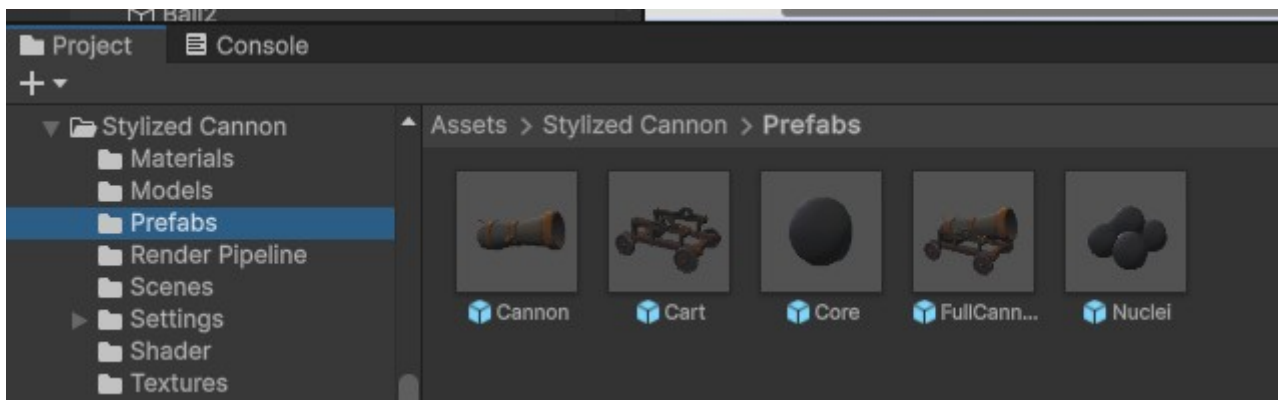
File size

Latest version

Latest release date Sep

Original Unity version 2021.3.28

We import objects and put them to the project:



And now it is seen here

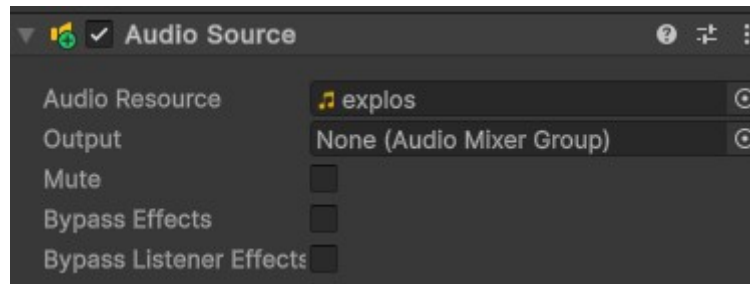


I have added crosshair to the cannon: it is used as a point where new cones are created and shot. It is just a transparent sphere.



I have also added a small platform to the cannon so that can put to a better position easily.

Cannon has an audiosource and a clip is added to to be played.



Explosion sound is played when shooting occurs...

Here is the whole code

```
public class gunfire : MonoBehaviour
{
    private GameObject crosshair = null;

    private float angle = 0f;
    public GameObject bullet = null;
    AudioSource effect;
    void Start()
    {
        this.crosshair = GameObject.Find("crosshair");
        effect = GameObject.Find("FullCannon").GetComponent<AudioSource>();
    }
    private float bulletForce = 1000f;

    int n = 0;
    void Update()
    {
        n++;

        if (Input.GetKey(KeyCode.Space) && n % 20 == 0)
        {
            GameObject temp = Instantiate(this.bullet,
            this.crosshair.GetComponent<Transform>().position,
            this.crosshair.GetComponent<Transform>().rotation);
            float rad_angle = this.angle * Mathf.Deg2Rad;
            float x1 = Mathf.Cos(rad_angle);
            float y1 = Mathf.Sin(rad_angle);

            temp.GetComponent<Rigidbody>().AddForce(new Vector3(3,3,0) *
            this.bulletForce);
            effect.Play();
            Destroy(temp.gameObject, 3f);
        }

        if (Input.GetKey(KeyCode.C))
        {
            if (bulletForce < 5000)
                bulletForce += 50;
        }

        if (Input.GetKey(KeyCode.V))
        {

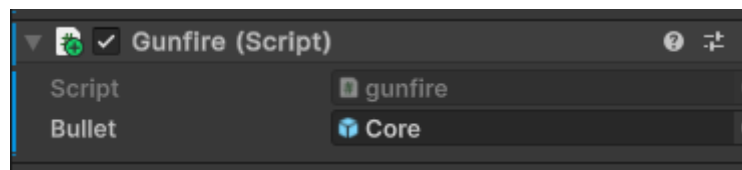
```

```

    }
    if (bulletForce >= 1000)
        bulletForce -= 50;
}

```

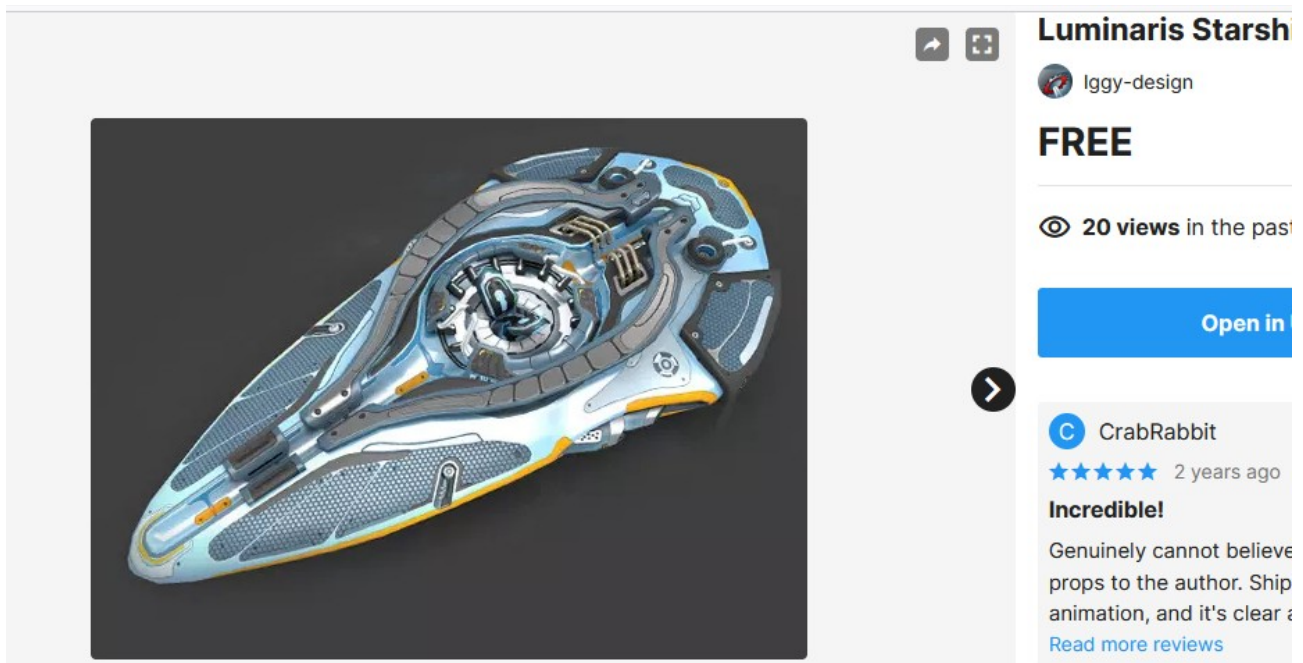
Code is attached to cannon. Bullet is added to the public field.



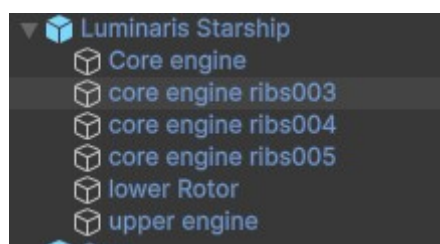
Adding drone

Now we add something that we shoot: it can be a drone taken from assets.

Check this:



It is here now



And looks like this:



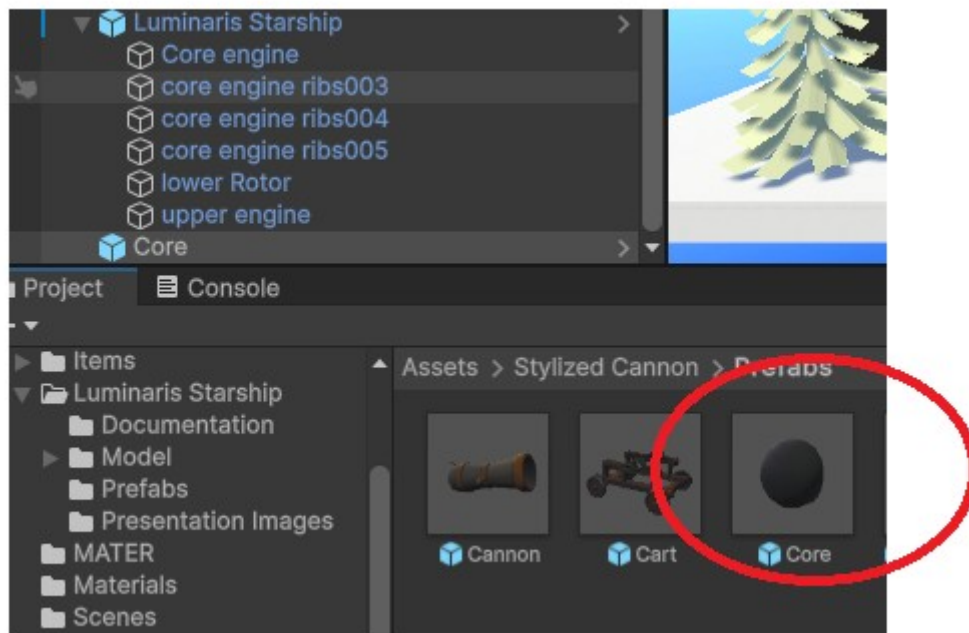
Now new code is needed:

```
GameObject dest;
Unity Message | 0 references
void Start()
{
    dest = GameObject.Find(this.name);
}
int n = 0;

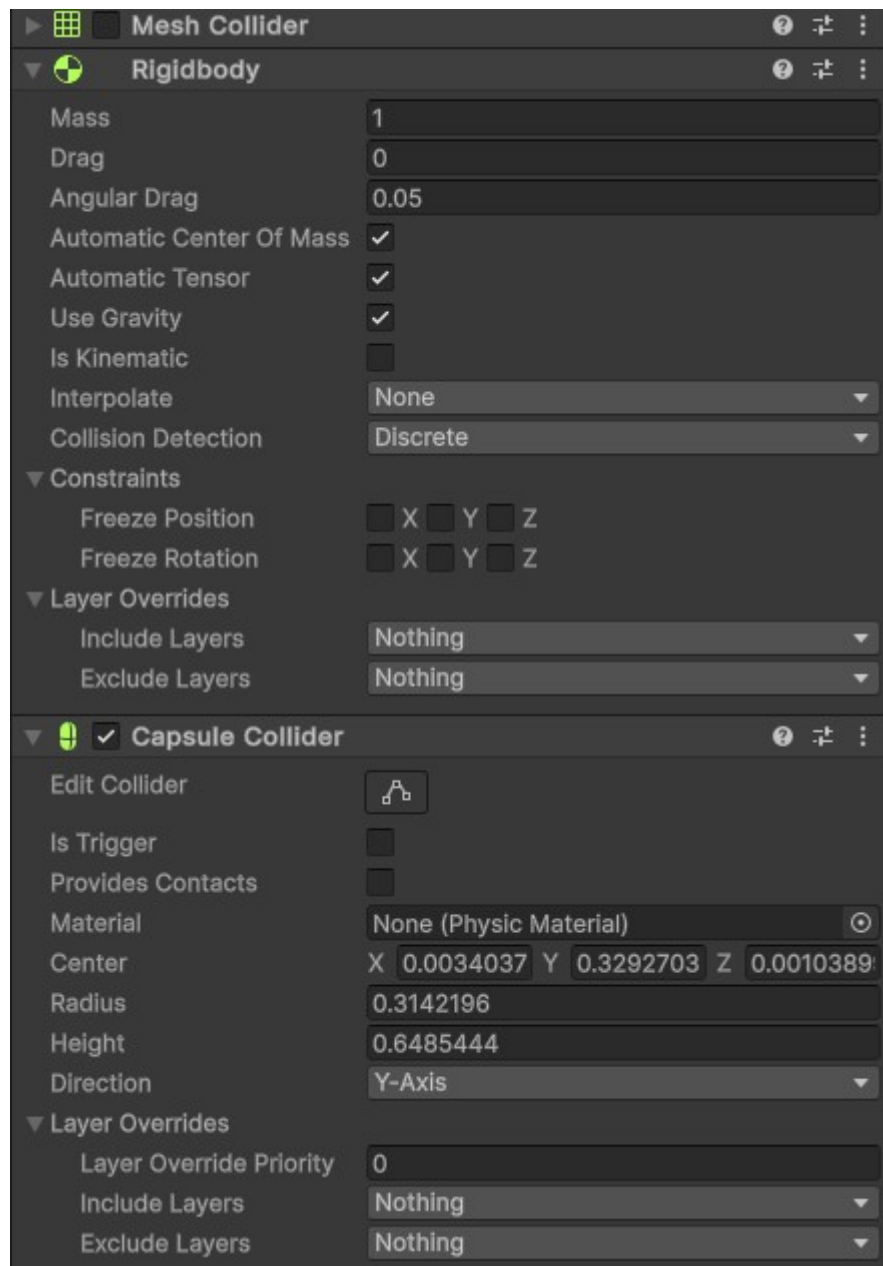
Unity Message | 0 references
private void OnTriggerEnter(Collider other)
{
    if (other.name.Equals("Core(Clone)"))
    {
        n++;
        if (n > 4)
            Destroy(dest, 1f);
    }
}
```

We add this codefile to the drone.

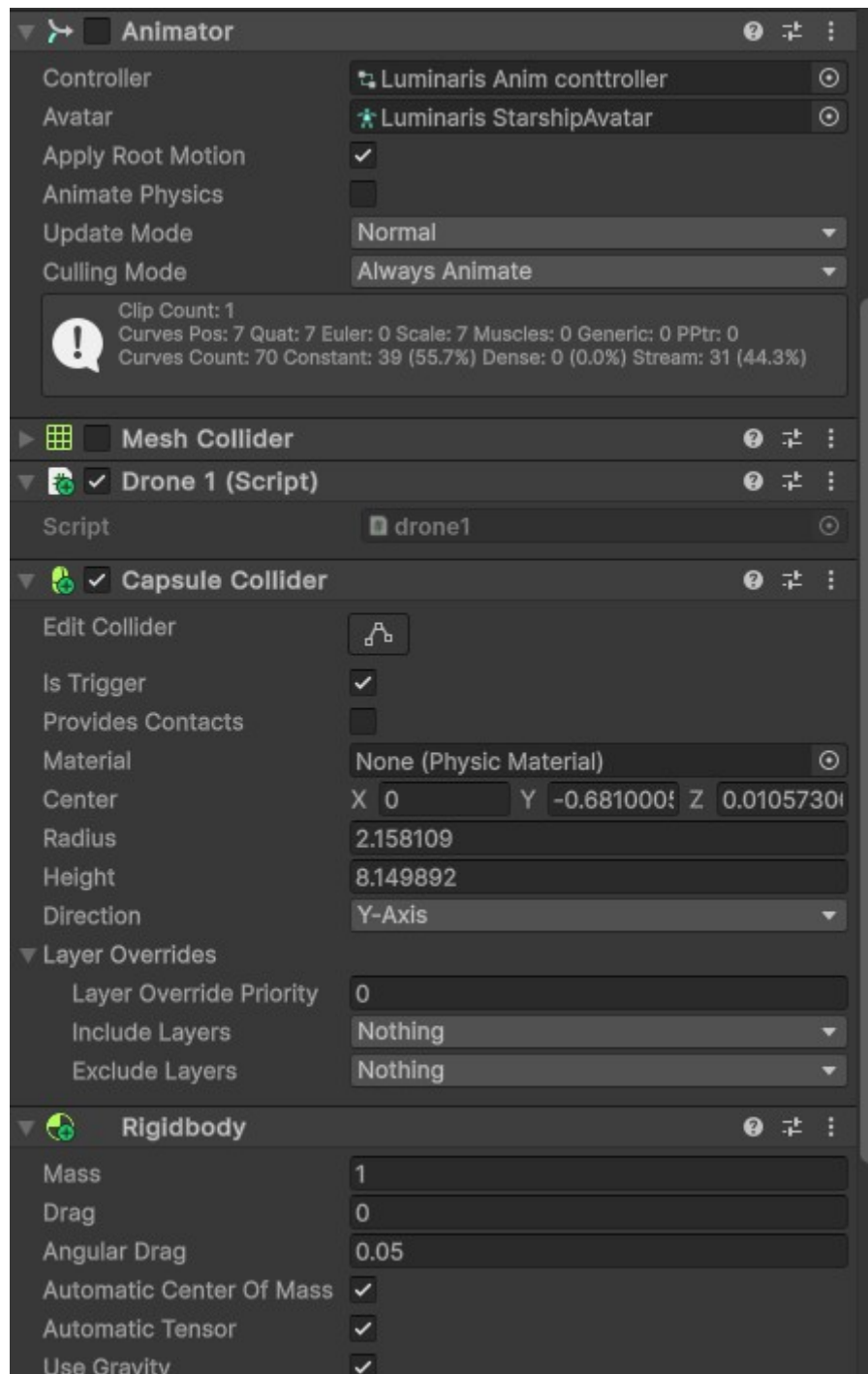
Cone (now called Core) is also taken from cannon package:



Settings can be seen here:



And drone settings



Here is the final gunfire-code:

```
gunfire : MonoBehaviour
{
    private GameObject crosshair = null;

    private float angle = 0f;
    public GameObject bullet = null;
    AudioSource effect;

    GameObject plane = null;

    float xx, yy, zz;
    void Start()
    {
        this.crosshair = GameObject.Find("crosshair");
        effect = GameObject.Find("FullCannon").GetComponent<AudioSource>();

        plane = GameObject.Find("Luminaris Starship");
        xx = plane.transform.position.x;
        yy = plane.transform.position.y;
        zz = plane.transform.position.z;
    }
    private float bulletForce = 1000f;

    void Update()
    {
        if (Input.GetKey(KeyCode.S))
        {
            GameObject temp = Instantiate(this.bullet,
            this.crosshair.GetComponent<Transform>().position,
                this.crosshair.GetComponent<Transform>().rotation);
            float rad_angle = this.angle * Mathf.Deg2Rad;
            float x1 = Mathf.Cos(rad_angle);
            float y1 = Mathf.Sin(rad_angle);

            temp.GetComponent<Rigidbody>().AddForce(new Vector3(1.5f,1.5f,0) *
            this.bulletForce);
            effect.Play();
            Destroy(temp.gameObject, 3f);
        }

        if (Input.GetKey(KeyCode.C))
        {
            if (bulletForce < 5000)
                bulletForce += 50;
        }

        if (Input.GetKey(KeyCode.V))
        {
            if (bulletForce >= 1000)
                bulletForce -= 50;
        }

        if (plane != null)
        {
            yy += 0.015f;
        }
    }
}
```

```

        xx += -0.045f;
        plane.transform.position = new Vector3(xx, yy, zz);
    }
}

```

And drone.cs code:

```

GameObject dest;
void Start()
{
    dest = GameObject.Find(this.name);
}
int n = 0;

private void OnTriggerEnter(Collider other)
{
    if (other.name.Equals("Core(Clone)"))
    {
        n++;
        if (n > 4)
            Destroy(dest, 1f);
    }
}

```

Scene looks like this now:



Note: try also another 3. person

"unity starter assets" in All Categories

CATEGORIES

3D (189)

2D (101)

Tools (98)

Templates (90)

Audio (29)

VFX (20)

Essentials (8)

Add-Ons (4)

Filters

Price



Sale



Rating

Results 1-96 of 539 for unity starter assets

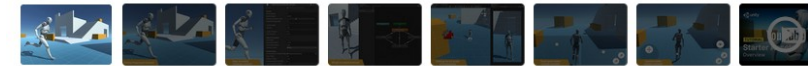


Starter Assets - ThirdPerson |
Updates in new...

★★★★☆ 4.2 (289)

UNITY TECHNOLOGIES

Free



More about 3D game creating

Terrains

Dancers

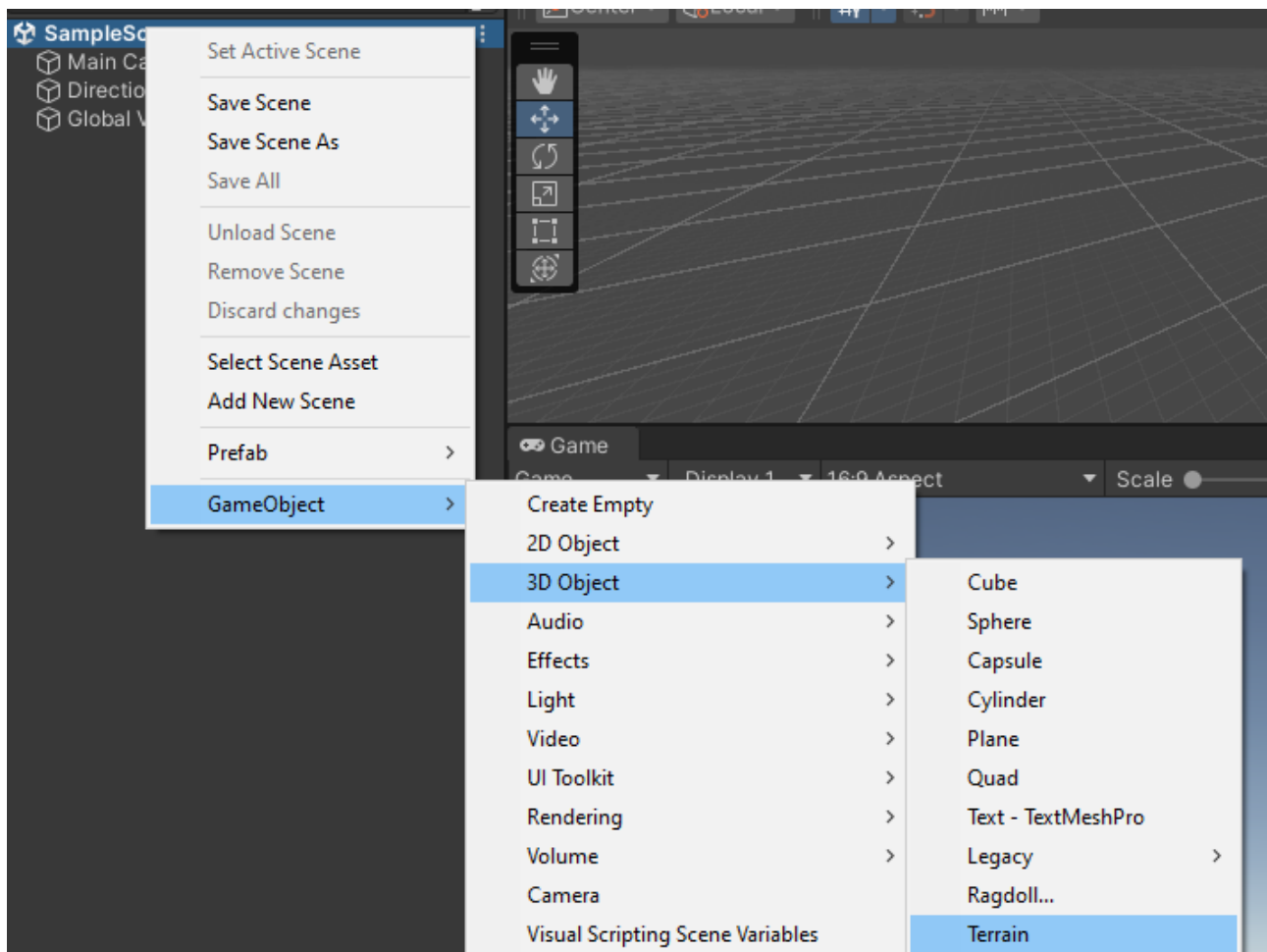
Audio

Camera

Terrain

Start a new 3D project.

Add there first terrain.



Note: Standard Assets are no more supported

So, we can not use assets like trees, water, third person and so on that Standard Assets contains!

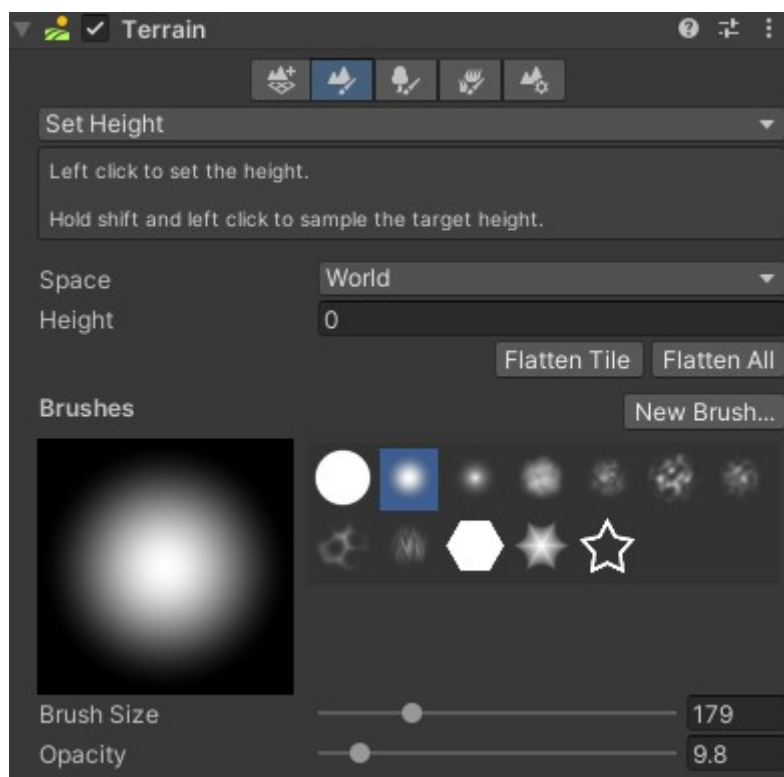
We have to use packages like Starter Assets and may be some free assets (we can make assets also ourselver or buy them....)

Paint terrain

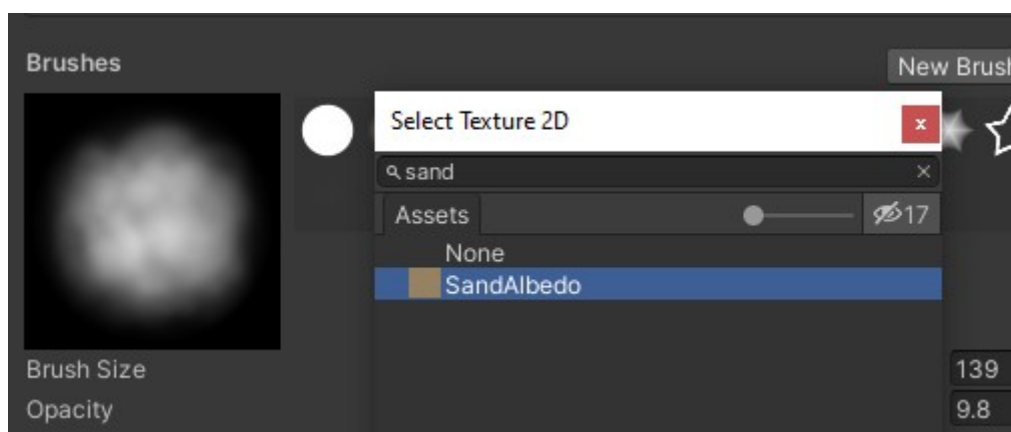
If we have started a new project we do not normally have so many textures to be used in painting terrains.

BUT: we can import textures or draw them self.

If there are already textures for brushes you can try to use them.



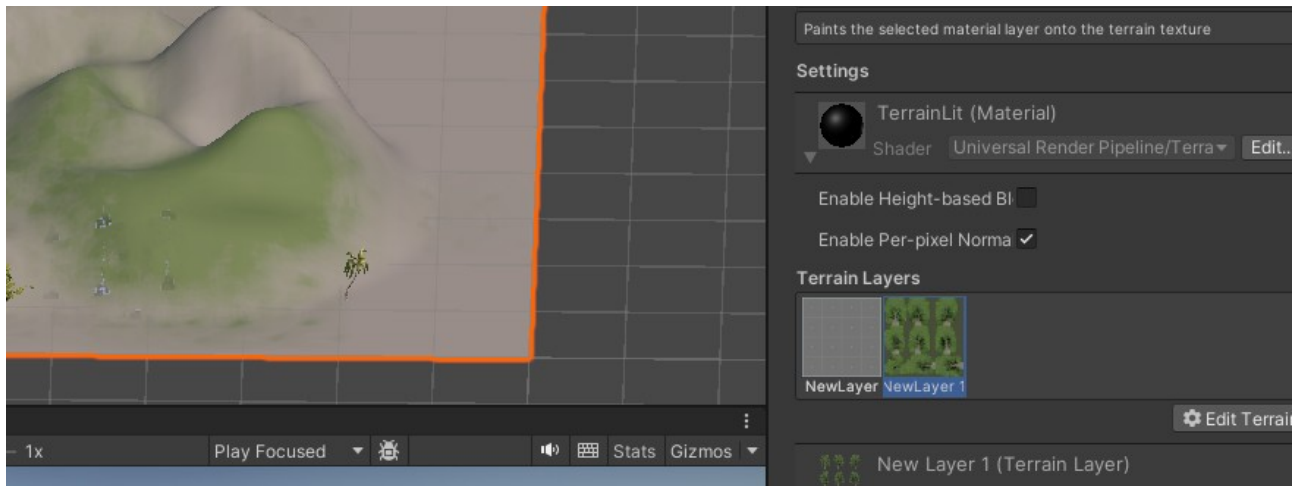
Choose color/pattern for the brush



Paint using left mouse button!

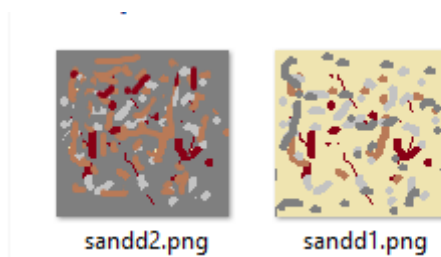
Create layers

Create layers and use them to paint natural colors and patterns.



Create own texture

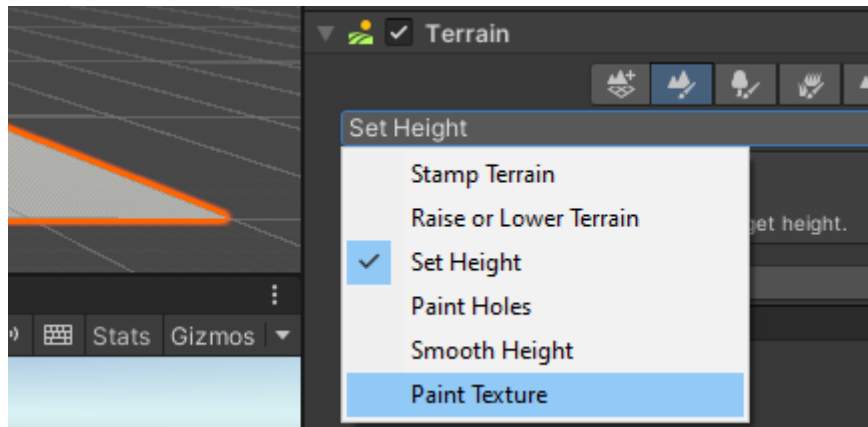
We use own colors in layers and terrain painting:



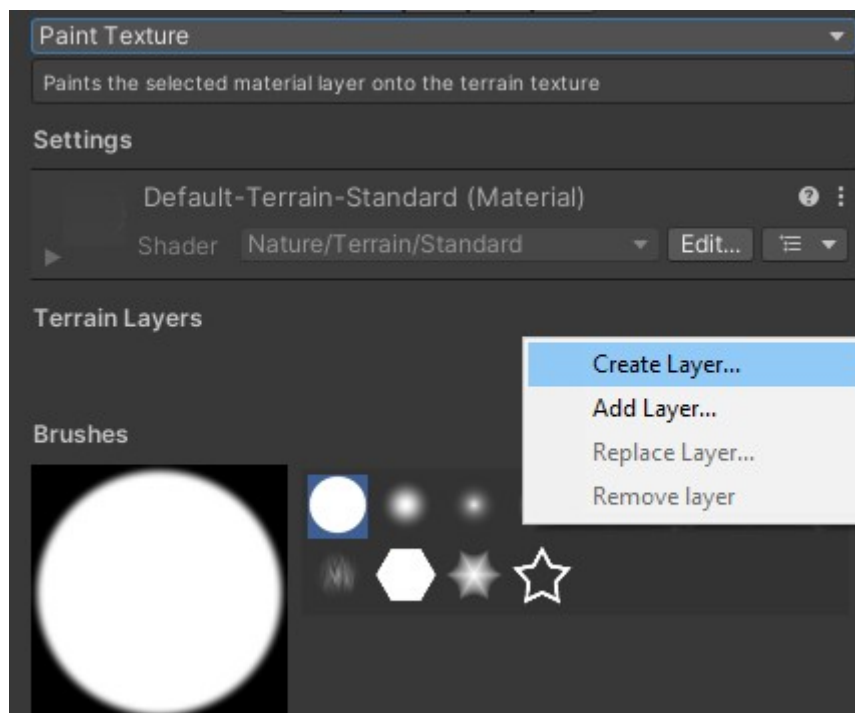
A bit about terrain building.

Add terrain and create layers.

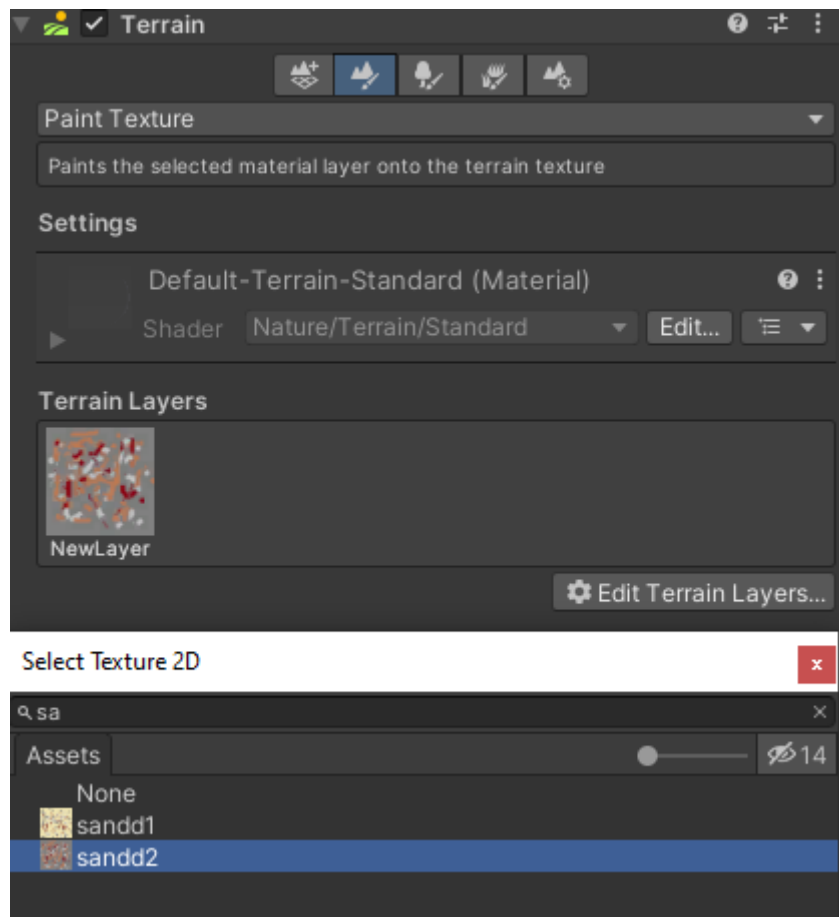
Choose Paint Texture



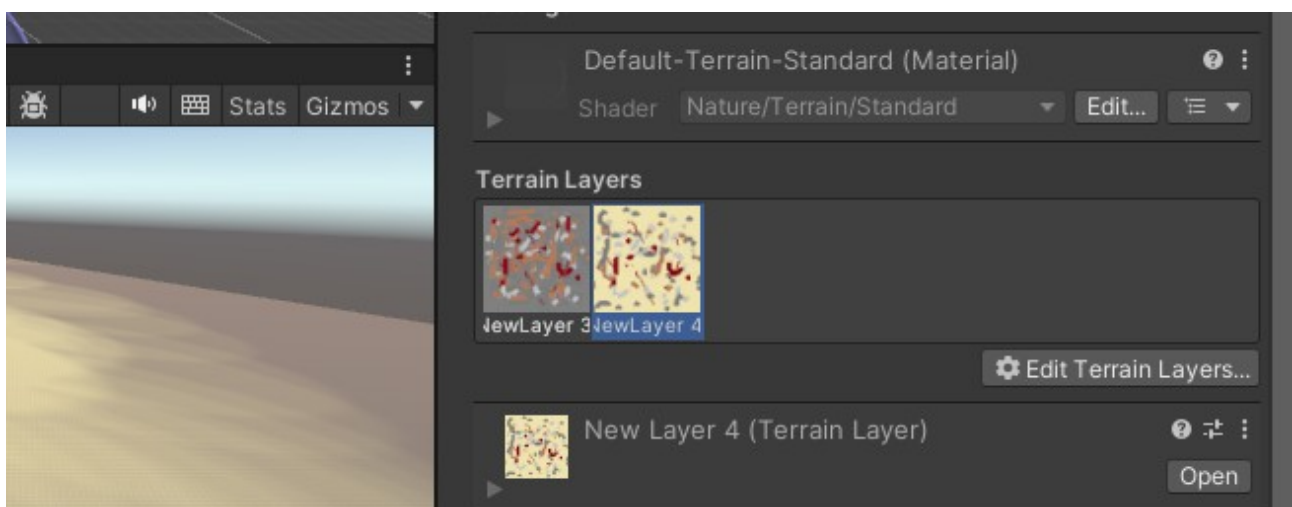
Add new layer



Choose layer texture (now we have created as an example an own pattern...or two...)

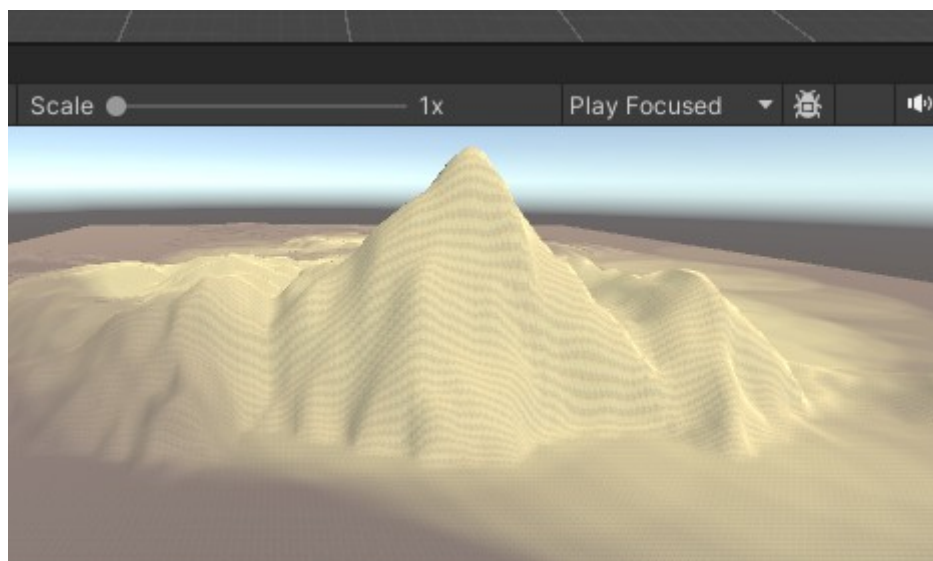
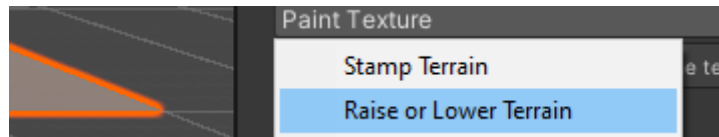


You can then create new layers and paint using chosen texture, example here.



Add hills!

By choosing option Raise or Lower Terrain, you can add height differences:



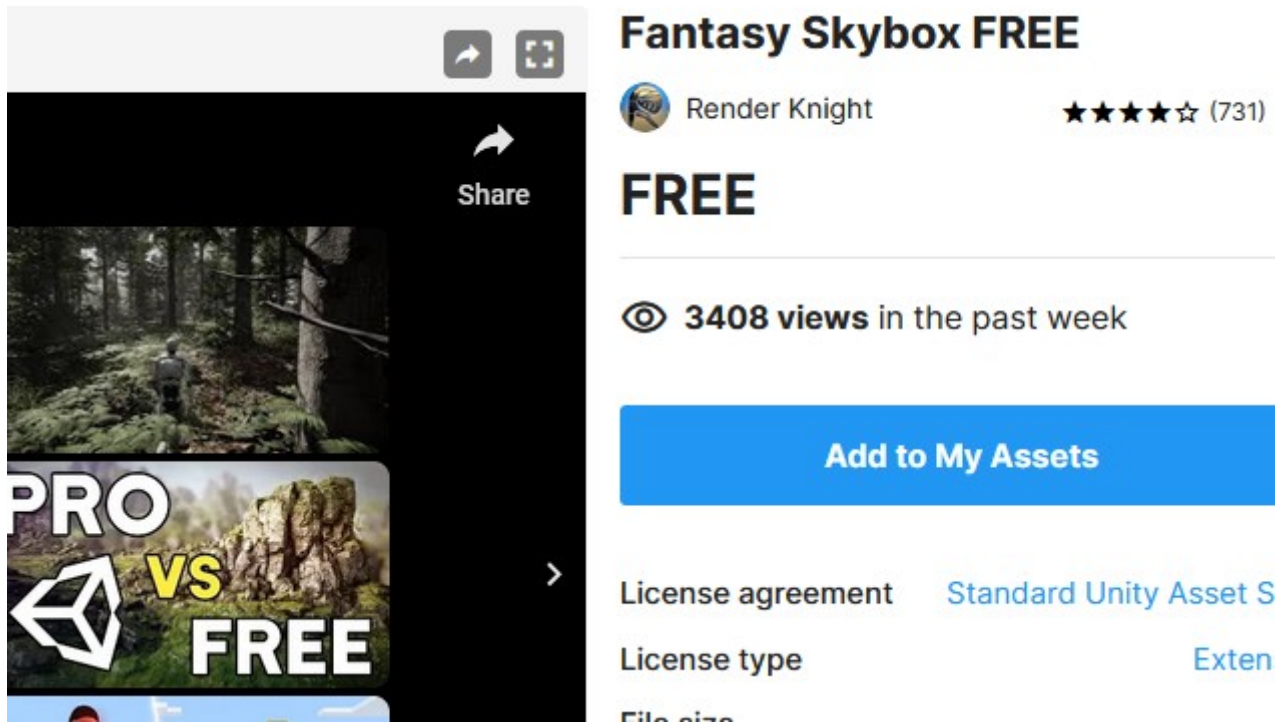
You can also define height that is used...

Here is an example of different things you can add:



Add skybox

From Unity assets we can find for example this package that contains skyboxes!!



The screenshot shows the Unity Asset Store interface. On the left is a preview image of a forest scene with a 'Share' button and a 'PRO VS FREE' comparison graphic. The main title is 'Fantasy Skybox FREE' by 'Render Knight', who has a 4.5-star rating from 731 reviews. The price is listed as 'FREE'. It shows '3408 views in the past week' and a blue 'Add to My Assets' button. Below this, the license is 'Standard Unity Asset Store License' and the license type is 'Extension'.

Fantasy Skybox FREE

Render Knight ★★★★★ (731)

FREE

👁 3408 views in the past week

[Add to My Assets](#)

License agreement [Standard Unity Asset Store License](#)

License type [Extension](#)

File size

Download and import



This screenshot shows the detailed information page for 'Fantasy Skybox FREE'. It includes the version '1.6.5' and release date 'October 13, 2024'. There are links to 'View in Asset Store', 'Publisher Website', and 'Publisher Support'. The 'Overview' tab is selected, showing 'Supported Unity Versions' as '2021.3.0 or higher' and 'Package Size' as '129,93 MB (Number of files: 121)'.

Fantasy Skybox FREE

1.6.5 · October 13, 2024 [Asset Store](#)

[Render Knight](#)

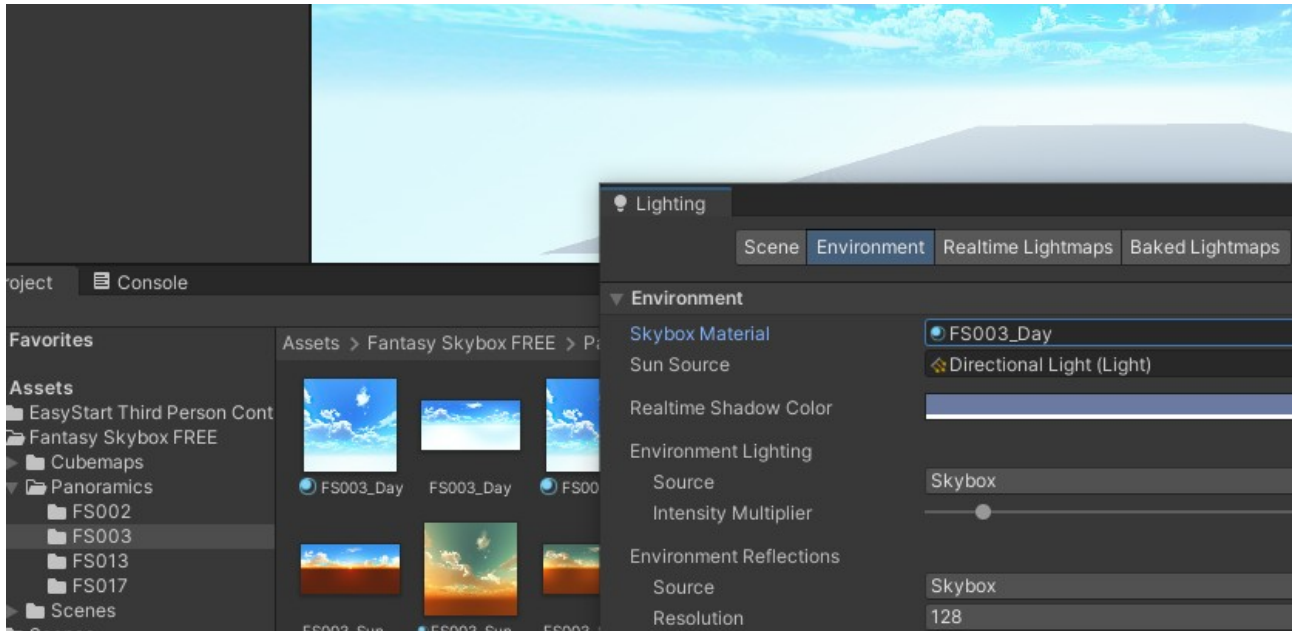
[View in Asset Store](#) [Publisher Website](#) [Publisher Support](#)

[Overview](#) [Releases](#) [Images](#)

Supported Unity Versions 2021.3.0 or higher

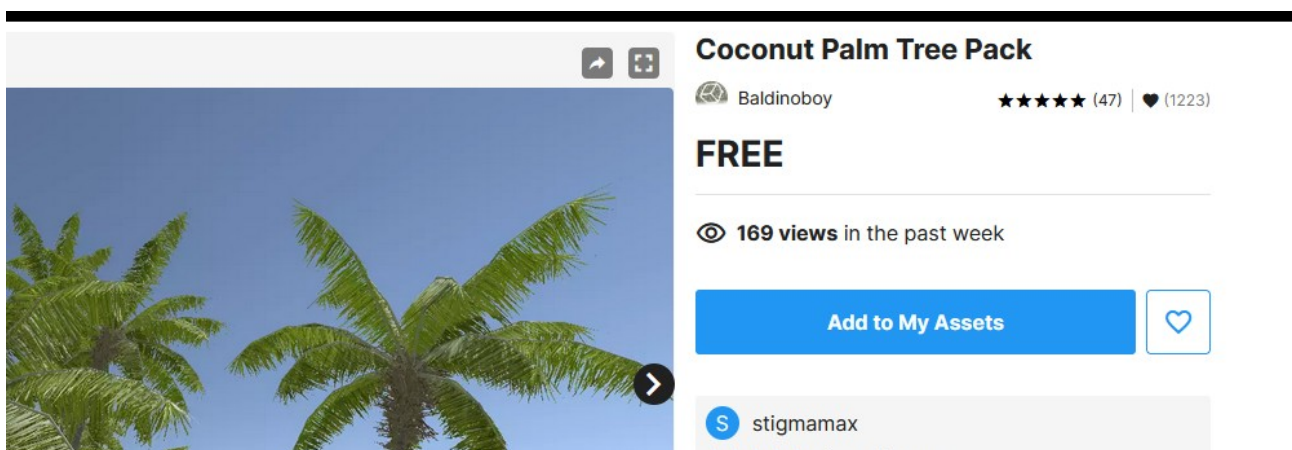
Package Size Size: 129,93 MB (Number of files: 121)

Choose Window - Rendering and Lighting and try with different skyboxes...

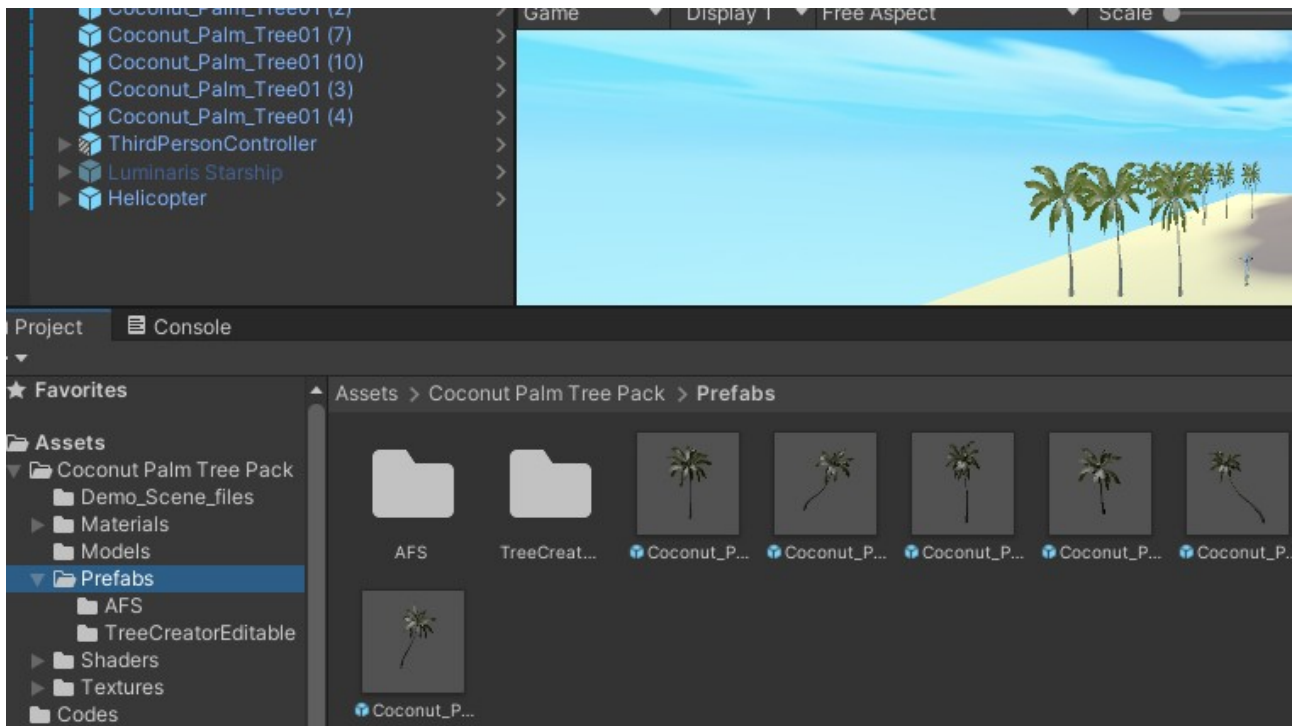


Add trees

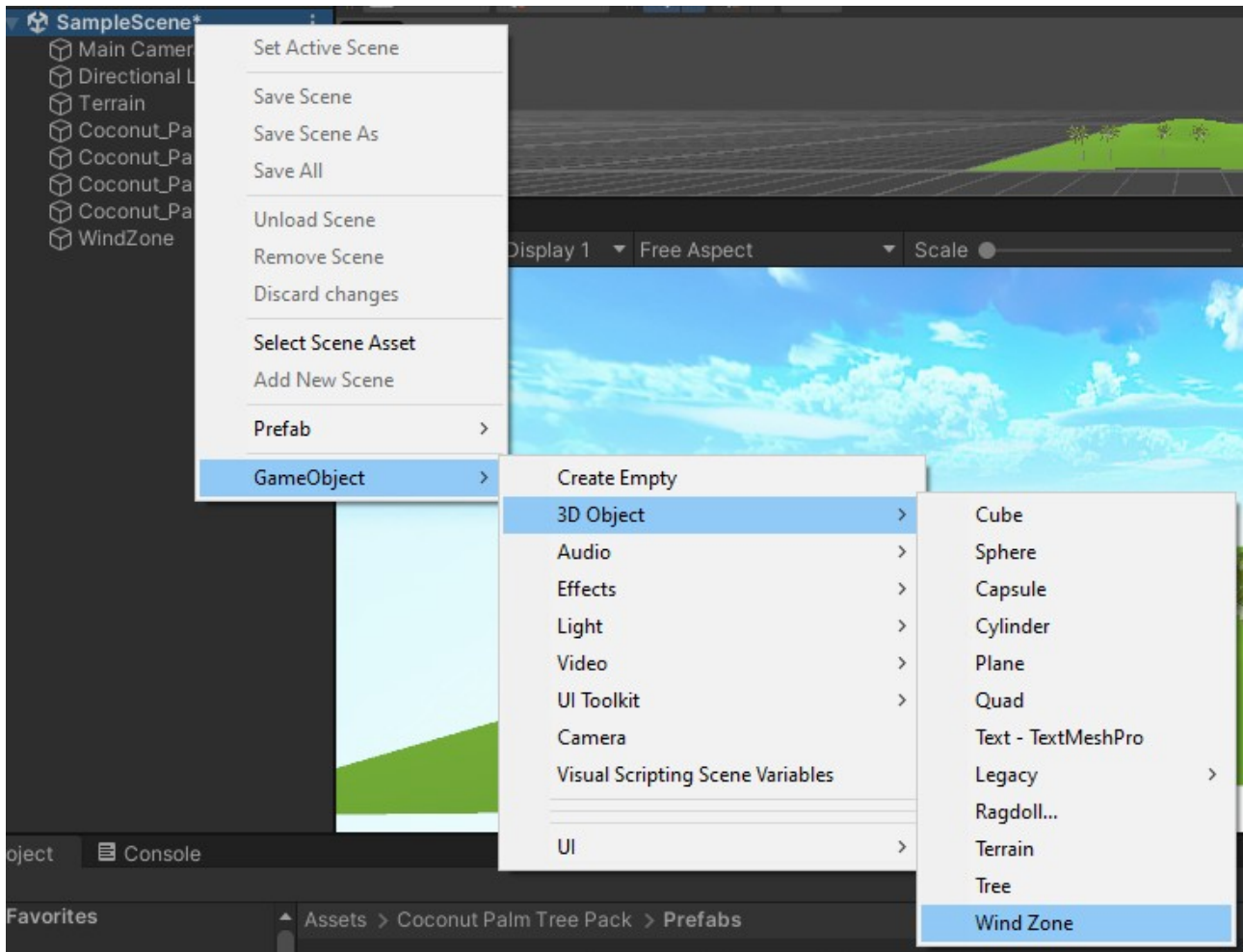
Let us take a free tree package from assets



Add some palms to your project.



Add wind



Try with different wind values...

Add player

We can use some free Third Person Controller now.

Here is one possible.

on Controller



EasyStart Third Person Controller



Conrado Saud

★★★★☆ (19)

♥ (260)

FREE

👁 867 views in the past week

Add to My Assets



Arrieboy_Official

★★★★★ 11 days ago

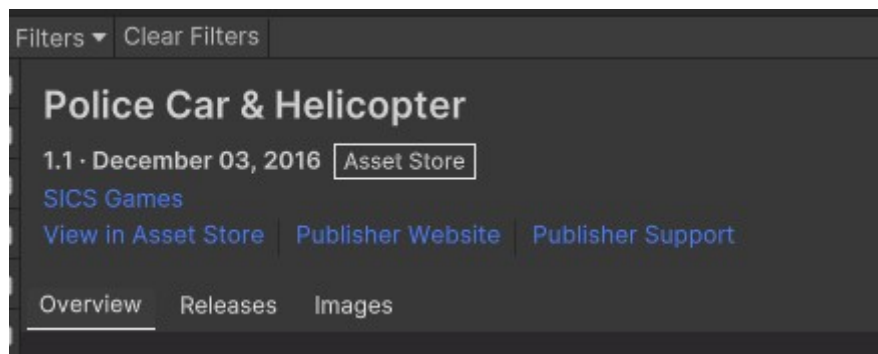
Very very awesome asset!

Download, import and add to the terrain



Helicopter to the sky

From assets we find this example:



Download, import and add to the project!



Helicopter movements code

Add movement to helicopter and also sound:

```
AudioSource effect;

GameObject copter = null;

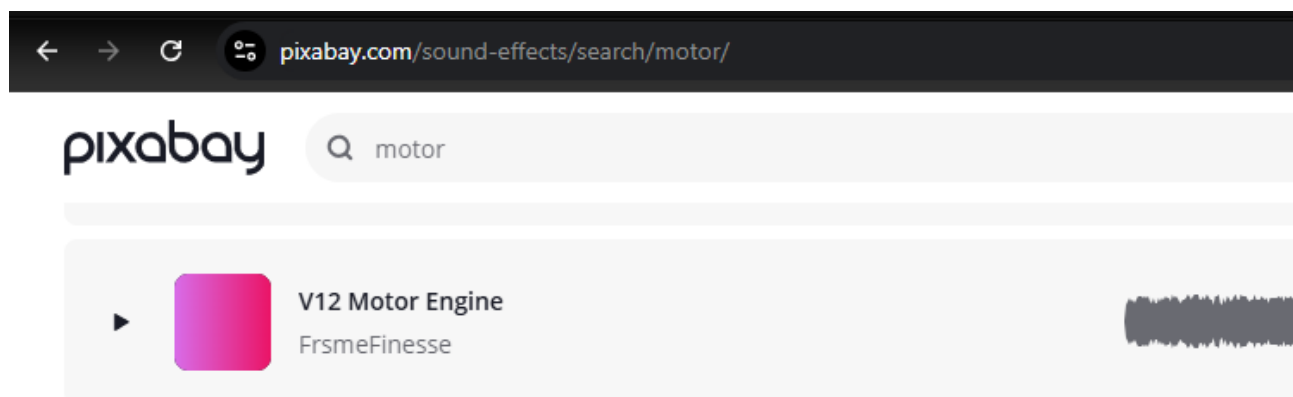
float xx, yy, zz;
void Start()
{
    effect = GameObject.Find("Helicopter").GetComponent<AudioSource>();

    copter = GameObject.Find("Helicopter");
    xx = copter.transform.position.x;
    yy = copter.transform.position.y;
    zz = copter.transform.position.z;
}

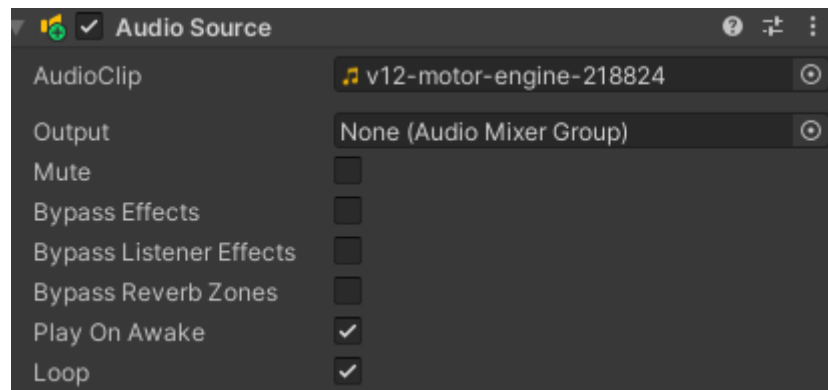
// Update is called once per frame
void Update()
{
    if (copter != null)
    {
        yy += -0.085f;
        xx += -0.045f;
        copter.transform.position = new Vector3(xx, yy, zz);
    }
}
```

Helicopter sound

We take a free sound from pixabay:



Then we add AudioSource to Helicopter object...and the clip is dropped to clip field.



Helicopter code update

We make now the code a bit more versatile so that helicopter first comes near the ground, rotates there and then rises up again.

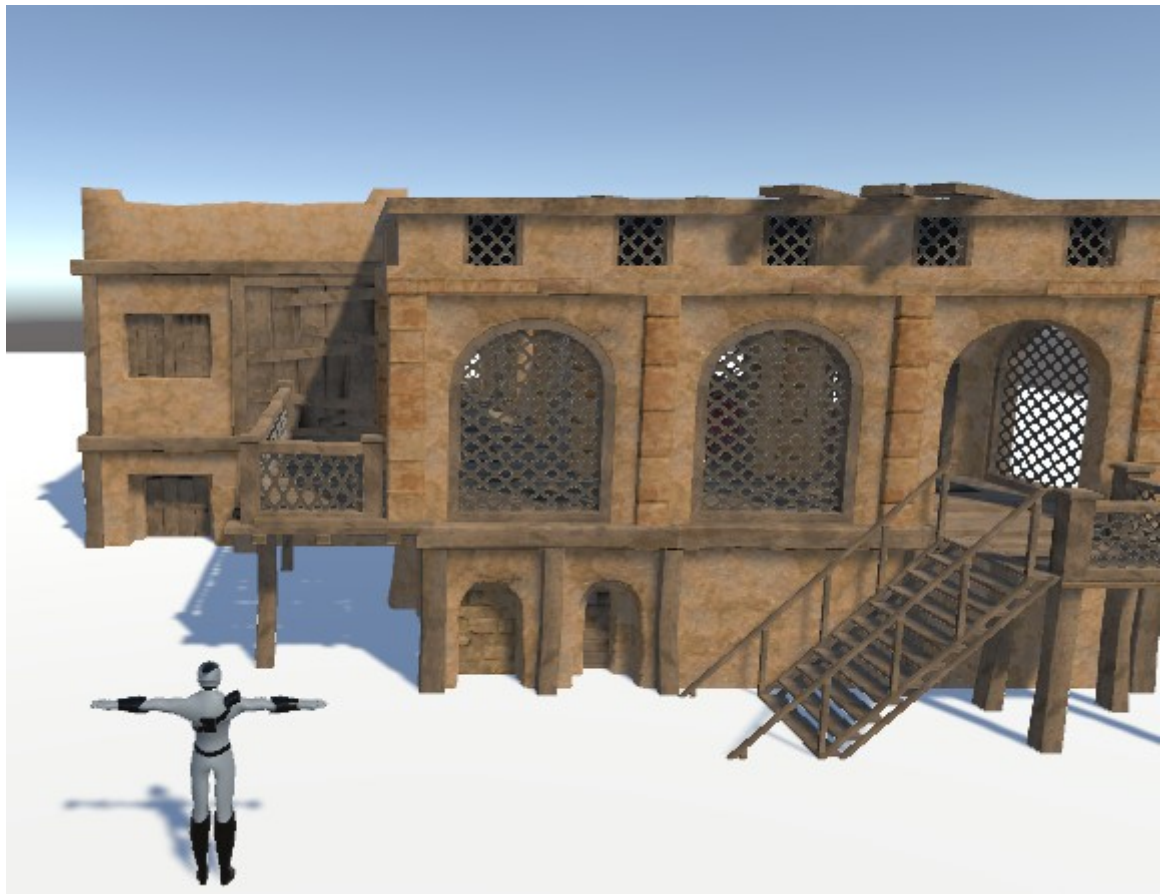
```
AudioSource effect;
GameObject copter = null;
float xx, yy, zz;

private float xAngle = 0f;
private float yAngle = 0.3f;
private float zAngle = 0f;

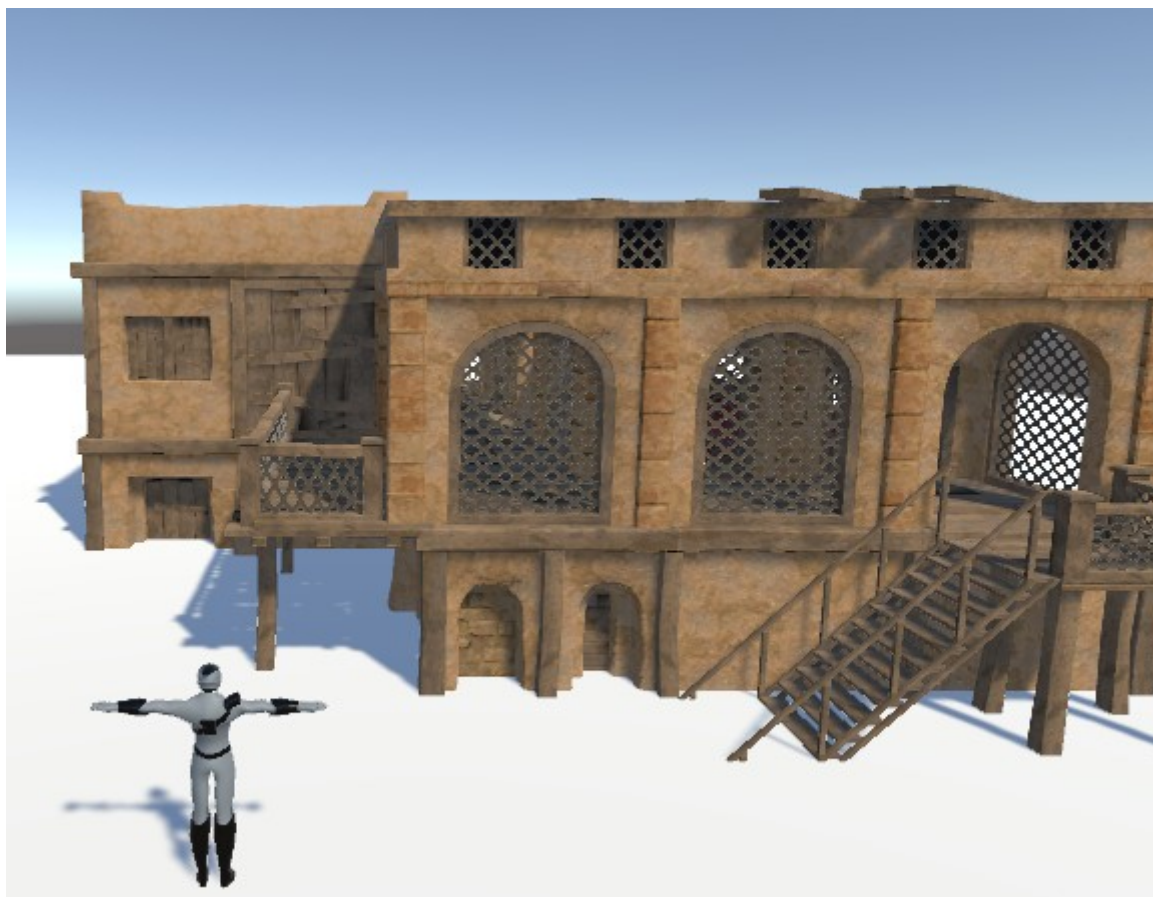
float xxStep = -0.5f;
float yyStep = -1f;
void Start()
{
    effect = GameObject.Find("Helicopter").GetComponent<AudioSource>();
    copter = GameObject.Find("Helicopter");
    xx = copter.transform.position.x;
    yy = copter.transform.position.y;
    zz = copter.transform.position.z;
}
int n = 0;
void Update()
{
    if (copter != null)
    {
        yy += yyStep;
        xx += xxStep;
        copter.transform.position = new Vector3(xx, yy, zz);

        if (yy <= 50 && n <= 1000)
        {
            xxStep = 0f;
            yyStep = 0f;
            this.transform.Rotate(xAngle, yAngle, zAngle, Space.Self);
            n++;
        }
        if (n > 1000)
        {
            //xxStep = 1f;
            yyStep = 2f;
            //this.transform.Rotate(xAngle, yAngle, zAngle, Space.Self);
        }
    }
}
```

Add house and create your own garden



Unity 3D part 2 c



Free eBook by
Adam Higherstein

Add 3D house

Add a house from assets. Here is one choice:

Desert Set House

⊕ Import 1.0 to project ▼

1.0 · January 26, 2019 Asset Store

[CrazyCool](#)

[View in Asset Store](#) | [Publisher Website](#)

[Overview](#) | [Releases](#) | [Images](#)

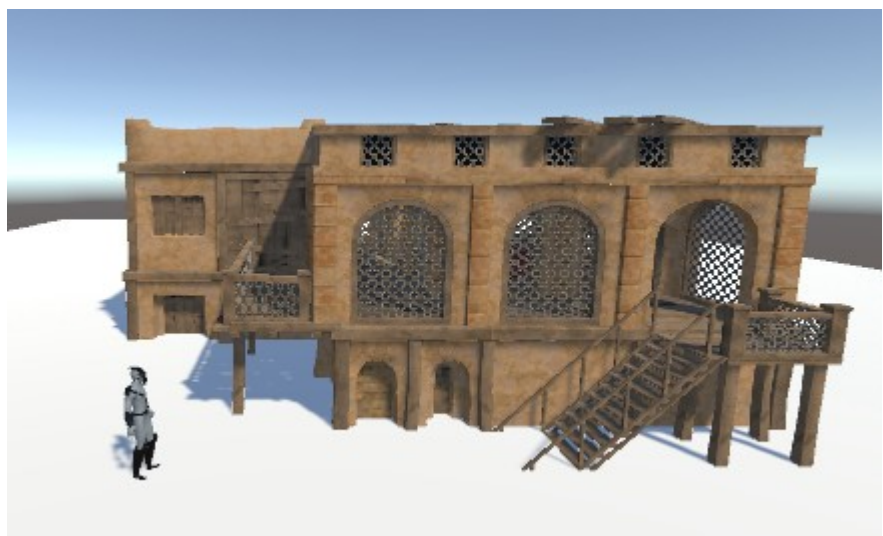
Supported Unity Versions 5.5.0 or higher

Package Size Size: 525,11 MB (Number of files: 74)

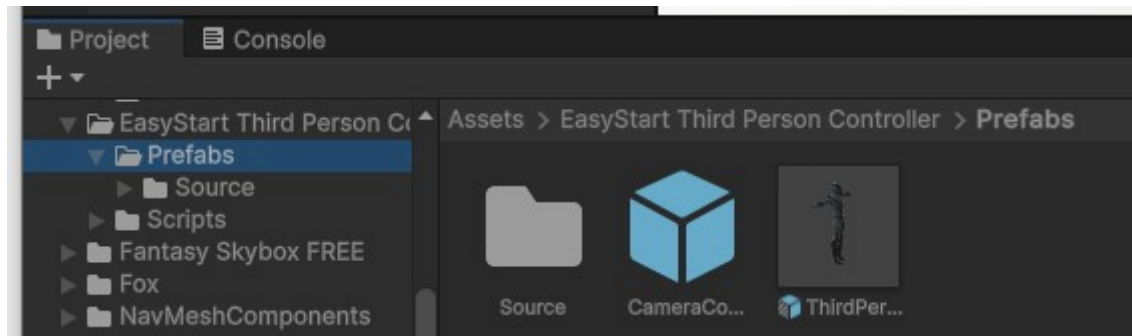
Purchased Date January 16, 2025

This model is part of larger package.
Desert City Set (<https://www.assetstore.unity3d.com/en/?stay#/content/137219/>)
House Model have 9049 polygons , 12 PBR materials.
Model is one mesh
Model have only exterior.
This is standalone package but it can be combined with Package in the link above.

Project has a plane and house is added there"



There is also 3. person



You can use stairs, too

Go on creating your own garden!

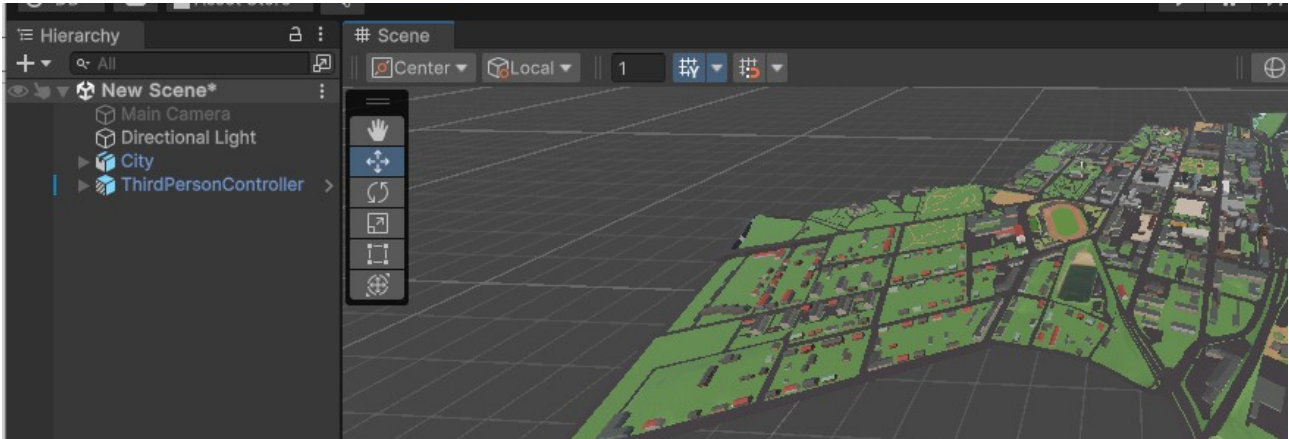
Add objects like trees, smaller houses, benches, flowers, skybox, wind, objects to pick and so on!!

Use assets and try with 3D constructions!



Adding a 3D city model

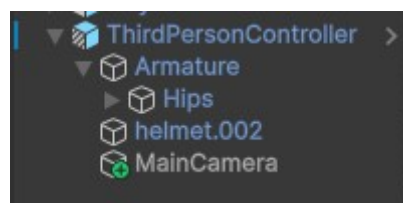
We import a city model to our project.



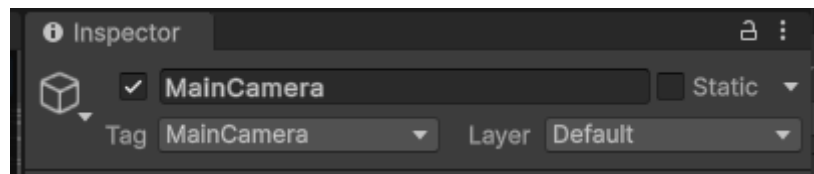
Then add there 3. person



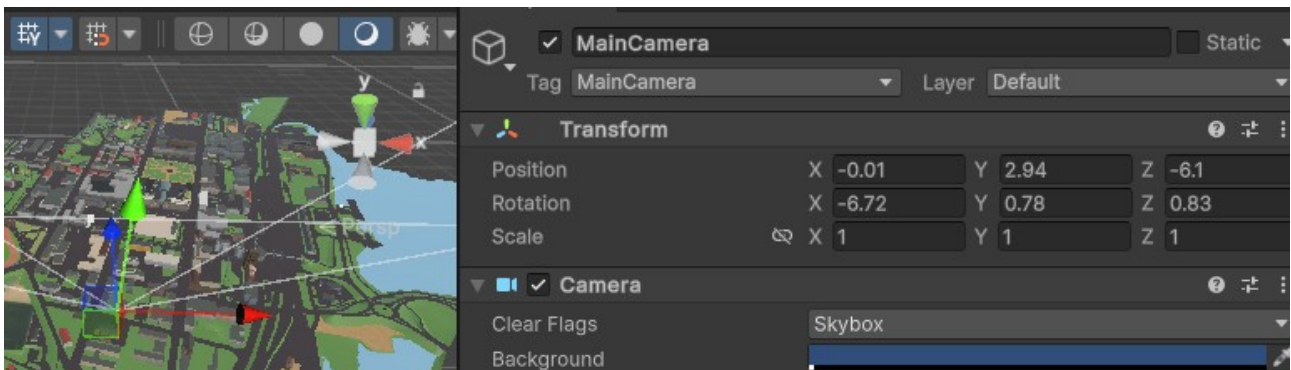
remove the main camera and add new camera to player:



Change name and tag:



Adjust camera so that you can see details of the city...

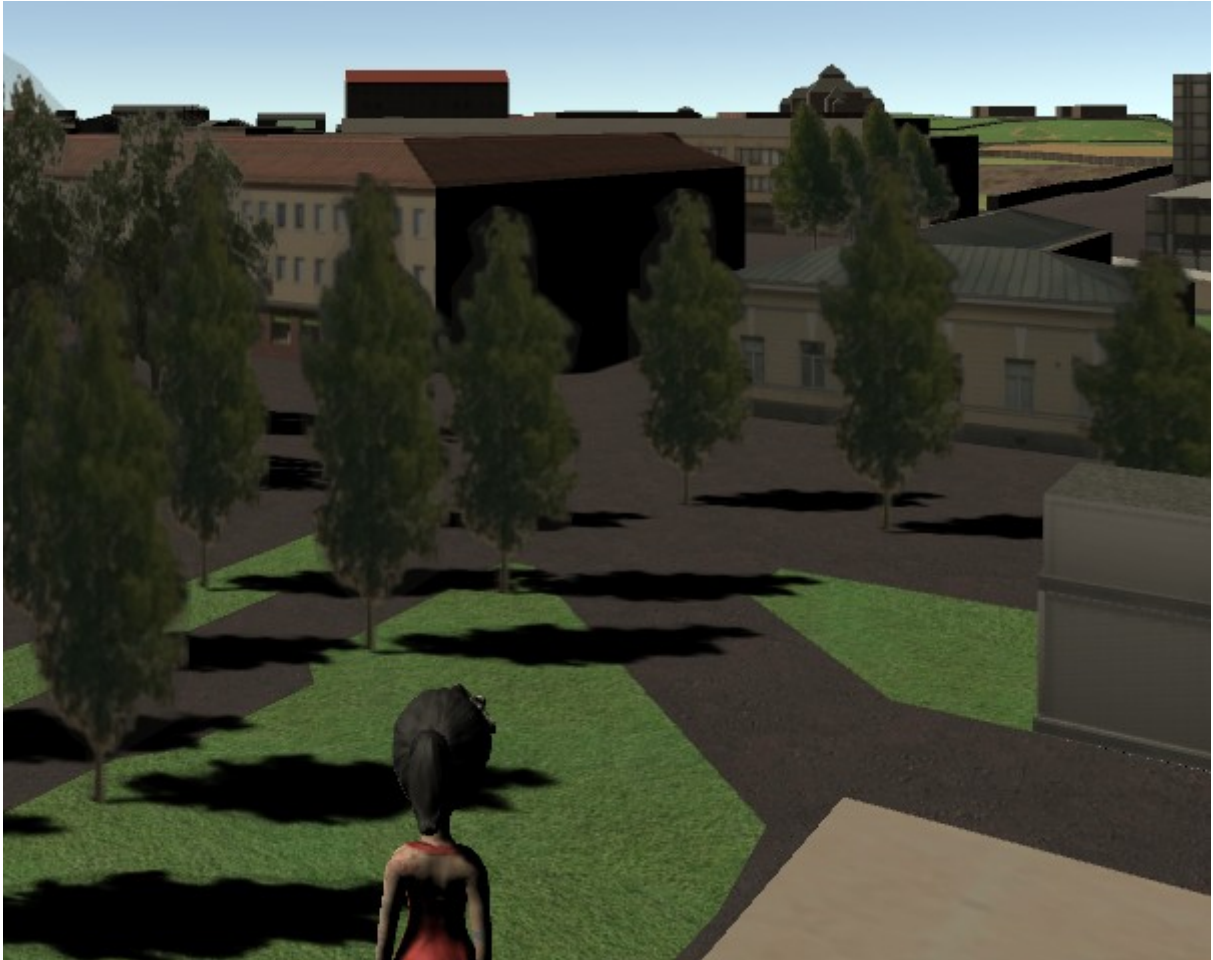


Now walk around the city.

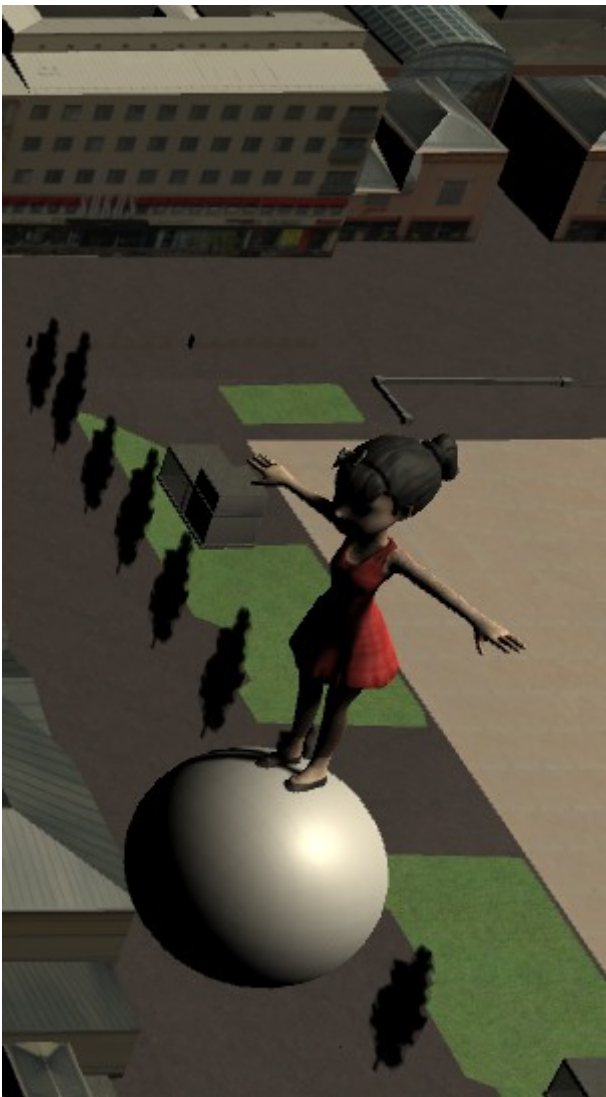
Add there new trees, busses, characters, buildings and object to search...

Moving in the city: examples here

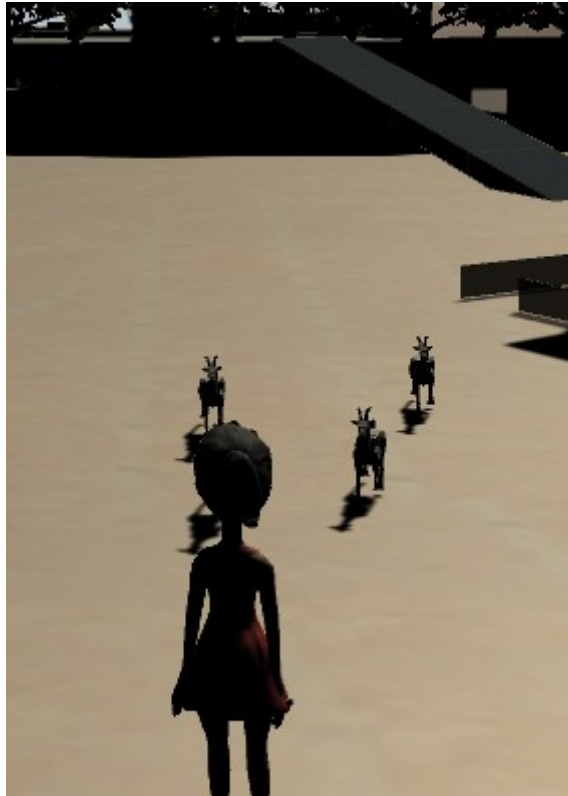
Moving around



Flying over city



Someone (goats now) following you (navigation needed)



Do experiments!

Let's dance!

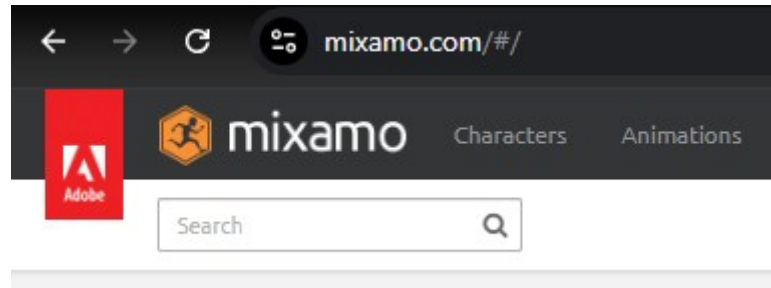
Now we dance a bit.

We take a dancer from Mixamo.

Then we create 3D project with terrain and add dancer there.

We also take music with.

Mixamo



Browse character and animation pages: try to find suitable dancer!!

I have no this character dancing rumba.

Now we download this choice.



We use these settings

DOWNLOAD SETTINGS

Format	Skin
<div>FBX for Unity(.fbx) ▼</div>	<div>With Skin ▼</div>
Frames per Second	Keyframe Reduction
<div>30 ▼</div>	<div>none ▼</div>

CANCEL

DOWNLOAD

We can download music also: here is one good place (you can listen first choices...)

← → ↻ 📄 pixabay.com/music/search/rumba/


pixabay 🔍 rumba

62+ Rumba no copyright music


Download rumba royalty-free audio tracks and instrumentals for your next project.

latin south america music dance latin america spain salsa to dance samba

Royalty-free music tracks

▶ 

Rumba by ahmad



Some Notes:

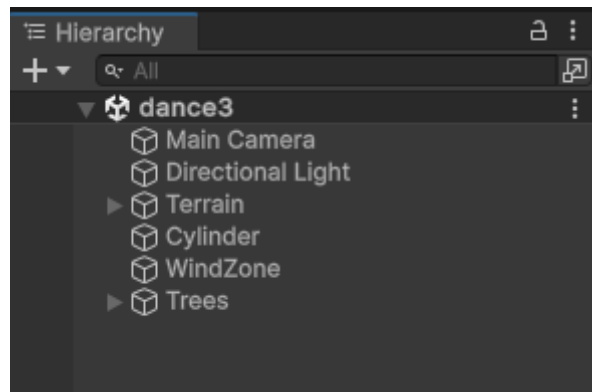
Dancing and music may need to be adjusted somehow

Dance musicality is may be needed a bit...

For example the rumba is a slow dance in 4/4 time...

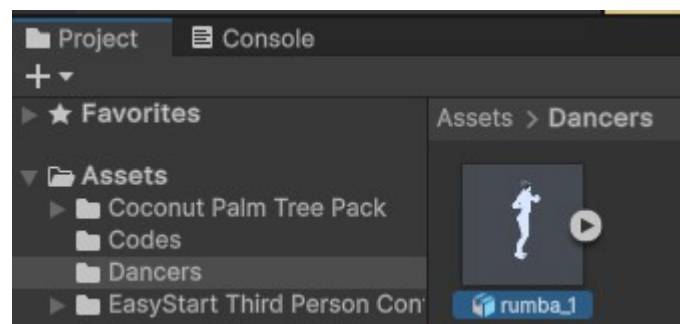
Now we take Mixamo character to Unity project.

Project has these objects (we use partially some older project, copy previous scene and parse it a bit)



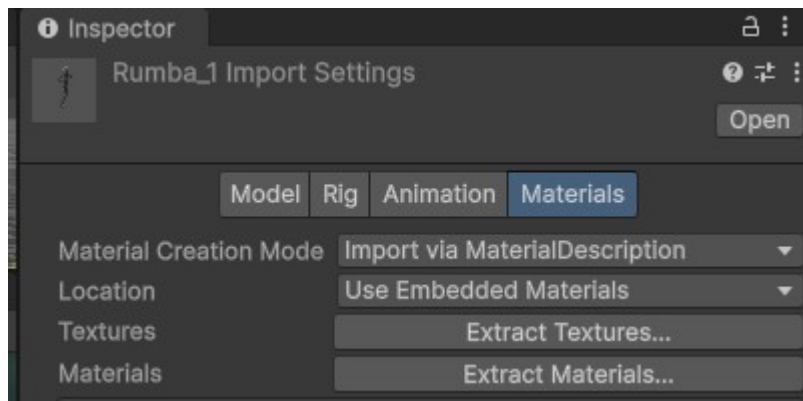
There is terrain and also a cylinder.

Dancer is imported to Dancers folder.

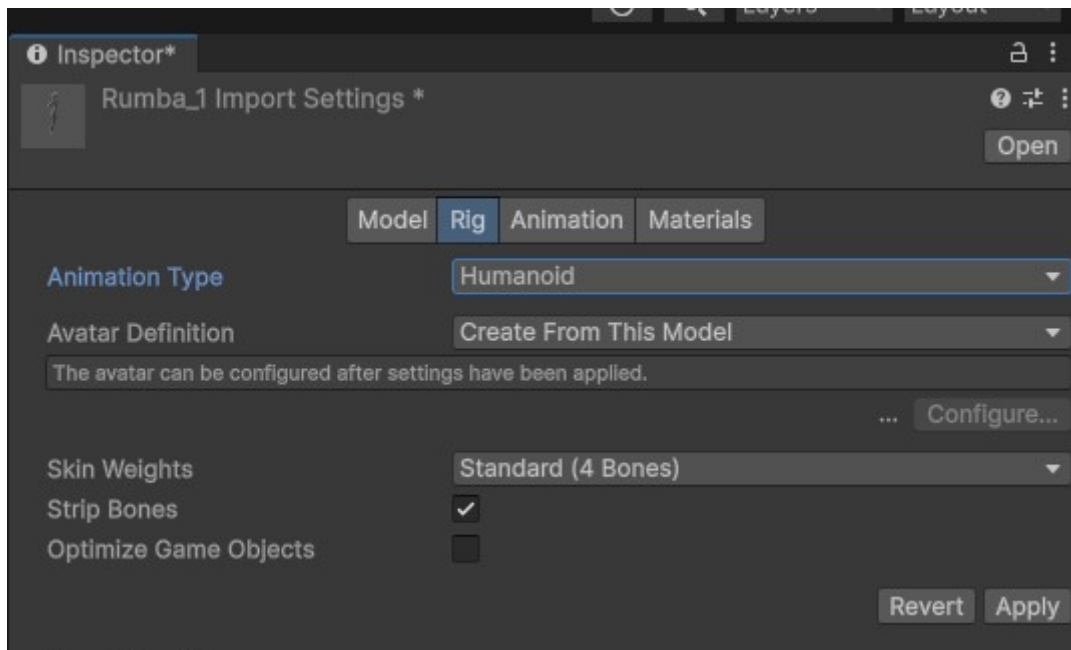


Detailed dancer settings.

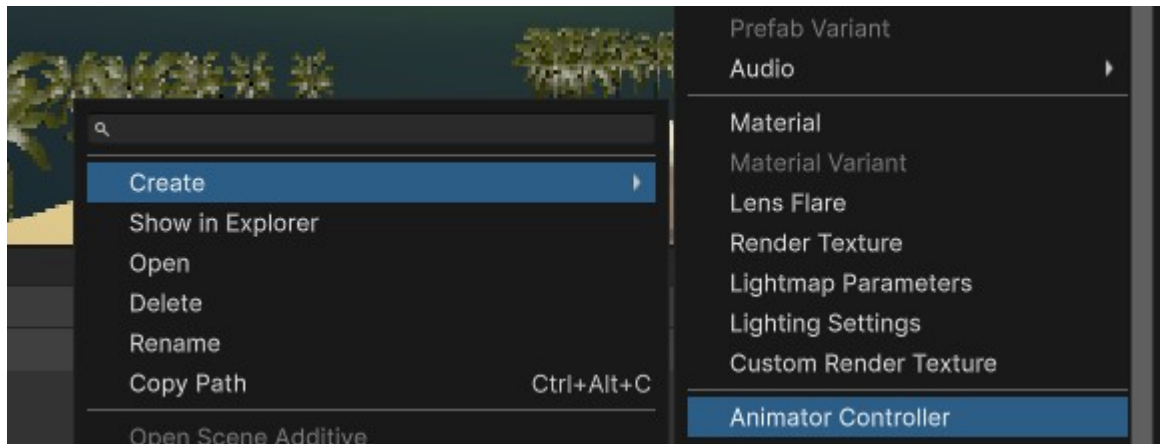
a)



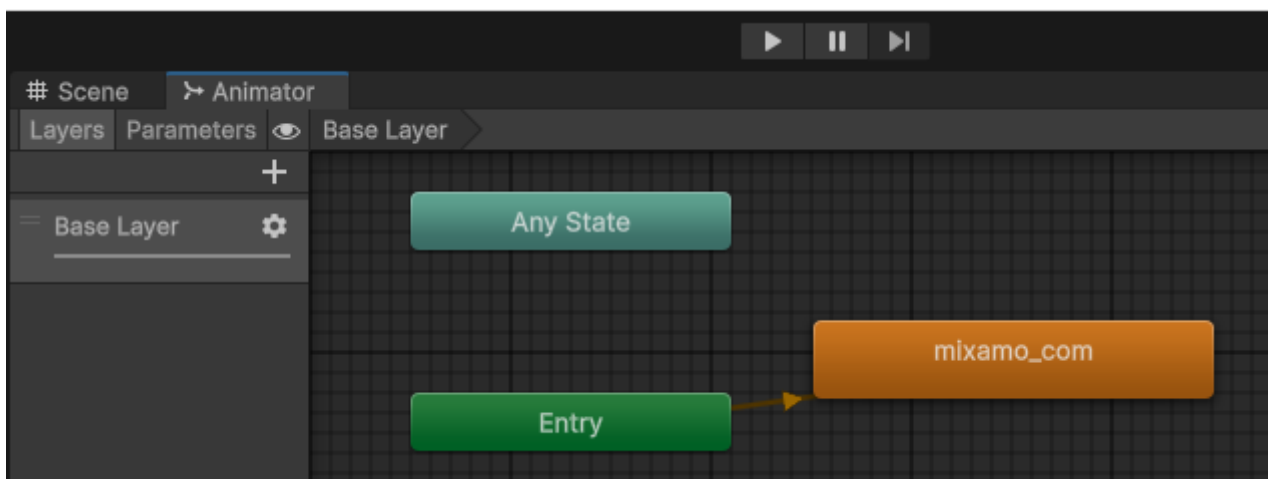
b)



Then create animation controller



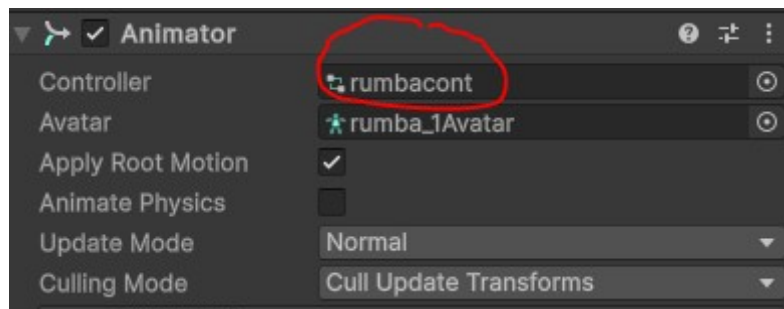
Add dancer's animation there



Add dancer to project



Add animator controller

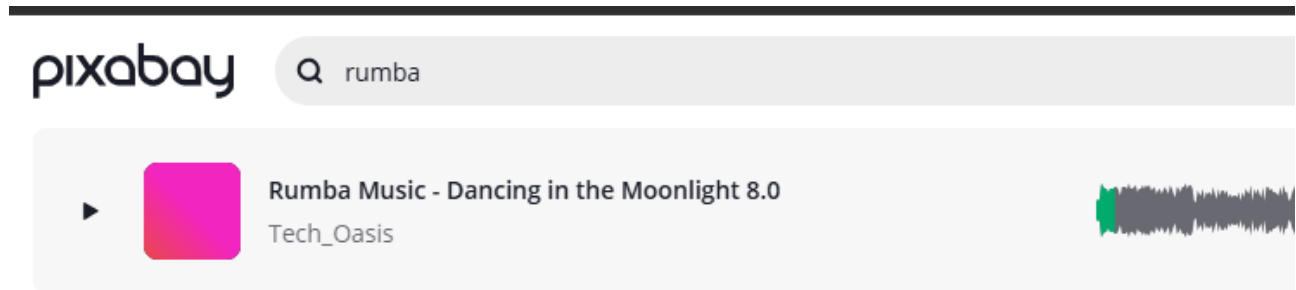


Here dancer is moved on the cylinder (stage).

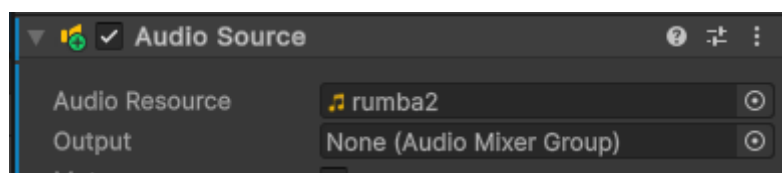


Add now sound. Add audiosource to dancer and import there some rumba clip.

Example here



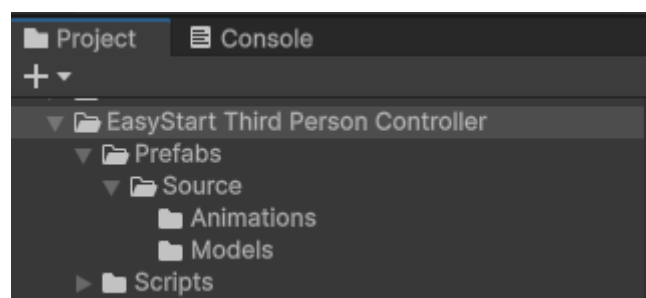
And added to dancer:



Testing: uuuuhhhh!!!

Add spectator

We add there third person





Now player can walk nearer dancer!!

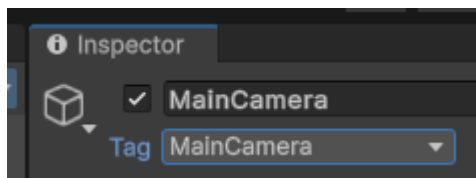
But we add an own **camera to player** - so we see same things than the player.

Disable project's own camera.

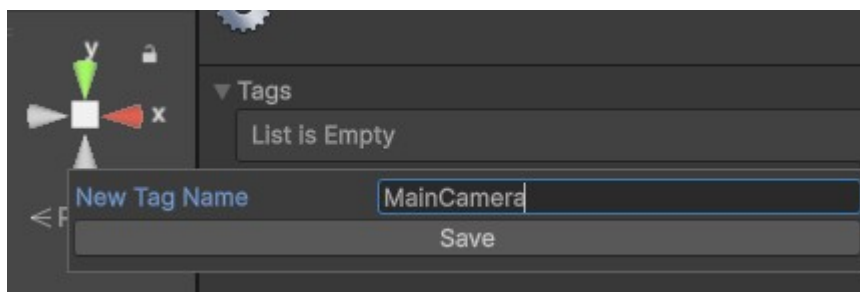
Add player a camera object.

Adjust it to show a suitable view.

Rename camera to "MainCamera" and add it also a tag called "MainCamera".



And



Try!

Yeah!!



Feedback is welcome!
Thank You!