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- Game Engines
- Unity Interface
- Cameras, Lights, and Objects
- Scripting in C#









- Control game object's motion using Unity's physics engine
- Ability to apply gravity to the game objects
- FixedUpdate() is recommended when applying force or controlling Rigidbody settings in a script



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- Allows physical interaction between objects
 - Rigidbody must attached to at least one game object
- Colliders react with other colliders
- Can also be used for selecting objects



Colliders

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▼ ✿ SampleScene*		
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	Rotation X 0 Y 0	zo
	Scale Scale X 1 Y 1	Z 1
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	Contribute Global	
	Receive Global IIIL Light Probes	
	▼ Probes	
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	Additional Settings	
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	Edit Collider	
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	Material 🔒 Bouncy	
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Enabling and Disabling Components

Inspector			a :
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Emission			0
Light Appearance	Filter an	d Tempera	ature 🔻
Filter		0	<i>8</i>
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Intensity	2		
Indirect Multiplier	1		
Rendering			0
Render Mode	Auto		
Culling Mask	Everythi	ing	
▼ Shadows			0
Shadow Type	Soft Sha	adows	
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```
1 using UnityEngine;
 2 using System.Collections;
 4 public class LightScript : MonoBehaviour {
 5
      private Light myLight;
 6
      // Use this for initialization
 7
      void Start () {
 8
           myLight = GetComponent<Light> ();
 9
10
       }
11
12
      // Update is called once per frame
13
      void Update () {
14
           if(Input.GetKeyUp(KeyCode.Space))
15
           Ł
16
               myLight.enabled = !myLight.enabled;
17
18
       }
19 }
```





- Making a GameObject inactive will disable every component and turn off any attached renderers, colliders, rigid bodies, scripts, etc...
- Any scripts that you have attached to the GameObject will no longer have Update() called



```
1 using UnityEngine;
 2 using System.Collections;
 3
 4 public class CubeScript : MonoBehaviour {
 5
      // Use this for initialization
 6
       void Start () {
 8
 9
10
11
      // Update is called once per frame
12
       void Update () {
13
           if(Input.GetKeyUp(KeyCode.Space))
14
15
               gameObject.SetActive (!gameObject.activeSelf);
16
17
18 }
```







- GetComponent<Type>()
- Allows you access to any Component in the object
- You can access Parent and Children too



Getting a Component

Inspector				
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Tra	neform			
			V A	
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Rotation	X X	0	Y O	
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Mesh		⊞C	ube	
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Materials				
▼ Lighting				
Cast Sha	adows	On		
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Script		∎ C	ubeSci	ript
Lit (I	Materia	al)		





• Scripts are GameComponents, so you can use reference to other scripts

```
1 using UnityEngine;
 2 using System.Collections;
 3
  public class KeyboardInput : MonoBehaviour {
 4
 5
 6
       private AnimationScript animationScript;
      // Use this for initialization
 8
 9
      void Start () {
           animationScript = GetComponent<AnimationScript> ();
10
       }
11
12
13
      // Update is called once per frame
14
       void Update () {
15
           if(Input.GetKeyUp(KeyCode.Space))
16
17
               animationScript.animate ();
18
19
       }
20 }
```

Calling Other Scripts

GetComponent<Type>()or FindObjectOfType<Type>() to obtain a

```
11
       // Use this for initialization
      void Start () {
12
13
           initialPosition = transform.position;
14
       }
15
       // Update is called once per frame
16
       void Update () {
17
18
           // Updated the position of the cube
19
           updatePosition ();
      }
20
21
22
       public void animate (){
23
           animating = !animating;
24
       }
25
```





• Implement a feature allowing the player to "eat" cubes







- Uses a large number of small objects to mimic "fuzzy"
 phenomena
- Fire, Smoke, Rain, Snow, Clouds, etc.



















- Everything UI starts with the Canvas
- Canvas is a GameObject
- All UI elements must be children of a canvas



+ ▼ • All	🖂 🖌 Canvas
👁 🖢 🔻 🤁 SampleScene* 🕴 🕴	
Main Camera	Tag Untagged Layer UI
Directional Light	🔻 🛠 🛛 Rect Transform
	Come velves driven hu Osnuss
M EventSystem	Some values driven by Canvas.
	Pos X Pos Y F
	541.375 194 0
	Width Height
	1082.75 388
	▶ Anchors
	Pivot X 0.5 Y 0.5
	Rotation X 0 Y 0 Z
	Scale X 1 Y 1 Z
	🔻 🧮 🖌 Canvas
	Render Mode Screen Space - Overl
	Pixel Perfect
	Sort Order 0
	Target Display Display 1
	Additional Shader Ct Nothing
	Additional ondater of Instanting
	🔻 🔳 🖌 Canvas Scaler
	UI Scale Mode Constant Pixel Size
	Scale Factor 1
	Reference Pixels Per 100
	🔻 江 🖌 Graphic Raycaster
	Script 🗧 Graphic Raycaster
	Ignore Reversed Gra
	Blocking Objects None
	Blocking Mask Everything
	Blocking wask

<u>ב :</u>







- Use textmeshpro whenever you need text
- Right-click hierarchy -> UI -> Text-Textmeshpro
- Text properties can be set in the Inspector
- Can be changed during runtime through scripting





Text Interface



- Can be used for almost anything, button, slider, etc.
- When importing an image, you must define what type of texture it is (Normal Map, Light Map, Sprite)
- For UI, we want a Sprite













- Button is a GameObject that must be a child of a canvas
- Many different options for styling



UI Button

⊨ Hierarchy		
+ ▼	R	Star
SampleScene* Main Camera	:	Tag Untagged - Layer UI
💮 Directional Light 💮 Global Volume		Rect Transform
		center Pos X Pos Y Pos
💬 EventSystem 💮 Cube		Width Height
		Anchors Pivot X 0.5 Y 0.5
		Rotation X 0 Y 0 Z 0 Scale X X 1 Y 1 Z
		Cull Transparent Me: 🗸
		🔻 🖾 🖌 Image 🛛 🚱
		Source Image IUISprite
		Material None (Material)
		Raycast Target ✓ ▶ Raycast Padding
		Maskable 🗸







- You can hook up a button to an action through the Inspector
- Chose your GameObject
- Choose your Component
- Choose your Method





🔻 🔘 🖌 Button		8	
Interactable	✓		
Transition	Color Tint		
Target Graphic	🖾 Button (Image)		
Normal Color			
Highlighted Color			
Pressed Color			
Selected Color			
Disabled Color			
Color Multiplier	•	- 1	
Fade Duration	0.1		
Navigation	Automatic		
	Visualize		
On Click ()			
= Runtime Only - Anir	nationScript.Animate		
Cube (Animation O			
		+	-







- Finish your game with following features:
 - Control the player's movement using the ASWD keys
 - Implement a feature allowing the player to "eat" cubes within the farm • •
 - Display the number of cubes eaten by the player
 - Include a "restart" button to allow the player to restart the game
- Bonus Features:

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Visualize • Reason • Analyze • Collaborate

- Enable smooth rotation of the player using mouse input •
- Replace the cube model with a customized model of your choice •
- Show the elapsed time since the player started the game
- Implement a time limit for the player's gameplay session ullet





- What if I want to create a standalone app?
- Let's make an executable



Creating an Executable

File	Edit	Assets	GameObject	Component	Jo	bs
	New S	Scene		Ctrl+N		
	Open	Scene	Ctrl+O			
	Open	Recent S	cene		>	
	Save			Ctrl+S		
	Save A	As		Ctrl+Shift+S		
	Save A	As Scene				
	New P	Project				
	Open	Project				
	Save P	Project				
	Build S	Settings		Ctrl+Shift+B		A
	Build	And Run		Ctrl+B		2
	Exit					







- Add the desired scene
- Select your platform
- Build and Run!



Creating an Executable



