Unity Tutorial: Car Controller with script

Step 1: Open **Unity** and go to your **Scene**

To make your life easier: Let's assume you have a car model and if you do not, feel free to use the standard assets or just make a square box and assume that as a car model.

Step 2: First make sure you have created a base box and change its Position to ***X:0, Y:1, Z:0***

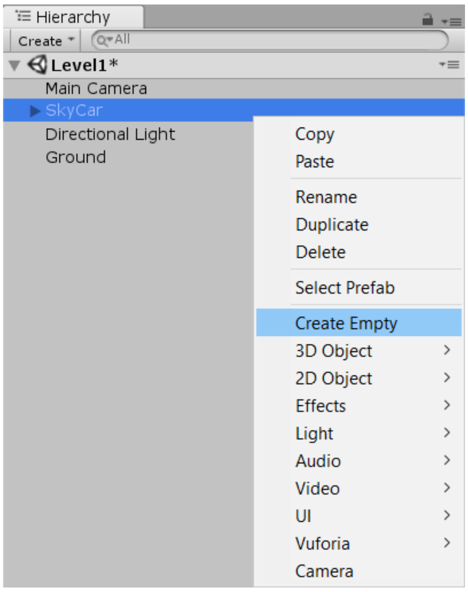
And change its Scale to ***X: 55, Y: 0.05, Z: 55***

Then place the Car Model on top of that

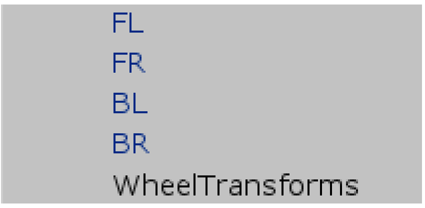
Let's call it SkyCar for now

Then Right Click SkyCar and Create Empty

Then rename it to WheelTransforms



To make your life easier: rename your Wheels to, **FL, FR, BL** and **BR** for front left, front right and so on.

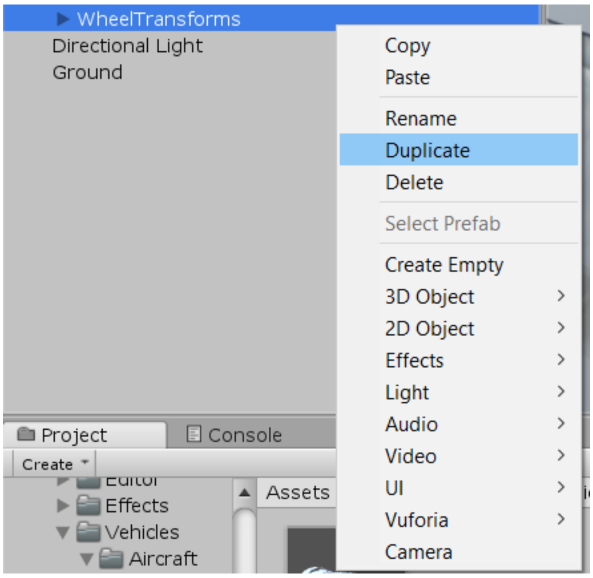


FL
FR
BL
BR
WheelTransforms

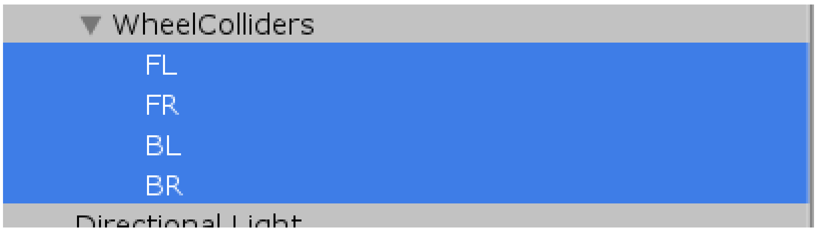
Then select them all and put them in the Sub Section of Wheel Transforms

To make your life easier: Now would be a good time to adjust the camera on your car (click on Main Camera and use the QWERT to adjust to your liking.

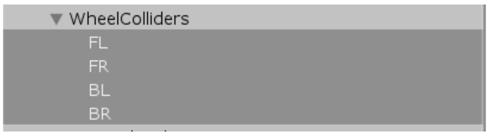
Now Right Click on WheelTransforms and **Duplicate** it

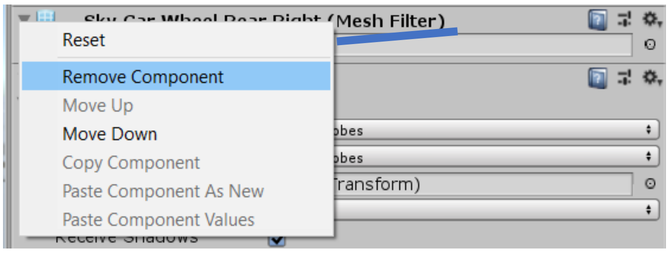


Rename it to WheelColliders, then open the sub rout and select all 4 wheels [ASB]

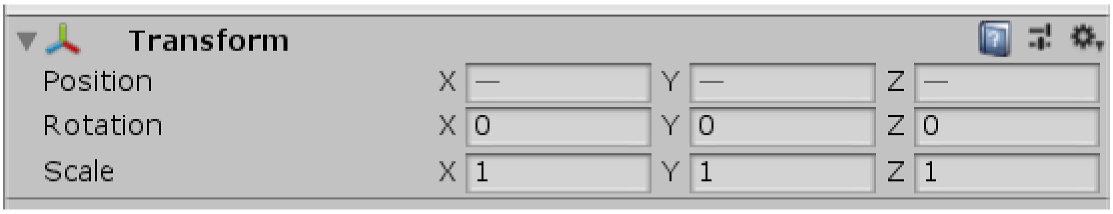


Make sure you Remove Component the **Mesh Filter** and **Mesh Renderer** for all 4 wheels [ASB]





Then make sure their **Scale** is ***X: 1, Y: 1, Z: 1*** [ASB]

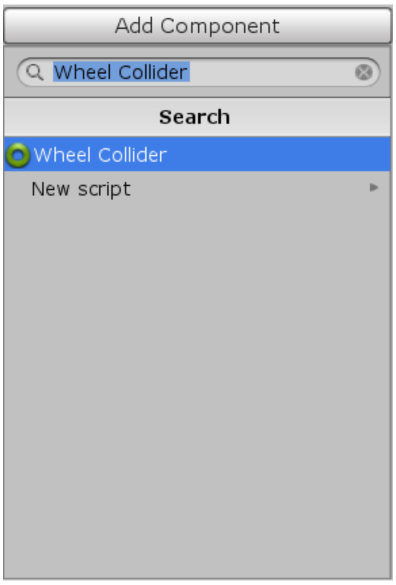

Transform

Position X — Y — Z —

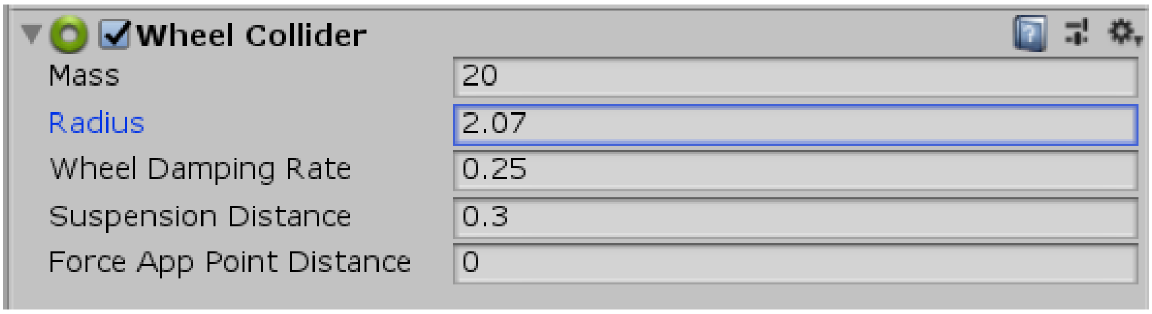
Rotation X 0 Y 0 Z 0

Scale X 1 Y 1 Z 1

Having them still selected, **Add New Component** > **Wheel Collider** [ASB]



Make the **Radius = 2.7** [ASB]



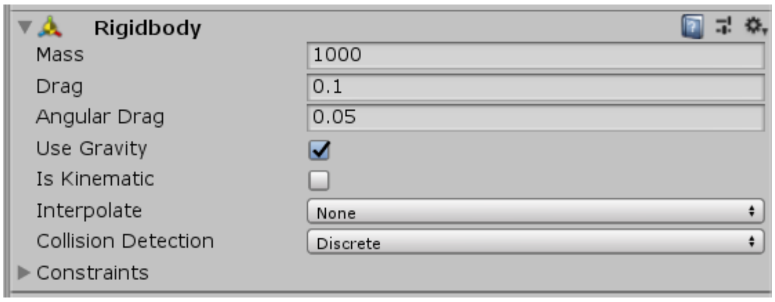
☑ **Wheel Collider**

Mass	20
Radius	2.07
Wheel Damping Rate	0.25
Suspension Distance	0.3
Force App Point Distance	0

Then Select the SkyCar at the **Hierarchy** > **Add Component** > **Rigidbody**

Change the **Mass** to **1000** (For now, you might want to change this value if you feel your car is not fast enough)

Also change **Drag** to **0.1** [ASB]

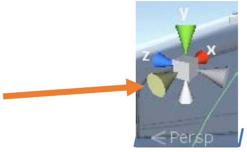


Rigidbody

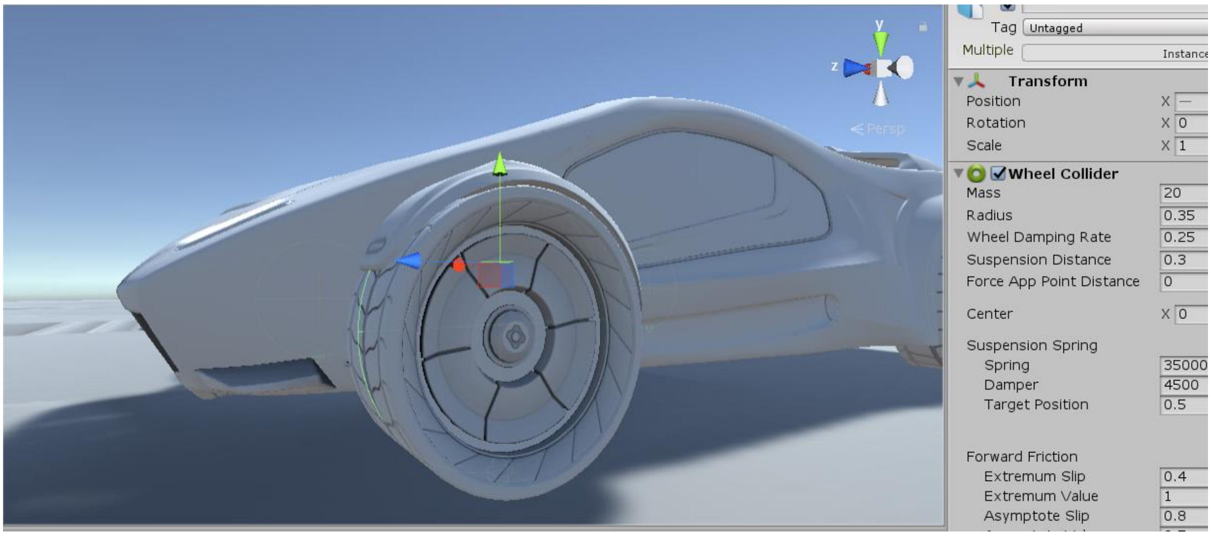
Mass	1000
Drag	0.1
Angular Drag	0.05
Use Gravity	☑
Is Kinematic	□
Interpolate	None
Collision Detection	Discrete
▶ Constraints	

Then go back to the **WheelColliders** > **Select all 4 Wheels**

Then using the side view (*To do that, you can use the View Navigator on top right*) [ASB]



Step 3: Change the **Radius** till the Green lines match the shape of the wheels [ASB]

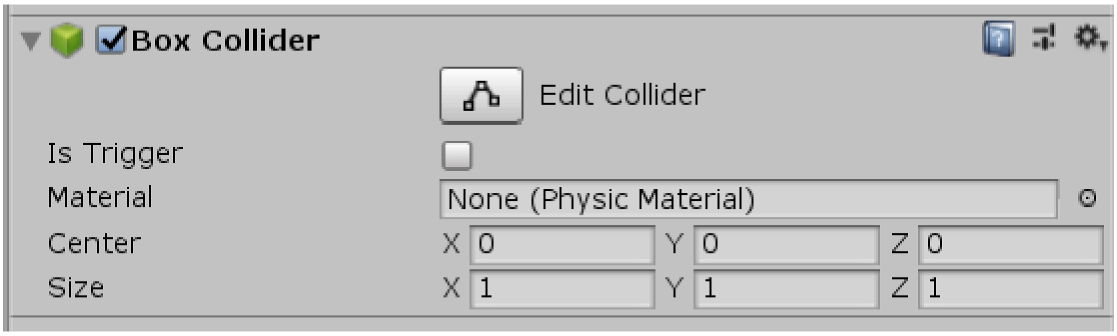


Tag Untagged
Multiple Instance

Transform
Position X —
Rotation X 0
Scale X 1

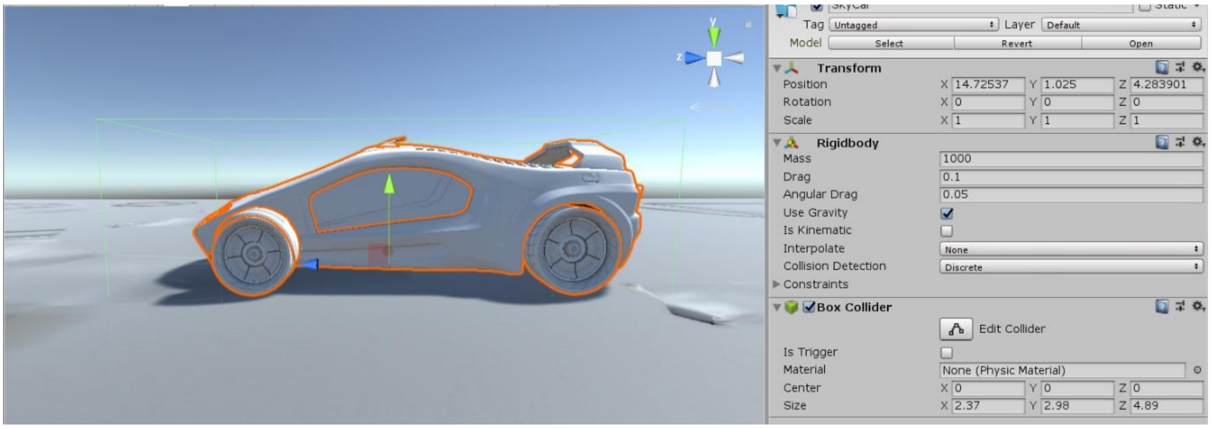
☑ Wheel Collider
Mass 20
Radius 0.35
Wheel Damping Rate 0.25
Suspension Distance 0.3
Force App Point Distance 0
Center X 0
Suspension Spring
Spring 35000
Damper 4500
Target Position 0.5
Forward Friction
Extremum Slip 0.4
Extremum Value 1
Asymptote Slip 0.8

Then Select **SkyCar** > **Add Component** > **Box Collider** [ASB]



☑ Box Collider
Edit Collider
Is Trigger ☐
Material None (Physic Material)
Center X 0 Y 0 Z 0
Size X 1 Y 1 Z 1

Then change its **size** so your car would **fit** inside of the **green 'Box'** [ASB]



Tag Untagged Layer Default
Model Select Revert Open

Transform
Position X 14.72537 Y 1.025 Z 4.283901
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Rigidbody
Mass 1000
Drag 0.1
Angular Drag 0.05
Use Gravity ☑
Is Kinematic ☐
Interpolate None
Collision Detection Discrete
Constraints

☑ Box Collider
Edit Collider
Is Trigger ☐
Material None (Physic Material)
Center X 0 Y 0 Z 0
Size X 2.37 Y 2.98 Z 4.89

Step 4: **SkyCar** > **Add Component** > **New Script** > **CarController**

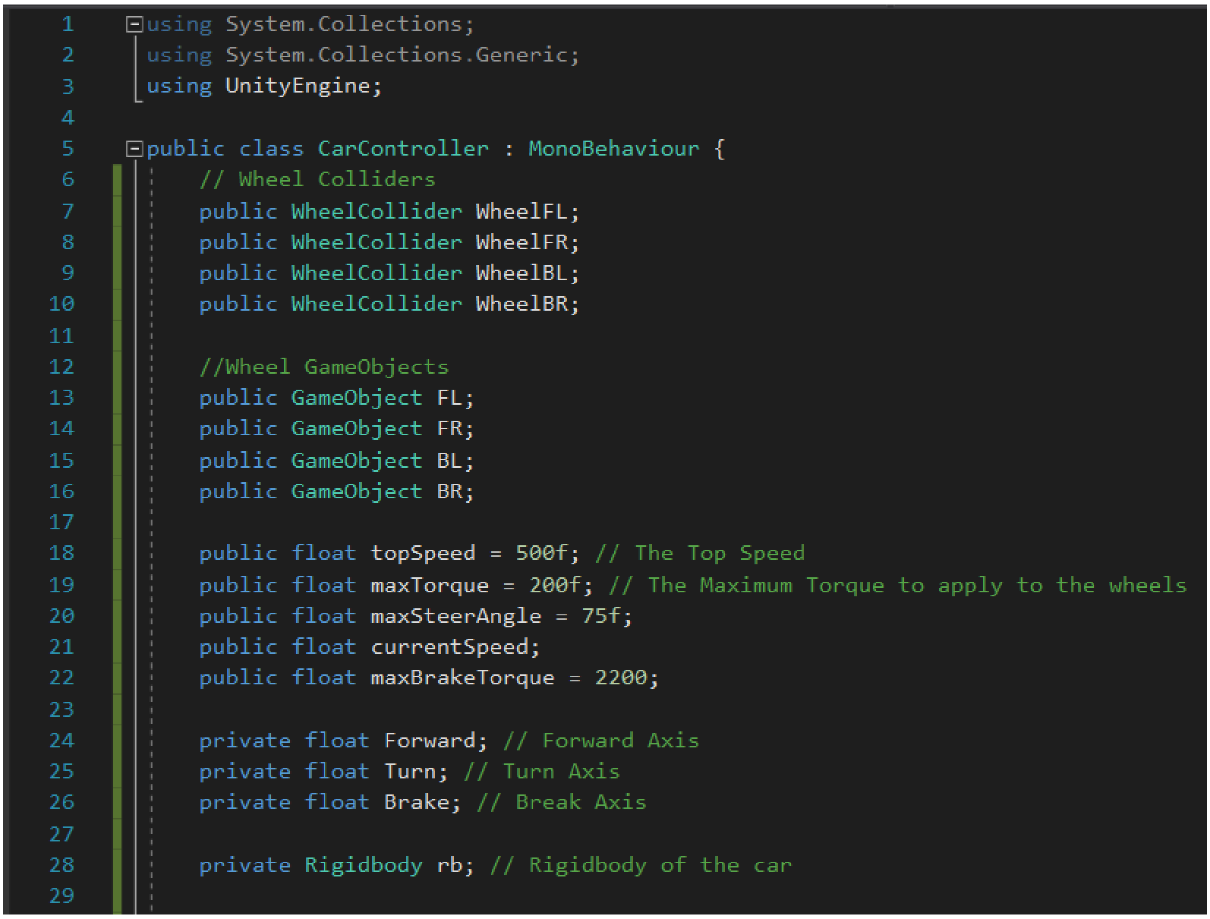
To make your life easier: Go to your Asset and make sure you move your **Script** into your Script Folder

Then > **Open the Script**

Just so you know: You need to implement the Wheel Colliders, Wheel Game object, Top Speed, Maximum Torque and so on, to do that use the code below and pay attention to the comments to understand the **behaviour of the code** and its **grammar**, Comments are followed '//' and are in green.

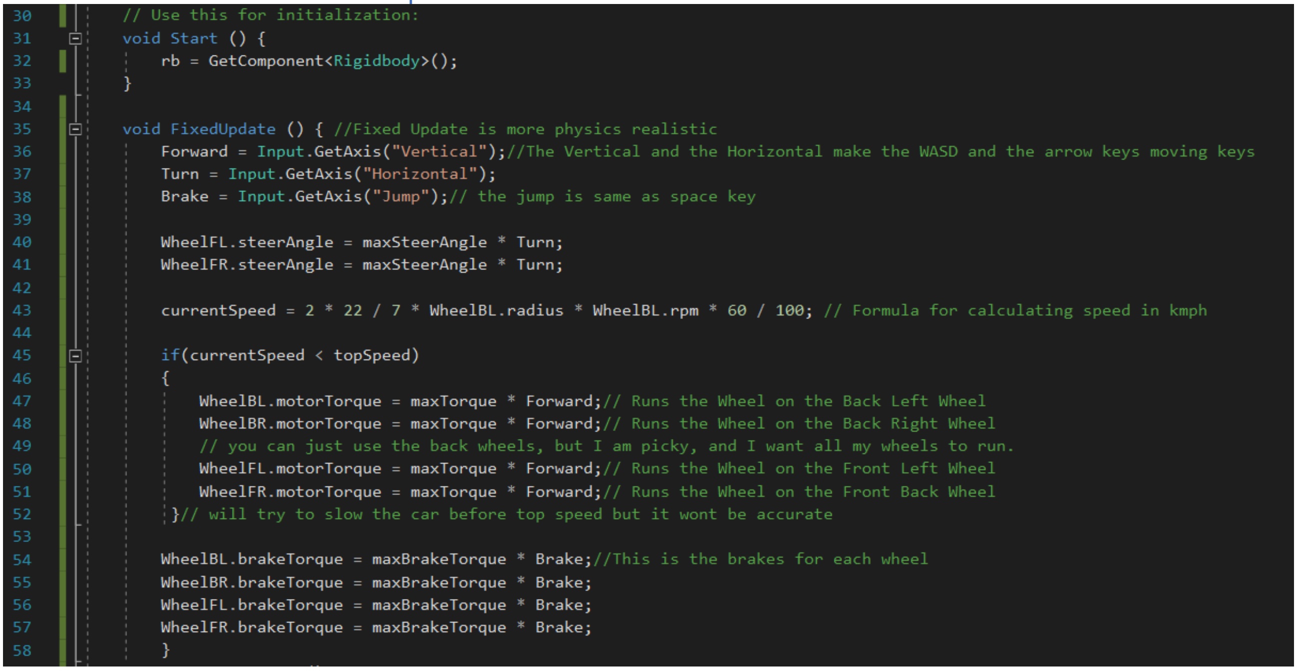
Step 5: Follow these codes:

The definition part:



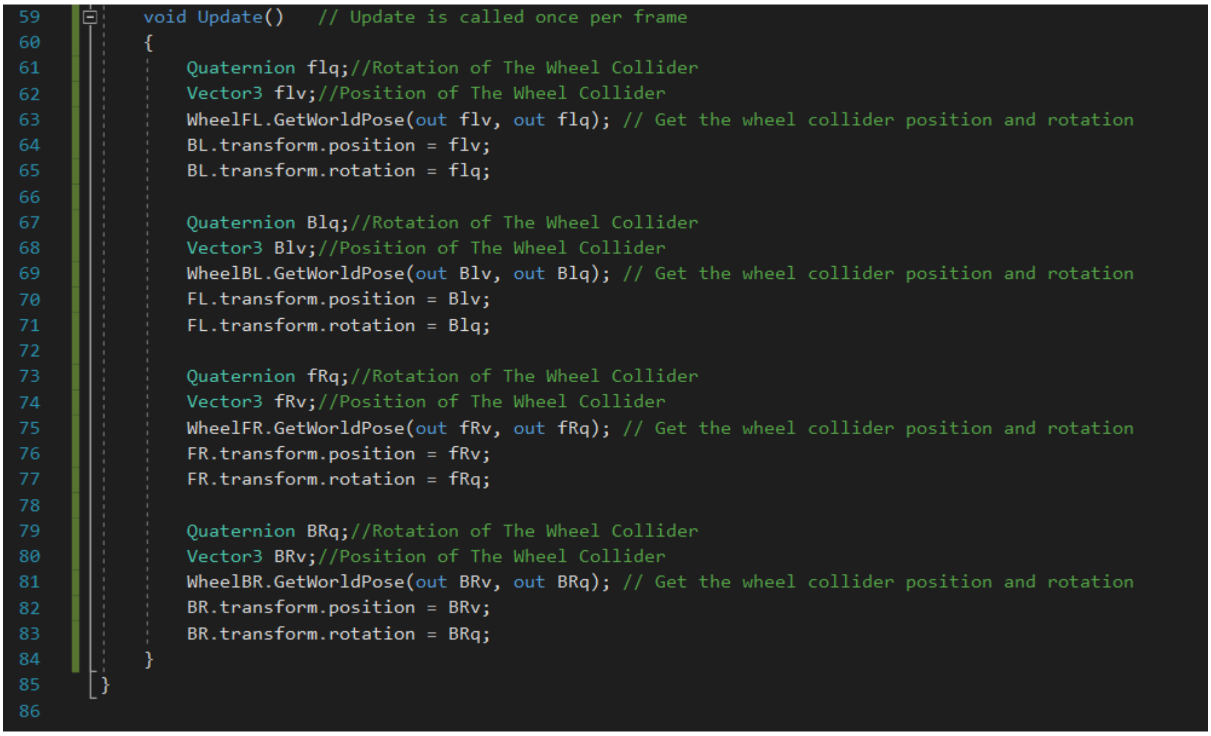
```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class CarController : MonoBehaviour {
    // Wheel Colliders
    public WheelCollider WheelFL;
    public WheelCollider WheelFR;
    public WheelCollider WheelBL;
    public WheelCollider WheelBR;

    //Wheel GameObjects
    public GameObject FL;
    public GameObject FR;
    public GameObject BL;
    public GameObject BR;

    public float topSpeed = 500f; // The Top Speed
    public float maxTorque = 200f; // The Maximum Torque to apply to the wheels
    public float maxSteerAngle = 75f;
    public float currentSpeed;
    public float maxBrakeTorque = 2200;

    private float Forward; // Forward Axis
    private float Turn; // Turn Axis
    private float Brake; // Break Axis

    private Rigidbody rb; // Rigidbody of the car

```

The Void Start and the Void FixUpdate:



```
    // Use this for initialization:
    void Start () {
        rb = GetComponent<Rigidbody>();
    }

    void FixedUpdate () { //Fixed Update is more physics realistic
        Forward = Input.GetAxis("Vertical");//The Vertical and the Horizontal make the WASD and the arrow keys moving keys
        Turn = Input.GetAxis("Horizontal");
        Brake = Input.GetAxis("Jump");// the jump is same as space key

        WheelFL.steerAngle = maxSteerAngle * Turn;
        WheelFR.steerAngle = maxSteerAngle * Turn;

        currentSpeed = 2 * 22 / 7 * WheelBL.radius * WheelBL.rpm * 60 / 100; // Formula for calculating speed in kmph

        if(currentSpeed < topSpeed)
        {
            WheelBL.motorTorque = maxTorque * Forward;// Runs the Wheel on the Back Left Wheel
            WheelBR.motorTorque = maxTorque * Forward;// Runs the Wheel on the Back Right Wheel
            // you can just use the back wheels, but I am picky, and I want all my wheels to run.
            WheelFL.motorTorque = maxTorque * Forward;// Runs the Wheel on the Front Left Wheel
            WheelFR.motorTorque = maxTorque * Forward;// Runs the Wheel on the Front Back Wheel
        }// will try to slow the car before top speed but it wont be accurate

        WheelBL.brakeTorque = maxBrakeTorque * Brake;//This is the brakes for each wheel
        WheelBR.brakeTorque = maxBrakeTorque * Brake;
        WheelFL.brakeTorque = maxBrakeTorque * Brake;
        WheelFR.brakeTorque = maxBrakeTorque * Brake;
        }
```

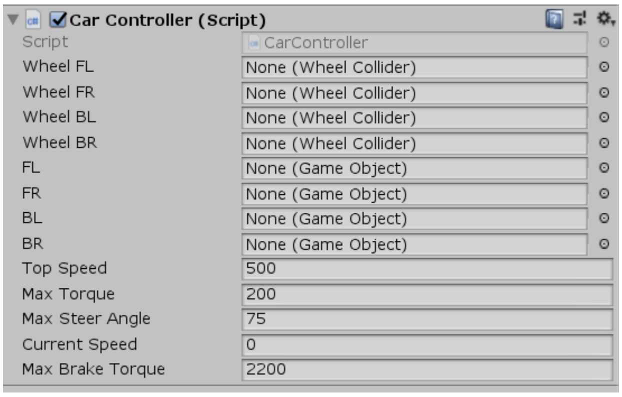
The Void Update:



```
    void Update()   // Update is called once per frame
    {
        Quaternion flq;//Rotation of The Wheel Collider
        Vector3 flv;//Position of The Wheel Collider
        WheelFL.GetWorldPose(out flv, out flq); // Get the wheel collider position and rotation
        BL.transform.position = flv;
        BL.transform.rotation = flq;

        Quaternion Blq;//Rotation of The Wheel Collider
        Vector3 Blv;//Position of The Wheel Collider
        WheelBL.GetWorldPose(out Blv, out Blq); // Get the wheel collider position and rotation
        FL.transform.position = Blv;
        FL.transform.rotation = Blq;

        Quaternion fRq;//Rotation of The Wheel Collider
        Vector3 fRv;//Position of The Wheel Collider
        WheelFR.GetWorldPose(out fRv, out fRq); // Get the wheel collider position and rotation
        FR.transform.position = fRv;
        FR.transform.rotation = fRq;

        Quaternion BRq;//Rotation of The Wheel Collider
        Vector3 BRv;//Position of The Wheel Collider
        WheelBR.GetWorldPose(out BRv, out BRq); // Get the wheel collider position and rotation
        BR.transform.position = BRv;
        BR.transform.rotation = BRq;
    }
}
```

Then Save all and return to **Unity**

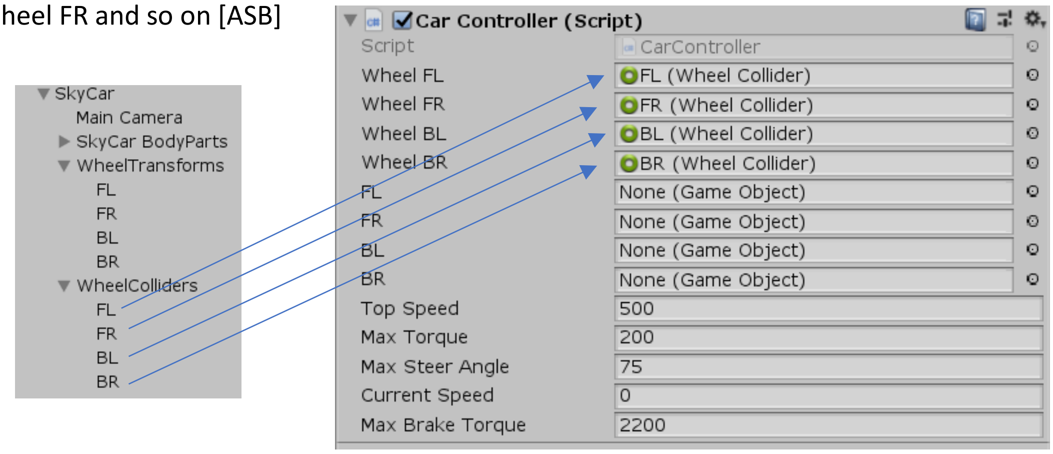
Step 6: When you returned to unity, Under SkyCar **Inspections**, you should have a bigger section for script than you did before [ASB]



☑ Car Controller (Script)

Script	CarController
Wheel FL	None (Wheel Collider)
Wheel FR	None (Wheel Collider)
Wheel BL	None (Wheel Collider)
Wheel BR	None (Wheel Collider)
FL	None (Game Object)
FR	None (Game Object)
BL	None (Game Object)
BR	None (Game Object)
Top Speed	500
Max Torque	200
Max Steer Angle	75
Current Speed	0
Max Brake Torque	2200

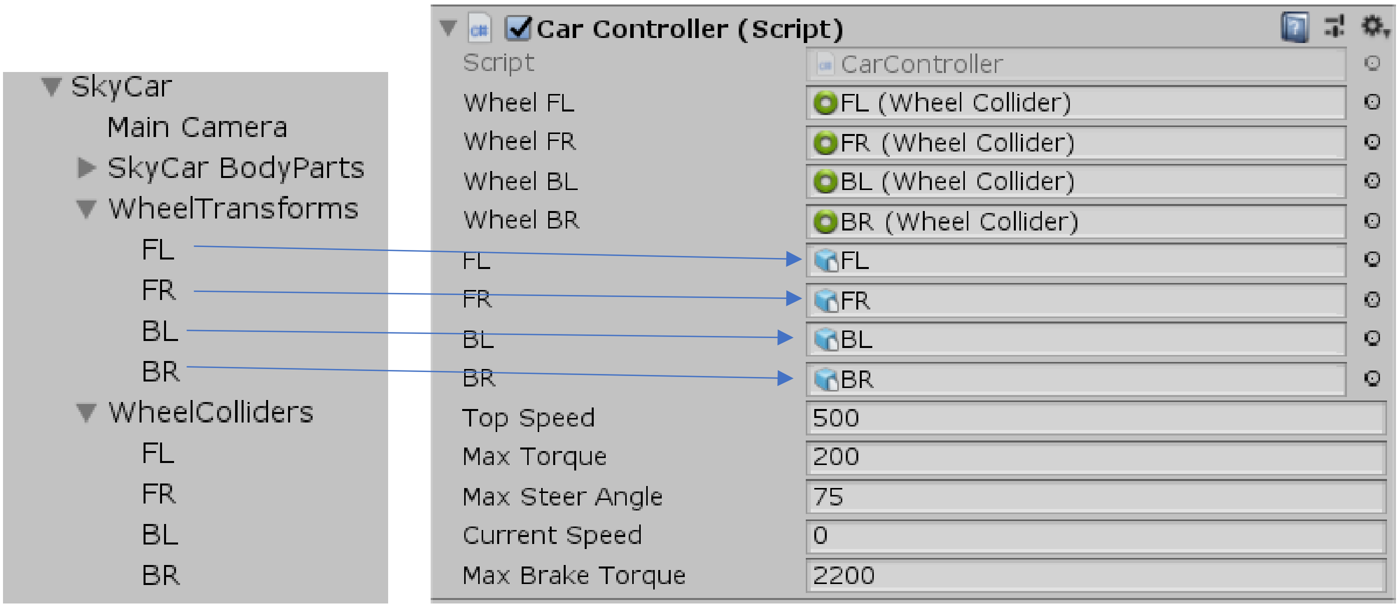
Then open the **WheelCollider** sub route in Hierarchy and drag and drop FL for Wheel FL, FR for Wheel FR and so on [ASB]



☑ Car Controller (Script)

Script	CarController
Wheel FL	FL (Wheel Collider)
Wheel FR	FR (Wheel Collider)
Wheel BL	BL (Wheel Collider)
Wheel BR	BR (Wheel Collider)
FL	None (Game Object)
FR	None (Game Object)
BL	None (Game Object)
BR	None (Game Object)
Top Speed	500
Max Torque	200
Max Steer Angle	75
Current Speed	0
Max Brake Torque	2200

Then do the same for **WheelTransforms** for the next four spaces below it [ASB]

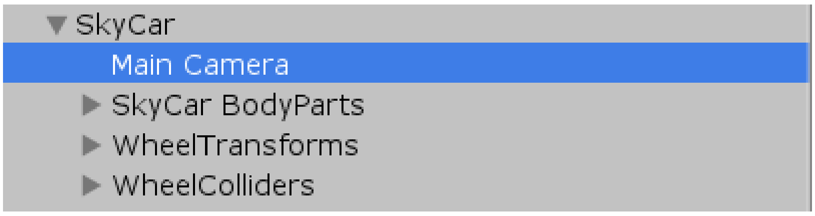


```
▼ SkyCar
    Main Camera
  ▶ SkyCar BodyParts
  ▼ WheelTransforms
      FL
      FR
      BL
      BR
  ▼ WheelColliders
      FL
      FR
      BL
      BR
```

Car Controller (Script)

Script	CarController
Wheel FL	FL (Wheel Collider)
Wheel FR	FR (Wheel Collider)
Wheel BL	BL (Wheel Collider)
Wheel BR	BR (Wheel Collider)
FL	FL
FR	FR
BL	BL
BR	BR
Top Speed	500
Max Torque	200
Max Steer Angle	75
Current Speed	0
Max Brake Torque	2200

Step 7: Drag the **Main Camera** and drop it under sub rout of **SkyCar** so the camera follows the car [ASB]



```
▼ SkyCar
    Main Camera
  ▶ SkyCar BodyParts
  ▶ WheelTransforms
  ▶ WheelColliders
```

Step 8: Save your work and Enjoy the ride ☺