

# Virtual Worlds

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## Programming Assignment #1

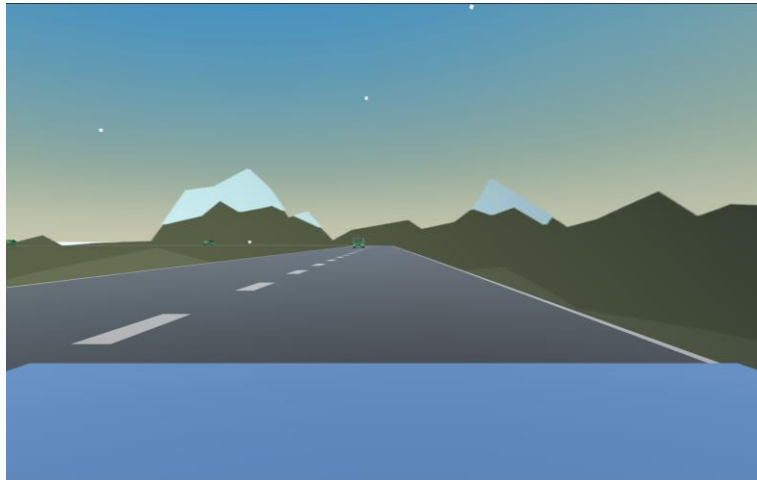
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# Easy 1: Camera Switcher

- ☐ Create two or more different camera perspectives. You should be able to switch cameras by pressing left or right shift. Only one camera must be installed.

1



shift



3



Camera view example

# Easy 2: Revival

- ☐ If Player runs off the road and falls to the ground, make sure he can run back on the road.

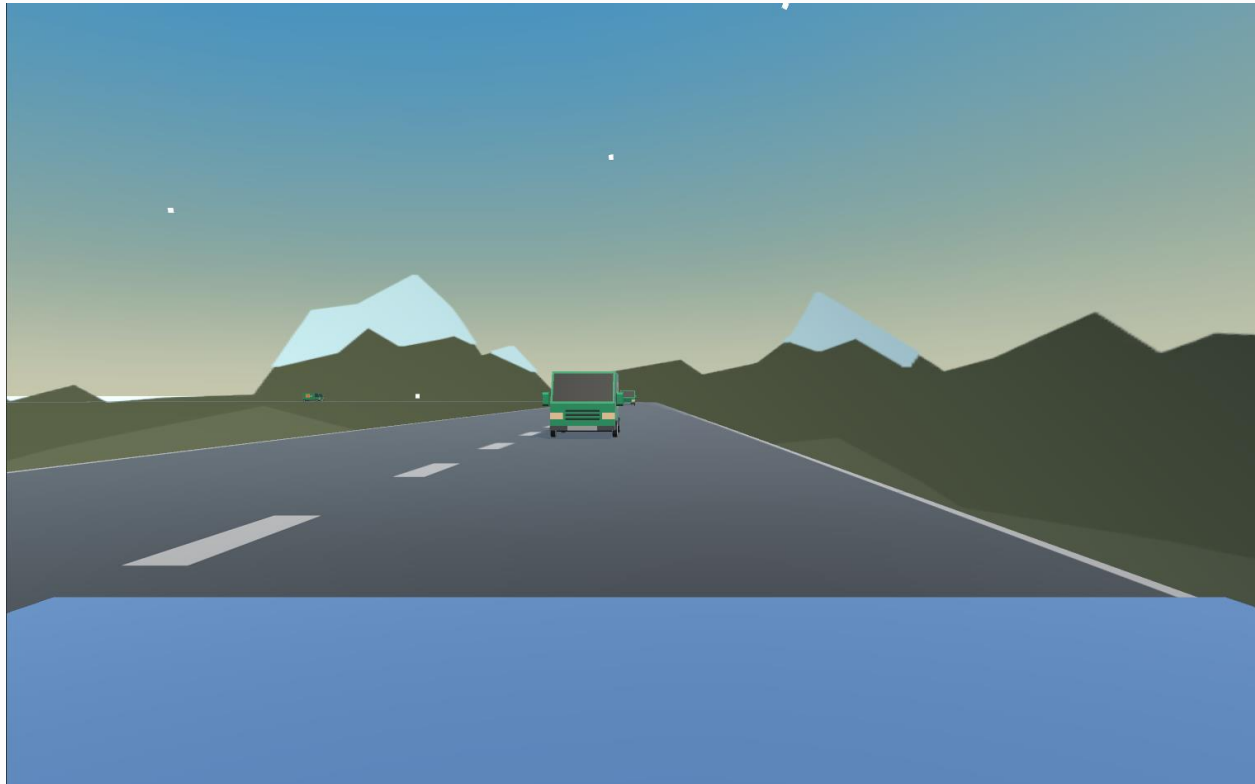


Example of revival



# Medium 1: Oncoming Vehicles

- ☐ Add three or more other cars that are automatically driving down the road in opposite direction, which the player also must avoid.



Example of oncoming vehicles

# Hard: Make a Curved Road Mesh

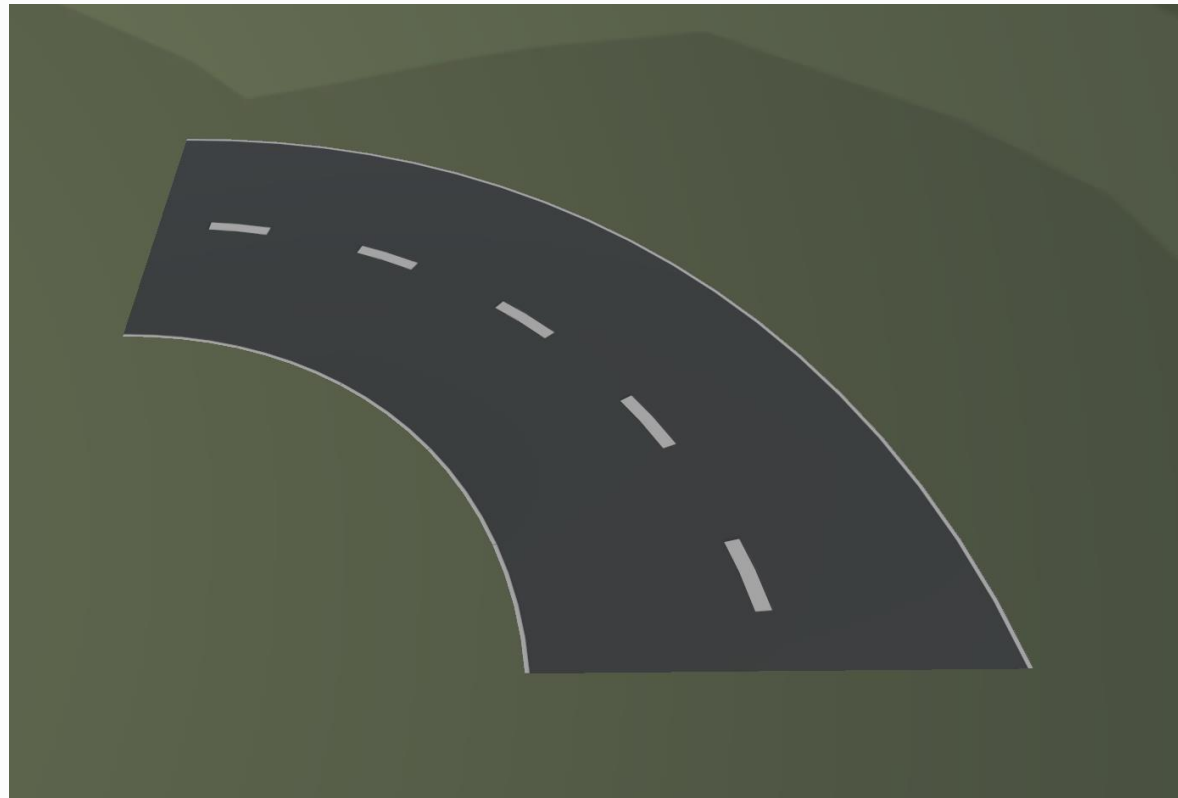
- ☐ Inherit the BaseMakeMesh code and Create a curved road. Turn the curved road you created into a Prefab.

90

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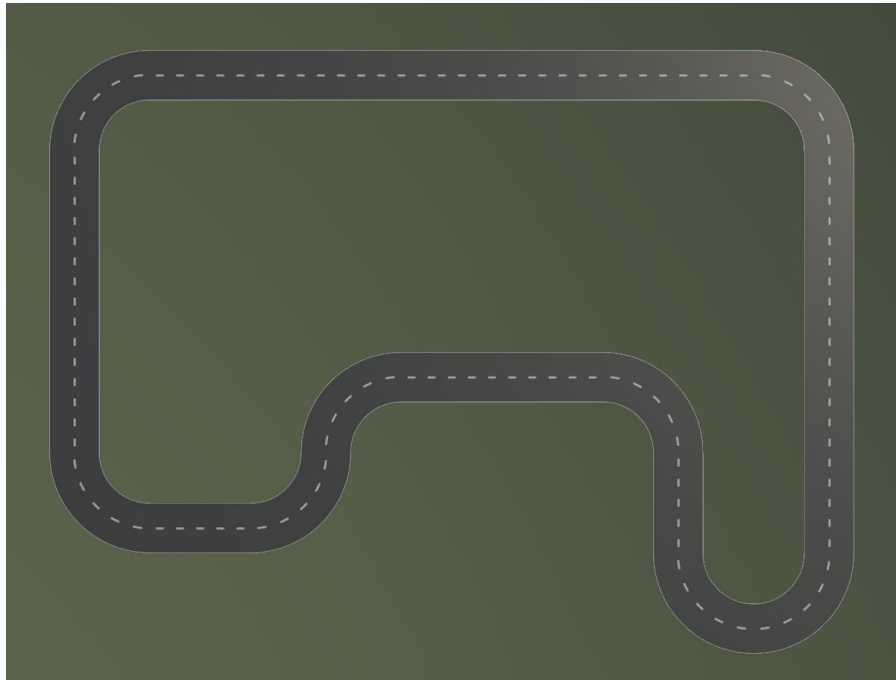
prefab



Example of curved road

# Medium 2: Road Layout

- Lay out roads with custom Prefabs. Roads should be closed and not simple squares.



Road Example



Incorrect Road Example

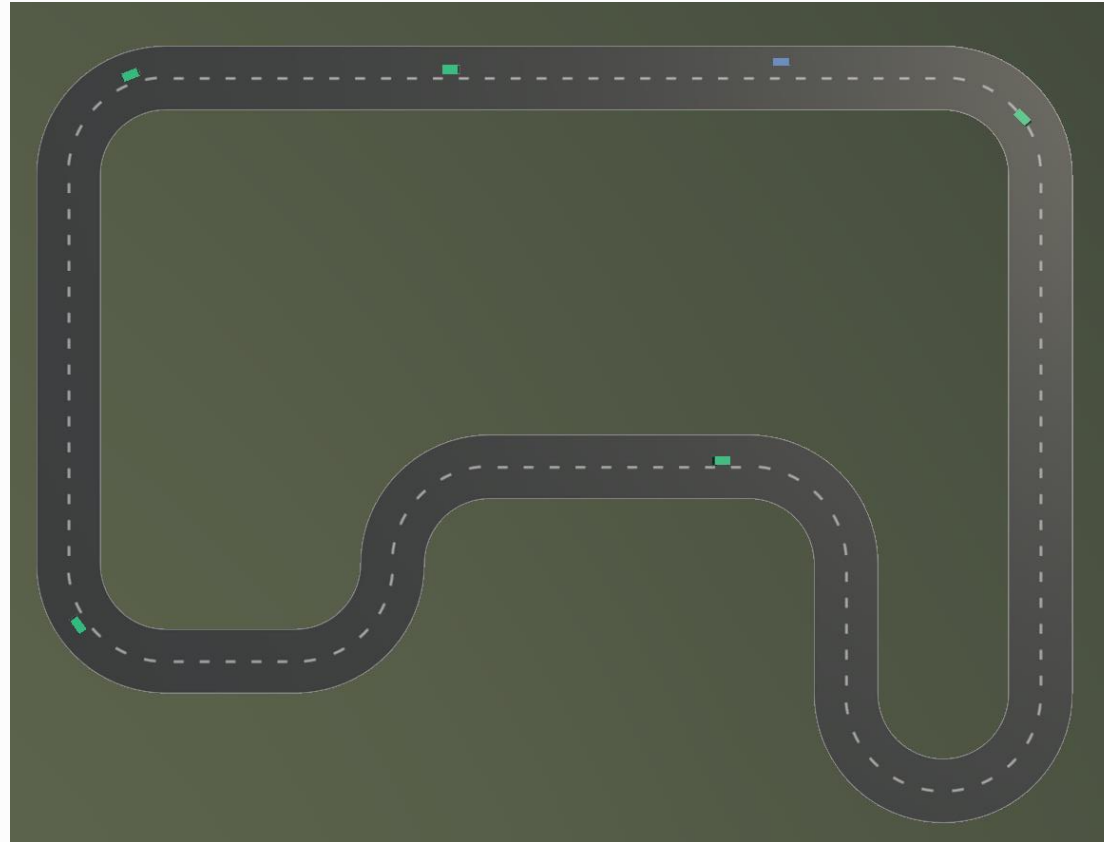
1 :

2 :

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# Expert: Oncoming Behicle on Curved Road

- ☐ Make cars driving down the road in opposite directions behave appropriately on curved roads.



A car that moves appropriately on curved and straight roads

# How to Create a Straight Road Mesh

- ☐ Create a new Empty Object and rename it "Straight Road"
- ☐ In the "Scripts" folder, Right-click > Create > C# Script named "StraightRoadMesh"
- ☐ Attach the "Straight Road Mesh" script to the Straight Road
- ☐ Change base class from "MonoBehaviour" to "BaseMakeMesh"
- ☐ Add abstract classes(SetNormals, SetTriangles, SetUV, SetVertices)

```
public class StraightRoadMesh : BaseMakeMesh
{
    protected override void SetVertices()
    {
    }

    protected override void SetNormals()
    {
    }

    protected override void SetUV()
    {
    }

    protected override void SetTriangles()
    {
    }
}
```

base

straight

4 mono  
가

vertex + normal  
UV 0~1  
SetTriangle ?  
face - vertex  
:

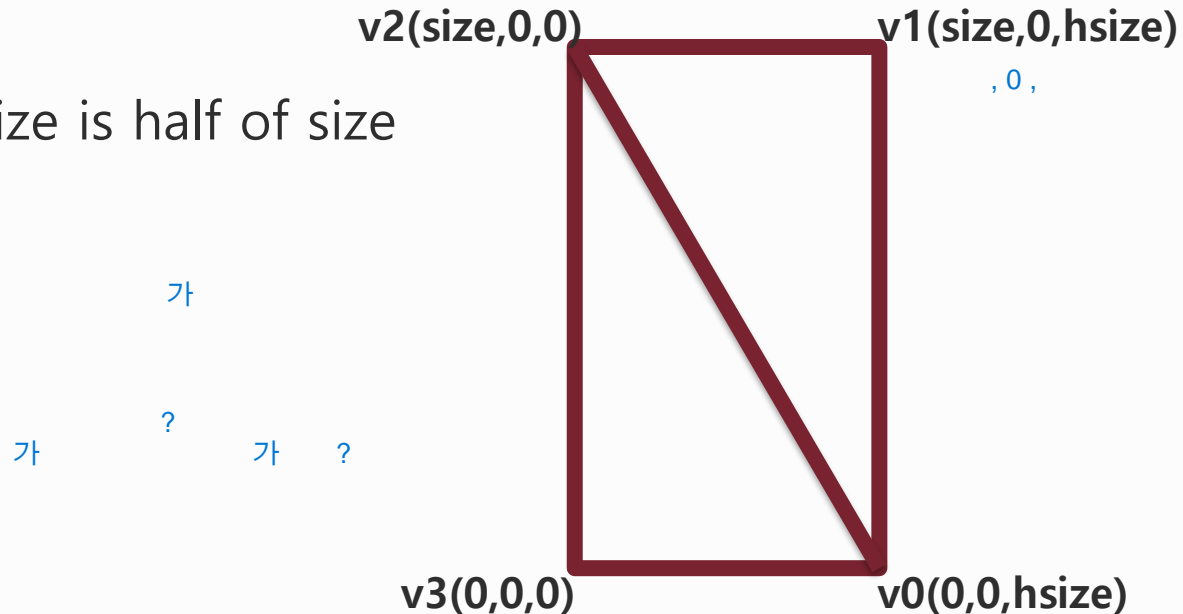
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# How to Create a Straight Road Mesh

- Add 4 vertices and normals: Each point represents the end of a rectangular road
- Map the UVs like this: Each point is used to apply a texture
- Set up triangles to construct the following shapes

❖ hsize is half of size



```
protected override void SetVertices()
{
    vertices.Add(new Vector3(-0f, 0f, hsize));
    vertices.Add(new Vector3(size, 0f, hsize));
    vertices.Add(new Vector3(size, 0f, -0f));
    vertices.Add(new Vector3(-0f, 0f, -0f));
}

protected override void SetNormals()
{
    normals.Add(new Vector3(0f, -1f, 0f));
    normals.Add(new Vector3(0f, -1f, 0f));
    normals.Add(new Vector3(0f, -1f, 0f));
    normals.Add(new Vector3(0f, -1f, 0f));
}

protected override void SetUV()
{
    uv.Add(new Vector2(0,0));
    uv.Add(new Vector2(1,0));
    uv.Add(new Vector2(1,1));
    uv.Add(new Vector2(0,1));
}

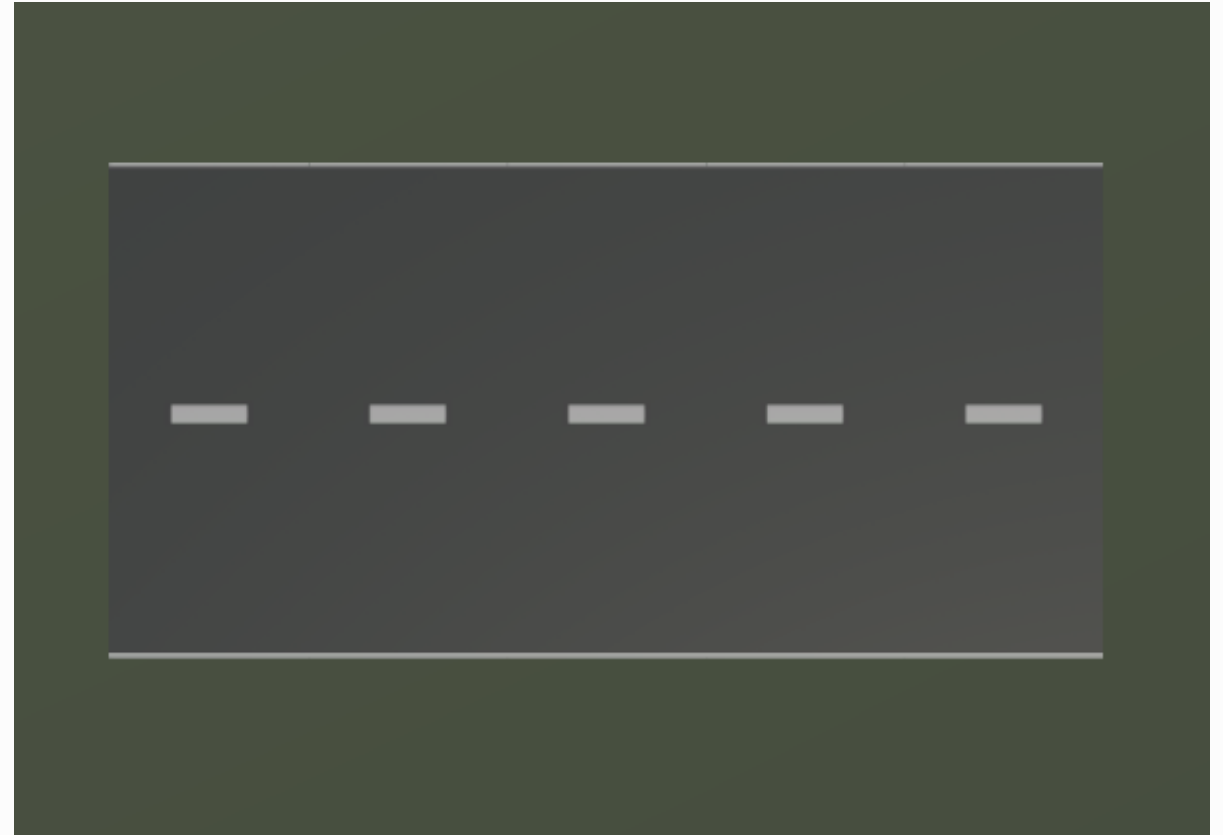
protected override void SetTriangles()
{
    triangles.Add(0);
    triangles.Add(1);
    triangles.Add(2);
    triangles.Add(0);
    triangles.Add(2);
    triangles.Add(3);
}
```

4  
y : 0  
normal vector  
4  
3 add  
0 1 2  
0 2 3

# How to Create a Straight Road Mesh

- ☐ Click on the "Straight Road" object to add the Road material to the mesh renderer.
- ☐ Run the editor and check if the mesh is created properly.

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## ☐ Report

### ■ Title page

- ☐ Course title, submission date, affiliation, student ID, full name

### ■ Fulfill table

- ☐ A table to write down what you are satisfied with
- ☐ An example is attached on the next page

### ■ For each requirement, explain how you fulfilled it

- ☐ Do not just dump the entire code
- ☐ It's okay to copy snippets of your code to complement written description

❖ Capture and attach a screen shot for each result

### ■ Conclude with some comments on your work

- ☐ Key challenges you have successfully tackled
- ☐ Limitations you hope to address in the future

### ■ Add a link to a video that runs the program (e.g. YouTube)

- ☐ Please take a video so we can clearly see what you achieved
- ☐ When you click the link, the video should be played back without problems

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## ☐ Example of Fulfill Table

Easy 1	Camera switcher	O
Easy 2	Revival	O
Medium 1	Oncoming vehicles	O
Medium 2	Road layout	X
Hard	Make a curved road mesh	O
Expert	Oncoming vehicle on curved road	X

# Submission

## ☐ Compress your build folder, export file and report into a single \*.zip file

### ■ Export File

#### ☐ Export > Export Files

❖ Once you have imported the provided unitypackage file, it will be in the top left menu.

#### ☐ The format of the export file is "packageFile.unitypackage".

### ■ Report

#### ☐ A single "report.pdf" file

❖ You should convert your word format (\*.hwp, \*.doc, \*.docx) to PDF format (\*.pdf) before zipping

### ■ Name your zip file as your student ID

❖ ex) 20xxxxxxx.zip

❖ **NOTE:** Before submitting, import the exported file into an empty project and check that it works well!

## ☐ Upload to homework assignment in KLAS

## ☐ Due at 4/16 (Wed) 11:59 PM