三、游戏对象与图形基础

课程实践：Unity中使用多个相机

- 中文 在Unity中使用多个相机 - 及其重要性
- 原文 Using Multiple Unity Cameras – Why This May Be Important?

作业与练习

自学资源

用户手册

- 图形元素
- 声音元素

c# 结构体

不负责的连接： http://www.cnblogs.com/kissdodog/archive/2013/05/11/3072832.html

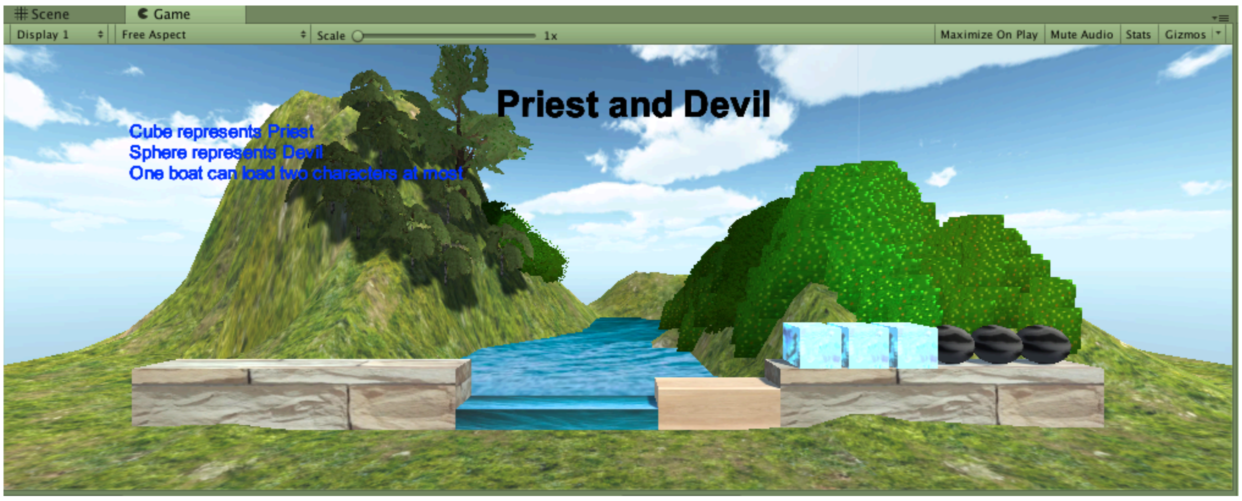
C# 枚举与常数

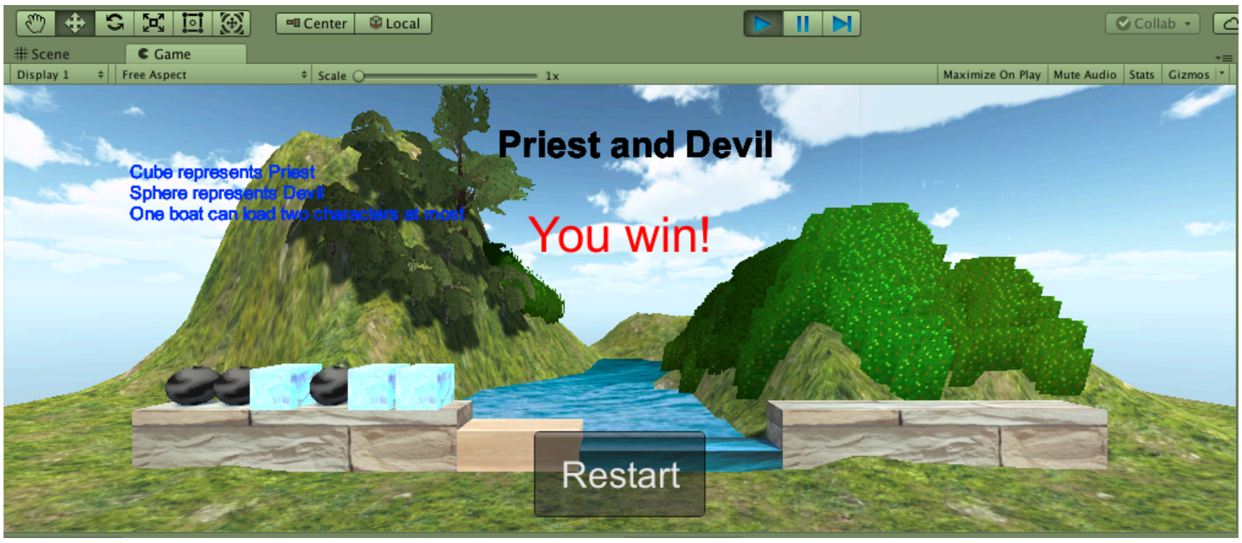
不负责任的连接： http://www.cnblogs.com/kissdodog/archive/2013/01/16/2863515.html

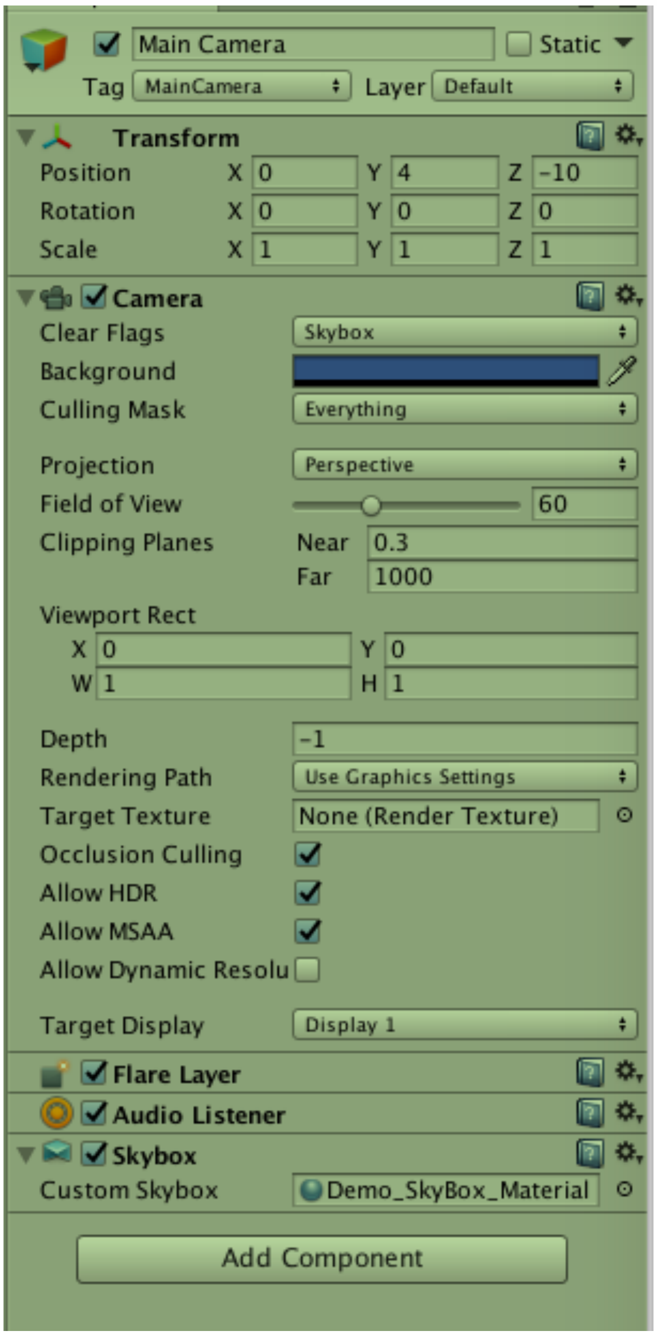
作业内容

1、操作与总结

- 参考 Fantasy Skybox FREE 构建自己的游戏场景
  1. 修改了游戏场景中的Terrain
  2. 下载Assets美化Skybox和为Terrain添加Textures。
  3. 添加树和草的prefabs实现种树种草。


Scene
Game
Display 1
Free Aspect
Scale
1x
Maximize On Play
Mute Audio
Stats
Gizmos
Priest and Devil
Cube represents Priest
Sphere represents Devil
One boat can load two characters at most


Center
Local
Collab
Scene
Game
Display 1
Free Aspect
Scale
1x
Maximize On Play
Mute Audio
Stats
Gizmos
Priest and Devil
Cube represents Priest
Sphere represents Devil
One boat can load two characters at most
You win!
Restart



Main Camera ☑ | Static ☐
Tag: MainCamera | Layer: Default

Transform

	X	Y	Z
Position	0	4	-10
Rotation	0	0	0
Scale	1	1	1

Camera ☑

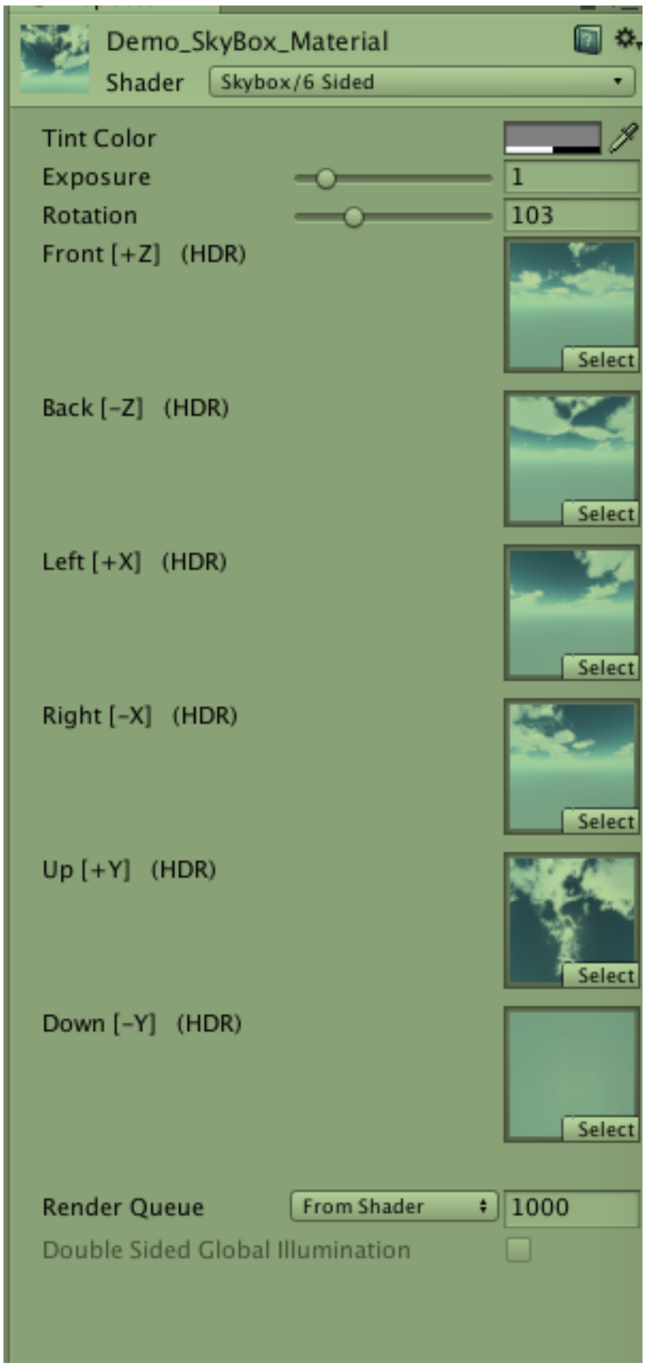
Clear Flags	Skybox
Background	
Culling Mask	Everything
Projection	Perspective
Field of View	60
Clipping Planes	Near 0.3
	Far 1000
Viewport Rect	X 0, Y 0, W 1, H 1
Depth	-1
Rendering Path	Use Graphics Settings
Target Texture	None (Render Texture)
Occlusion Culling	✓
Allow HDR	✓
Allow MSAA	✓
Allow Dynamic Resolu	☐
Target Display	Display 1

Flare Layer ☑

Audio Listener ☑

Skybox ☑

Custom Skybox	Demo_SkyBox_Material



Demo_SkyBox_Material

Shader Skybox/6 Sided

Tint Color

Exposure 1

Rotation 103

Front [+Z] (HDR) Select

Back [-Z] (HDR) Select

Left [+X] (HDR) Select

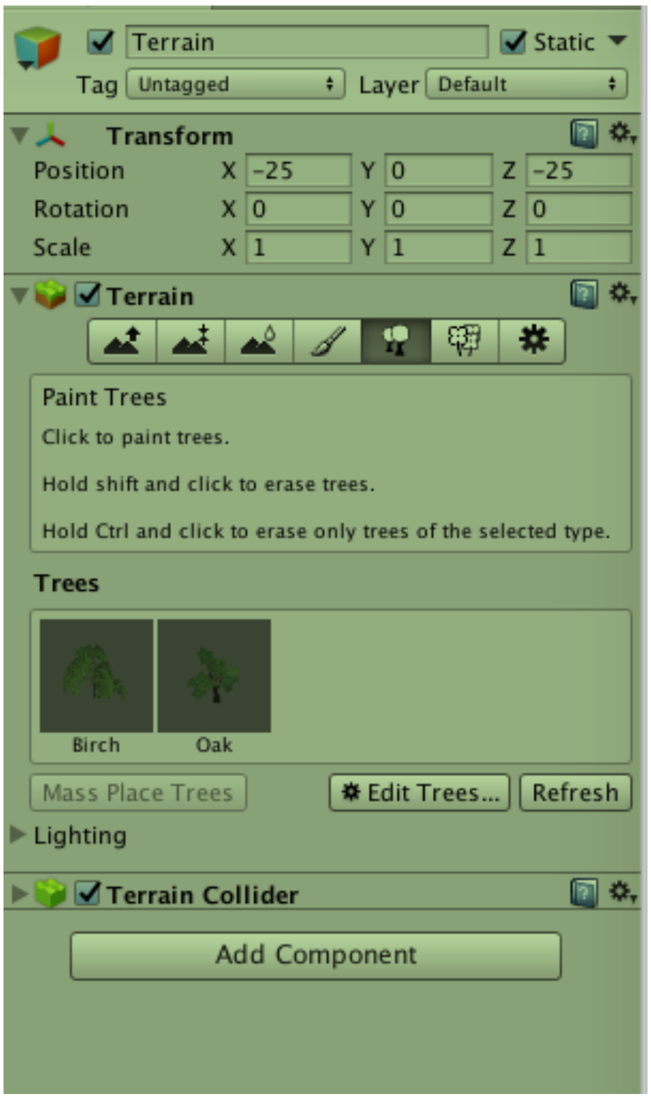
Right [-X] (HDR) Select

Up [+Y] (HDR) Select

Down [-Y] (HDR) Select

Render Queue From Shader 1000

Double Sided Global Illumination


Terrain
Static
Tag Untagged
Layer Default
Transform
Position X -25 Y 0 Z -25
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1
Terrain
Paint Trees
Click to paint trees.
Hold shift and click to erase trees.
Hold Ctrl and click to erase only trees of the selected type.
Trees
Birch
Oak

- 写一个简单的总结，总结游戏对象的使用

1. 游戏对象有很多方法：
    - 通过GameObject菜单栏中创建
    - 通过代码实例化预设
    - 克隆游戏对象
    - GameObject.Find()
2. 可以添加许多组件，其中Transform为必需组件
3. 游戏对象 (GameObject) 还具有标记 (Tag)、层 (Layer) 和名称 (Name)。
4. 在父子对象间传送消息
5. 为其添加shader渲染，成为一个material

2、编程实践

- 牧师与魔鬼 动作分离版

1. 利用课件中的框架进行简单修改
2. 将之前的控制游戏对象动作的Moveable组件取消，而是由简单动作和组合动作完成。
3. FirstController只关心ActionManager的行为，再通过其为游戏对象添加简单动作和组合动作。

部分修改代码：

```
//SceneActionManager.cs
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class SceneActionManager : SSActionManager,ISSActionCallback {

    public void MoveBoat(BoatController boat){
        CCMoveToActions action =
CCMoveToActions.GetSSAction(boat.getDestination(),20);
        this.RunAction (boat.getGameobj (), action, this);
    }

    public void MoveCharacter(CharacterController _characterCtrl,Vector3 des) {

        Vector3 pos = _characterCtrl.getPos();
        Vector3 mid = pos;
        if (des.y > pos.y)
            mid.y = des.y;
        else
            mid.x = des.x;

        SSAction action1 = CCMoveToActions.GetSSAction(mid, 40);
        SSAction action2 = CCMoveToActions.GetSSAction (des, 40);
        SSAction action = CCSequenceAction.GetSSAction (1, 0, new List<SSAction>{
action1, action2 });
        this.RunAction (_characterCtrl.getGameobj (), action, this);
    }
    public new void SSActionEvent(SSAction source){}
}

//FirstController.cs
public void moveBoat() {
//      if (userGUI.status == 1 || userGUI.status == 2)
//          return;
        if (boat.isEmpty ())
            return;
//      boat.Move ();
//      Debug.Log(actionManager);
        actionManager.MoveBoat(boat);
        boat.move ();
        userGUI.status = check_game_over ();
    }

    public void characterIsClicked(CharacterController _characterCtrl) {
//      if (userGUI.status == 1 || userGUI.status == 2)
//          return;
```

```
        if (_characterCtrl.isOnBoat ()) {
            CoastController whichCoast;
            if (boat.get_to_or_from () == -1) { // to->-1; from->1
                whichCoast = rightCoast;
            } else {
                whichCoast = leftCoast;
            }

            boat.GetOffBoat (_characterCtrl.getName());
//            _characterCtrl.moveToPosition (whichCoast.getEmptyPosition ());

            actionManager.MoveCharacter (_characterCtrl,
whichCoast.getEmptyPosition ());

            _characterCtrl.getOnCoast (whichCoast);
            whichCoast.getOnCoast (_characterCtrl);

        } else {

            CoastController whichCoast = _characterCtrl.getCoastController ();

            if (boat.getEmptyIndex () == -1) {      // boat is full
                return;
            }

            if (whichCoast.get_to_or_from () != boat.get_to_or_from ()) // boat
is not on the side of character
                return;
            whichCoast.getOffCoast(_characterCtrl.getName());
//            _characterCtrl.moveToPosition (boat.getEmptyPosition());

            actionManager.MoveCharacter (_characterCtrl,boat.getEmptyPosition());


            _characterCtrl.getOnBoat (boat);
            boat.GetOnBoat (_characterCtrl);
        }
        userGUI.status = check_game_over ();
    }

//CCSequenceAction.cs
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class CCSequenceAction : SSAction,ISSActionCallback {

    public List<SSAction> sequence;
    public int repeat = -1;//repeat forever
    public int start = 0;

    public static CCSequenceAction GetSSAction(int repeat,int start,List<SSAction>
sequence){
        CCSequenceAction action =
ScriptableObject.CreateInstance<CCSequenceAction> ();
        action.repeat = repeat;
        action.sequence = sequence;
        action.start = start;
        return action;
    }

    // Use this for initialization
    public override void Start () {
        foreach (SSAction action in sequence) {
            action.gameobject = this.gameobject;
            action.transform = this.transform;
            action.callback = this;
            action.Start ();
        }
    }

    // Update is called once per frame
    public override void Update () {
        if (sequence.Count == 0)
            return;
        if (start < sequence.Count) {
            sequence [start].Update ();
        }
    }

    public void SSActionEvent(SSAction source){
        source.destory = false;
        this.start++;
        if (this.start >= sequence.Count) {
            this.start = 0;
            if (repeat > 0)
                repeat--;
            if (repeat == 0) {
                this.destory = true;
                this.callback.SSActionEvent (this);
            }
        }
    }

    public void OnDestroy(){
        foreach (SSAction ac in sequence) {
            DestroyObject (ac);
        }
    }

}


//CCMoveToAction.cs
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class CCMoveToActions : SSAction {

    public Vector3 target;
    public float speed;

    public static CCMoveToActions GetSSAction(Vector3 target,float speed){
        CCMoveToActions action = ScriptableObject.CreateInstance<CCMoveToActions>
();
        action.target = target;
        action.speed = speed;
        return action;
    }

    public override void Start (){}

    public override void Update(){
        this.transform.position = Vector3.MoveTowards (this.transform.position,
target, speed * Time.deltaTime);
        if (this.transform.position == target) {
            this.destory = true;
            this.callback.SSActionEvent (this);
        }
    }

}

//SSAction.cs
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class SSAction : ScriptableObject {

    public bool enable = true;
    public bool destory = false;
    public GameObject gameobject{ get; set;}
    public Transform transform { get; set;}
    public ISSActionCallback callback{ get; set;}

    protected SSAction(){}

    public virtual void Start(){
        throw new System.NotImplementedException ();
    }

    public virtual void Update(){
        throw new System.NotImplementedException ();
    }

}


//SSActionManager.cs
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class SSActionManager : MonoBehaviour {



    private Dictionary<int, SSAction> actions = new Dictionary<int, SSAction> ();
    private List<SSAction> waitingAdd = new List<SSAction>();
    private List<int> waitingDelete = new List<int>();

    protected void Update() {
        foreach (SSAction ac in waitingAdd) {
            actions[ac.GetInstanceID()] = ac;
        }
        waitingAdd.Clear();
        foreach (KeyValuePair<int, SSAction> kv in actions) {
            SSAction ac = kv.Value;
            if (ac.destory) {
                waitingDelete.Add(ac.GetInstanceID());
            } else if (ac.enable) {
                ac.Update();
            }
        }
        foreach(int key in waitingDelete) {
            SSAction ac = actions[key];
            actions.Remove(key);
            DestroyObject(ac);
        }
        waitingDelete.Clear();
    }

    public void RunAction(GameObject gameobject, SSAction action,
ISSActionCallback manager) {
        action.gameobject = gameobject;
        action.transform = gameobject.transform;
        action.callback = manager;
        waitingAdd.Add(action);
        action.Start();
    }

    public void SSActionEvent(SSAction source){}

    protected void Start() {}
}
```