Introduction to Unity 2017/18

Demystifying Game Prototyping
by Peter Bickhofe, November 2017

So, you want to be game developer?

Congrats!
You’re in good company.

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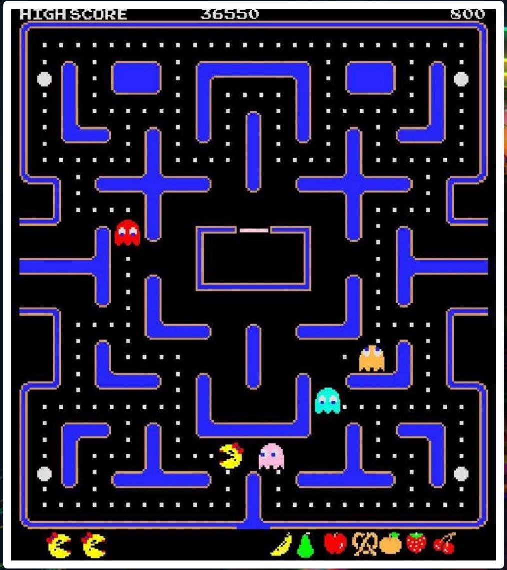
NOOB PROGRAMMERS EVERYWHERE
memegenerator.net

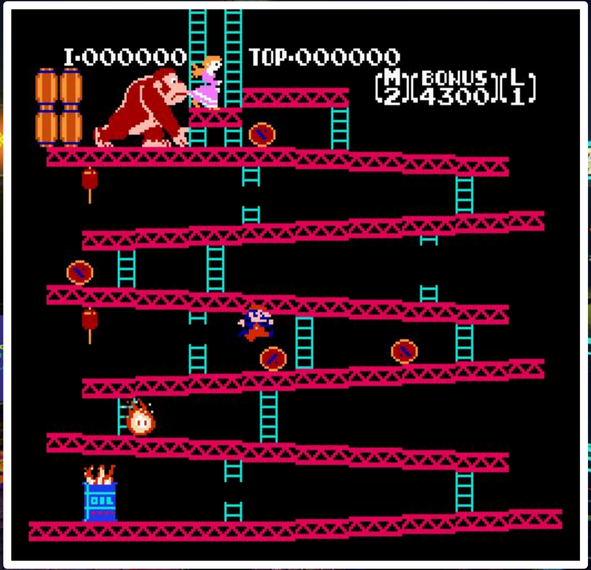
Let met tell you a secret...

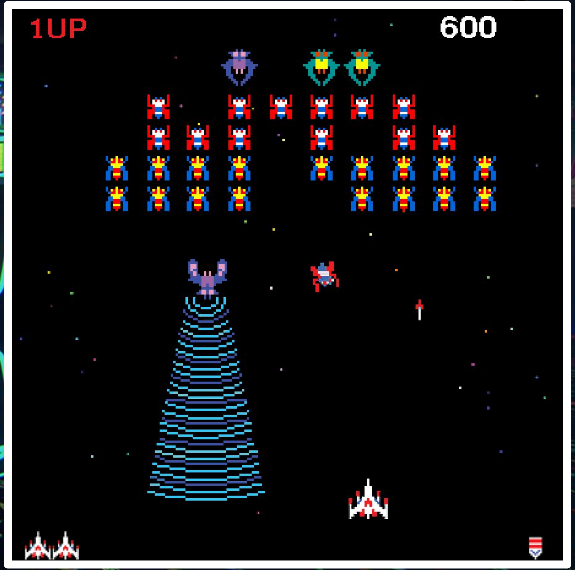
All classic* games have three basic things in common...

*some contemporary games, too!

Three different games from the 80s

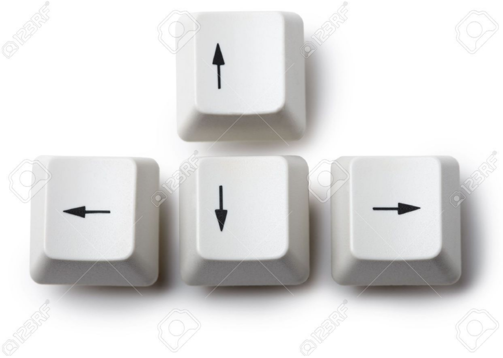






1. Input/Control

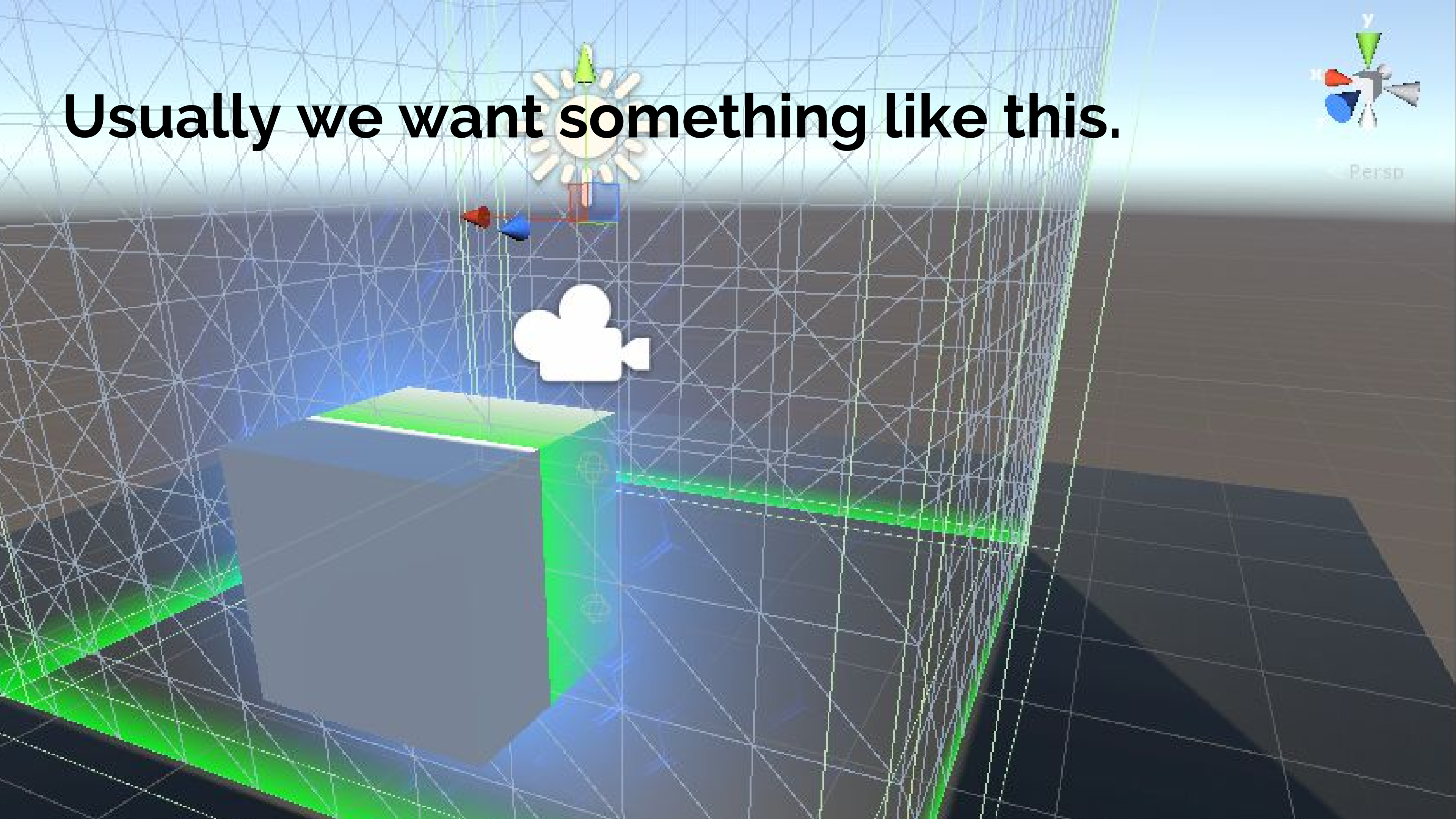
Input: Keyboard, Mouse & Touch



2. Collision

Not necessarily this kind of...

Usually we want something like this.



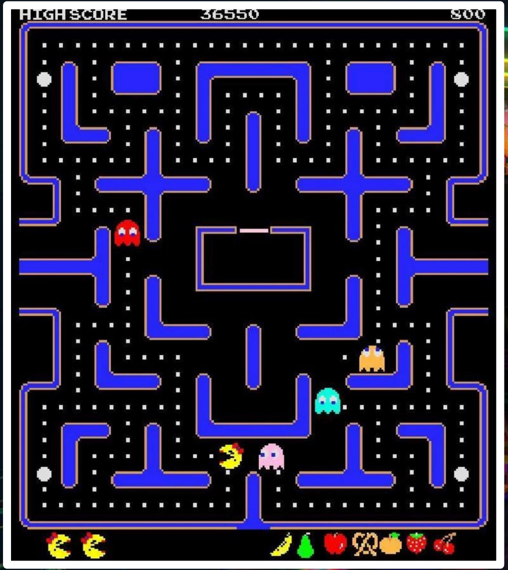
3. Instantiation

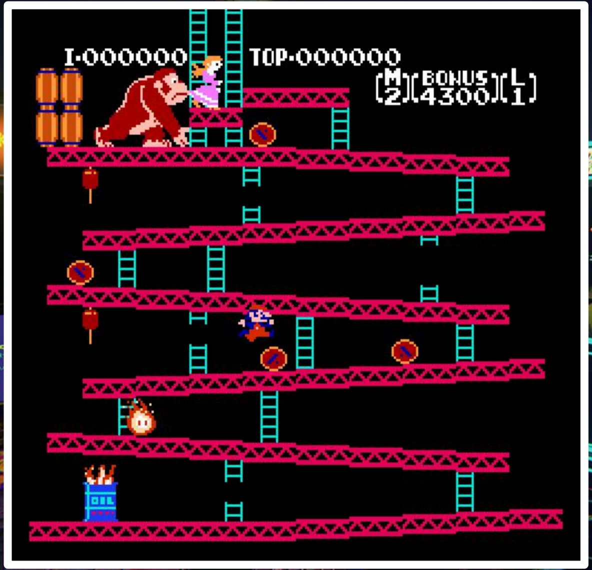
Tataaaaa...

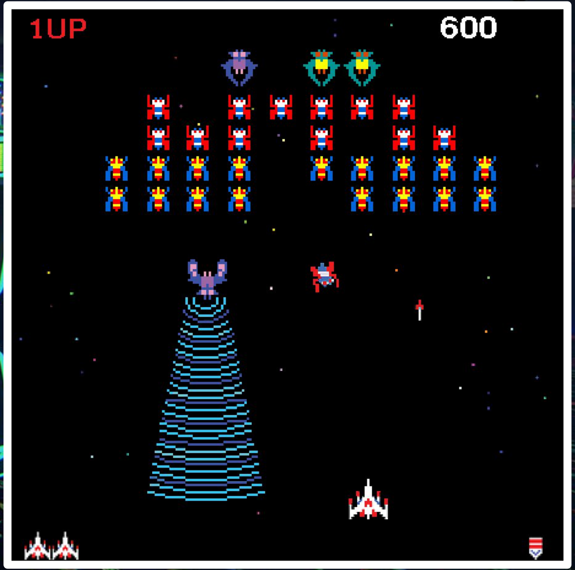
End of lecture

#not

Maybe some similar mechanics?







Input: Keyboard

```
using UnityEngine;
using System.Collections;

public class ExampleClass : MonoBehaviour
{
    public void Update()
    {
      if (Input.GetKey(KeyCode.UpArrow))
      {
            Debug.Log("Up arrow pressed!");
      }
    }
}
```

Input: Mouse Button

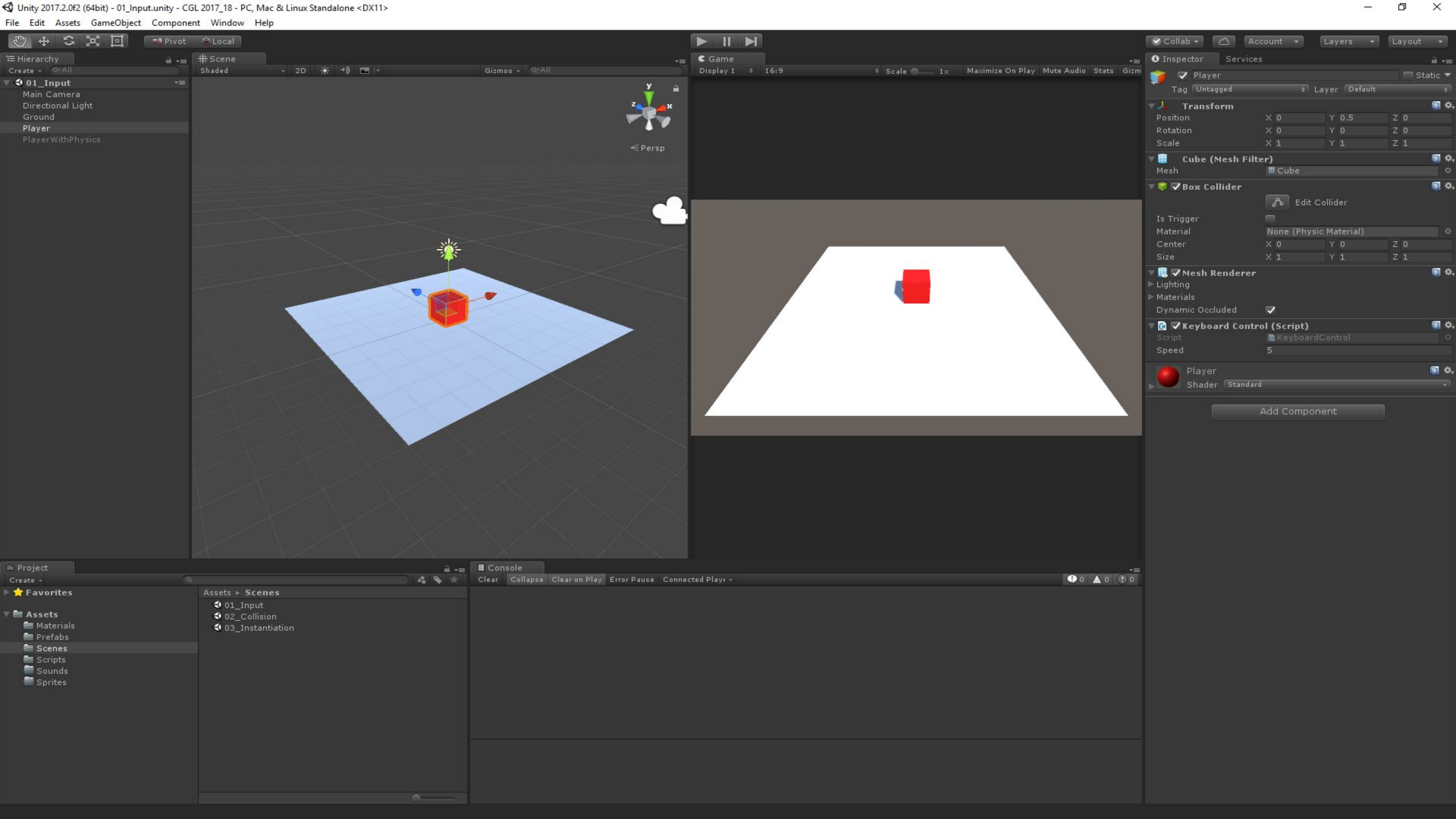
```
using UnityEngine;
using System.Collections;

public class ExampleClass : MonoBehaviour
{
    public void Update()
    {
      if (Input.GetMouseButton(0))
      {
            Debug.Log("Pressed left click.");
      }
    }
}
```

Input: Touch

```
using UnityEngine;
using System.Collections;

public class ExampleClass : MonoBehaviour
{
    public void Update()
    {
      if (Input.touchCount > 0 && Input.GetTouch(0).phase == TouchPhase.Began)
      {
            Debug.Log("Touched!");
      }
    }
}
```



Unity 2017.2.0f2 (64bit) - 01_Input.unity - CGL 2017_18 - PC, Mac & Linux Standalone <DX11>

01_Input
Main Camera
Directional Light
Ground
Player
PlayerWithPhysics

Player
Static
Tag Untagged
Layer Default

Transform
Position X 0 Y 0.5 Z 0
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Cube (Mesh Filter)
Mesh Cube

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

Mesh Renderer
Lighting
Materials
Dynamic Occluded ☑

Keyboard Control (Script)
Script KeyboardControl
Speed 5

Player
Shader Standard

Assets
Materials
Prefabs
Scenes
Scripts
Sounds
Sprites

Assets ▸ Scenes
01_Input
02_Collision
03_Instantiation

0 0 0

Input: Movement

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

public class KeyboardControl : MonoBehaviour {

      public float speed = 5.0f;

      void Update ()
      {
            if (Input.GetKey(KeyCode.UpArrow))
            {
                  Debug.Log("Up arrow pressed!");
                  transform.Translate(Vector3.forward * speed * Time.deltaTime);
            }
      }
}
```

Input: Movement with Physics

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

public class KeyboardControlWithPhysics : MonoBehaviour {

      public float force = 5.0f;
      public Rigidbody rb;

      void Update ()
      {
            if (Input.GetKey(KeyCode.UpArrow))
            {
                  print("up");
                  rb.AddForce(Vector3.forward * force);
            }
      }
}
```

Collision (by Hand)

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

public class CheckBorder : MonoBehaviour {

      void Update () {
            if (transform.position.x > 4) print (“stop”);
      }
}
```

Collisions (Physics)

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

public class CheckCollision : MonoBehaviour {

      Rigidbody rb;

      void OnCollisionEnter(Collision collision)
      {
            print("hit: " + collision.gameObject.name);
      }

}
```

Colliders and Triggers (Physics)

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

public class CheckCollision : MonoBehaviour {

	Rigidbody rb;

	void OnTriggerEnter(Collider collider)
	{
		print("Enter: " + collider.gameObject.name);
	}

}
```

Spawn objects

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

public class SpawnObject : MonoBehaviour {

      public GameObject Pill;

      void Start()
      {
            if (Input.GetKeyDown(KeyCode.Space))
            {
                  Instantiate(Pill, transform.position, Quaternion.identity);
            }
      }
}
```

Fire bullet (cannonball)

New object has physics/rigidbody!

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

public class FireCannonball : MonoBehaviour {

      public GameObject Bullet;
      public float Power = 1000f;

      void Update ()
      {
            if (Input.GetMouseButtonDown(0))
            {
            GameObject NewBullet = Instantiate(Bullet, Vector3.zero,
            Quaternion.identity);

            NewBullet.GetComponent<Rigidbody>().AddForce(Vector3.forward * Power);
      }
}
```

Three tools to make a game!

Your task

Create a game based on the principles of **“Input”, “Collision” and “Instantiation”.**

Start with a scribble that fits on one DIN A4 sheet.

Github
https://github.com/bickhofe/CGL-2017-18

Part two

Some additional basics

Working with scenes

Canvas, Textfields and 3DText

Adding UI Buttons

Adding Bitmaps/Sprites

PlayerPrefs

Sound

Your task for 15th January

Finish “your” game with:
- Scenes (Title, Game, Results)
- Scores or text output
- Sound

Github
https://github.com/bickhofe/CGL-2017-18

Part three

...more useful stuff

Typical coding situations

Clickable objects and Raycasts

Tweening

Exporting your game

Enum

```
public enum WeaponType {

      Sword,

      Gun,

      Stone

}

public WeaponType weaponType;
```

Arrays

```
public int[] numbers;

numbers = new int[5];

nanumbers mes[0] = 10W;



public string[] names;

names = new string[3];

names[0] = “Peter”;
```

Loops

```
for (i=0; i<10; i++){

      print (“Hello: ”+i);

}

for (i=0; i < array.Length; i++){

      print (“Hello: ”+i);

}
```

https://unity3d.com/de/learn/tutorials/topics/scripting/loops

For each (string)

```
string[] strings = new string[3];

strings[0] = "First string";
strings[1] = "Second string";
strings[2] = "Third string";

foreach(string item in strings)
{
      print (item);
}
```

https://unity3d.com/de/learn/tutorials/topics/scripting/loops

For each (game object)

```
public Transform myObjects;

foreach (Transform obj in myObjects)

{

      print(obj.name);

}
```

While

```
while(cupsInTheSink > 0)
{
      Debug.Log ("I've washed a cup!");
      cupsInTheSink--;
}
```

Switch

```
switch (intelligence)
{
        case 5:
            print ("Why hello there good sir! Let me teach you about Trigonometry!");
            break;
        case 4:
            print ("Hello and good day!");
            break;
        case 3:
            print ("Whadya want?");
            break;
        case 2:
            print ("Grog SMASH!");
            break;
        case 1:
            print ("Ulg, glib, Pblblblblb");
            break;
        default:
            print ("Incorrect intelligence level.");
            break;
}
```

Raycasting

```
void FixedUpdate()
    {
        Vector3 fwd = transform.TransformDirection(Vector3.forward);

        if (Physics.Raycast(transform.position, fwd, 10))
            print("There is something in front of the object!");
    }
```