Introduction to Unity

Step 3: introduce some „activities” to the game world with scripts

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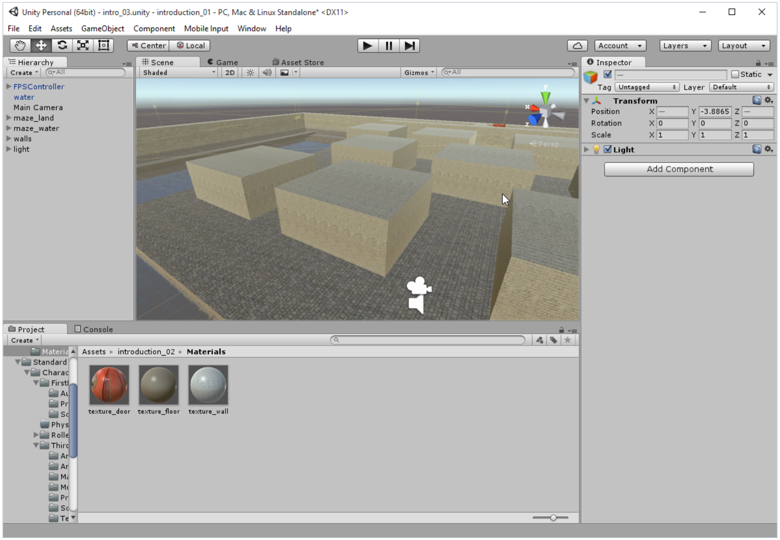
Scripting

Scripts make it possible to add logic and more interactivity to our games, as well as customize interaction based on the players' actions.
As we have mentioned in a first part of this tutorial, we can create scripts using both JavaScript and C#. While JavaScript is usually considered an easy and accessible scripting language, C# is usually favored by intermediate and advanced programmers, as it facilitates the programming workflow and makes it possible to develop more complex programs.

1. Open the previous project (scene `intro_02`).
2. Duplicate the scene we have been working on so far by saving it as `intro_03` **File | Save Scene As**.
3. Create a container for all objects we created for the game world in the previous step:
    1. Create an empty object **Game Object | Create Empty** and change its name to `maze_land`.
    2. Change its position to (x=0, y=0, z=0).
    3. In the **Hierarchy** window, select all objects which creates land maze (`maze_land`), and drag-and-drop these objects on the object labeled `maze`.
4. With the same method create containers for other object if you need it.


Unity Personal (64bit) - intro_03.unity - introduction_01 - PC, Mac & Linux Standalone* <DX11>
File Edit Assets GameObject Component Mobile Input Window Help
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Transform
Position X Y -3.8865 Z
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1
Light
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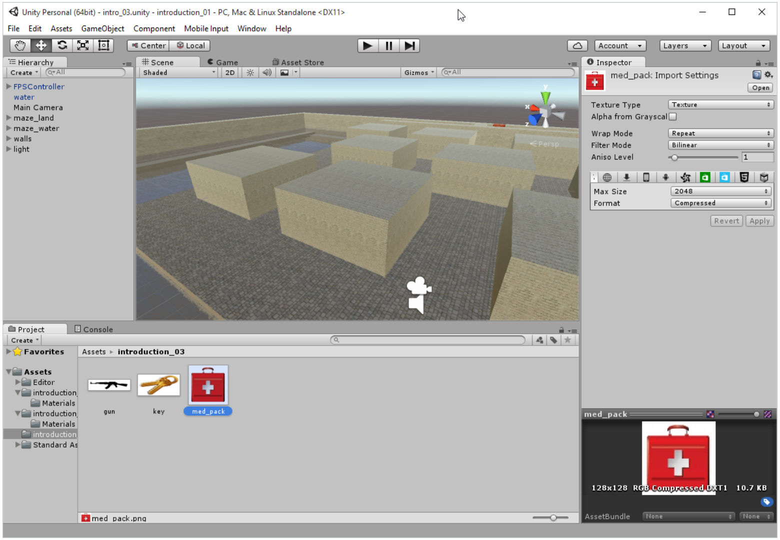
Assets ▸ introduction_02 ▸ Materials
texture_door
texture_floor
texture_wall

1. Create a new folder called `introduction_03`, inside the `Assets` folder.
2. Find / prepare texture for medical package (we will call this: medpack) object.
3. Find / prepare texture for key object.
4. Find / prepare texture for gun object.
5. Find / prepare sound for collecting things (for example: `http://soundbible.com/2084-Glass-Ping.html`).
6. Find the font you want to use as user interface font (for example: `www.dafont.com`, *Techno / LCD / Open 24 Display ST by Southype*) and download the font and unzip it (you should see the `*.ttf` file).

Preliminaries

Import textures

1. Select the current project folder `introduction_03`.
2. Select **Assets | Import New Asset**.
3. Browse to the folder where we downloaded the textures.
4. Select one of the texture saved before and click on **Import**.
5. Repeat above steps for the rest of textures.


Unity Personal (64bit) - intro_03.unity - introduction_01 - PC, Mac & Linux Standalone <DX11>

med_pack.png

Inspector — med_pack Import Settings

```
Texture Type          Texture
Alpha from Grayscale  ☐
Wrap Mode             Repeat
Filter Mode           Bilinear
Aniso Level           1
Max Size              2048
Format                Compressed
```

med_pack

128x128 RGB Compressed DXT1 10.7 KB

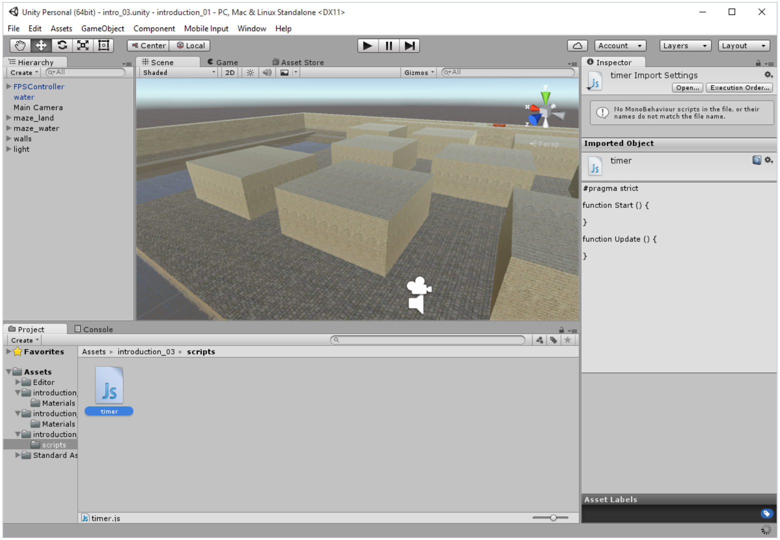
AssetBundle None None

Create folder for the scripts

1. Select the folder `introduction_03` and from the **Project** window, select **Create | Folder**.
2. Rename this folder `scripts`.

Create a new script

1. Check if the folder `scripts` is selected.
2. From the top menu, select **Assets** | **Create** | **JavaScript**.
3. Doing so should create a new JavaScript script within the folder labeled `scripts`.
4. Rename this script `timer`.



```
#pragma strict
function Start () {
}
function Update () {
}
```

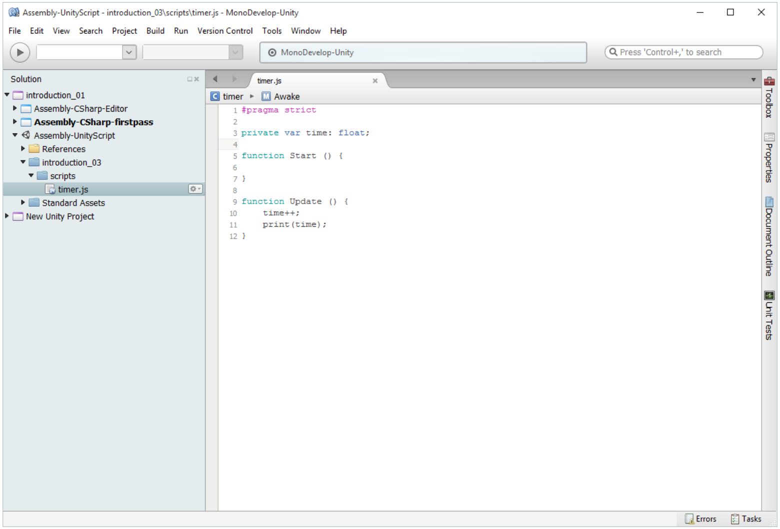
Edit a script

1. When the script has been created, we can see its content in the **Inspector** window.
2. Double-click on the script labeled `timer`. Doing so should open the default editor for Unity3D scripts: MonoDevelop[1].
3. Once in MonoDevelop, we can see that there are two functions created in the timer script by default:
   - The `Start` function is called when the script is first called. For example, if this script is linked to an object, this function will be called when the object is created or added to the scene.
   - The `Update` function is called every frame (that is, when the screen is refreshed).
4. Modify the timer script as follows (see next slide):

[1] We could have changed Unity3D's preferences accordingly in **Edit** | **Preferences** | **External Tool**.

Edit a script

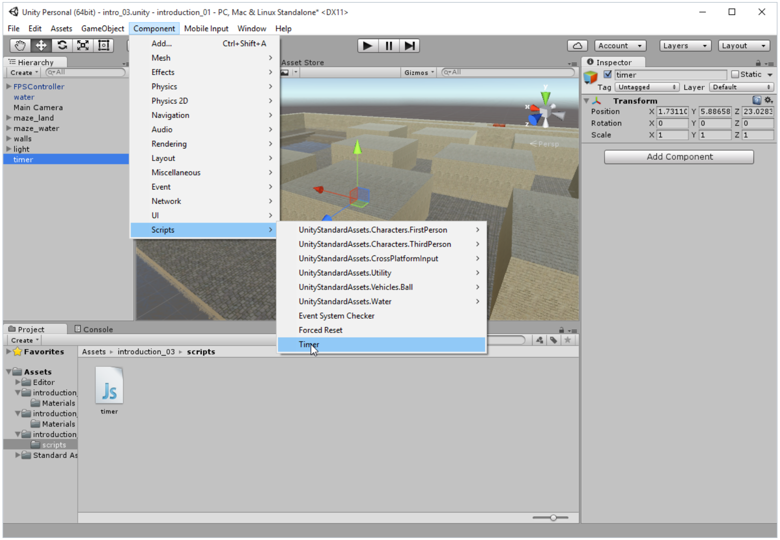
```
private var time: float;

function Start ()
{
}

function Update ()
{
    time++;
    print(time);
}
```



```
#pragma strict

private var time: float;

function Start () {

}

function Update () {
    time++;
    print(time);
}
```

Attached script to an object

1. Create an empty object **Game Object | Empty Object** and rename it `timer`.
2. Attach the script by either
   - dragging-and-dropping the script from the `scripts` folder to the `timer` object, or
   - by selecting the object labeled `timer` and selecting **Component | Scripts | timer** from the top menu.
3. Now, if we click once on the `timer` object, the **Inspector** will reveal an additional component for this object, a script labeled `timer`.
4. Open the Console window (**Ctrl** + **Shift** + **C**) and play the scene (**Ctrl** + **P**). We can see that the counter is displayed and that its value increases over time.


Unity Personal (64bit) - intro_03.unity - introduction_01 - PC, Mac & Linux Standalone* <DX11>
File
Edit
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Mobile Input
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Help
Add... Ctrl+Shift+A
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Physics 2D
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UnityStandardAssets.Characters.FirstPerson
UnityStandardAssets.Characters.ThirdPerson
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Transform
Position X 1.73110 Y 5.88658 Z 23.0283
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Scale X 1 Y 1 Z 1
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Favorites
Assets ▸ introduction_03 ▸ scripts
Assets
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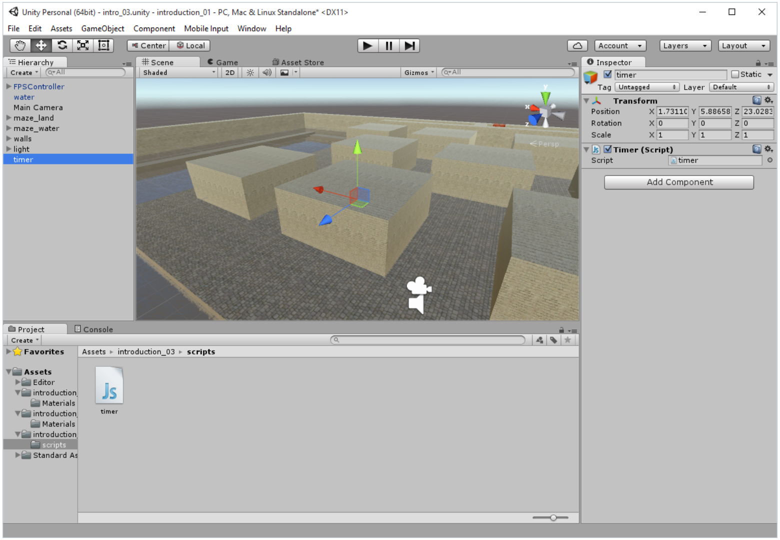
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Persp
Inspector
timer Static
Tag Untagged Layer Default
Transform
Position X 1.73110 Y 5.88658 Z 23.0283
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Scale X 1 Y 1 Z 1
Timer (Script)
Script timer
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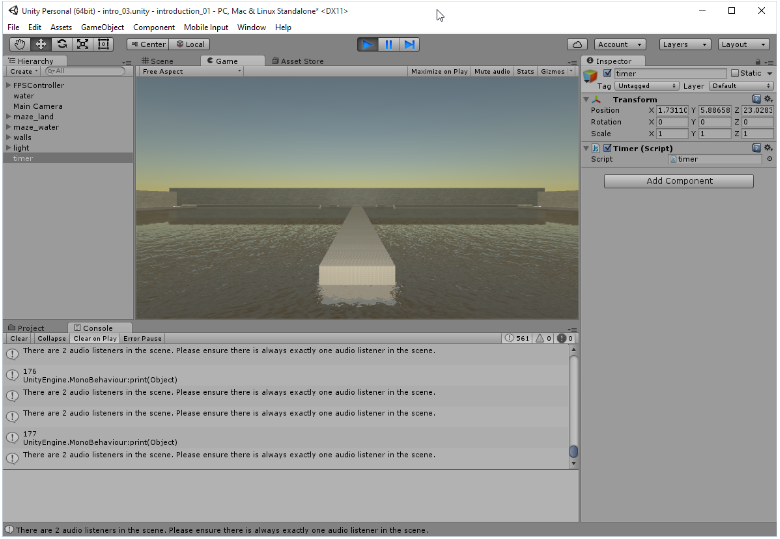
timer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timer
Scene Game Asset Store
Free Aspect
Maximize on Play Mute audio Stats Gizmos
Inspector
Static
Transform
Add Component
Project Console
Clear Collapse Clear on Play Error Pause
561 0 0

Inspector: timer — Tag Untagged, Layer Default

Transform			
Position	X 1.73110	Y 5.88658	Z 23.0283
Rotation	X 0	Y 0	Z 0
Scale	X 1	Y 1	Z 1

Timer (Script) — Script: timer

```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
176
UnityEngine.MonoBehaviour:print(Object)
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
177
UnityEngine.MonoBehaviour:print(Object)
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
```

```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
```

Change script to use seconds not frames

We will use a built-in variable called `Time.deltaTime` to deal with seconds not framse. What a **deltaTime** is shuld be clear as we have talked about this in lecture *Game loop and time*.

1. Modify the script

   ```
   function Update ()
   {
       time = time + Time.deltaTime;
       print(time);
   }
   ```

2. Play the scene.

Change script to display minutes and seconds

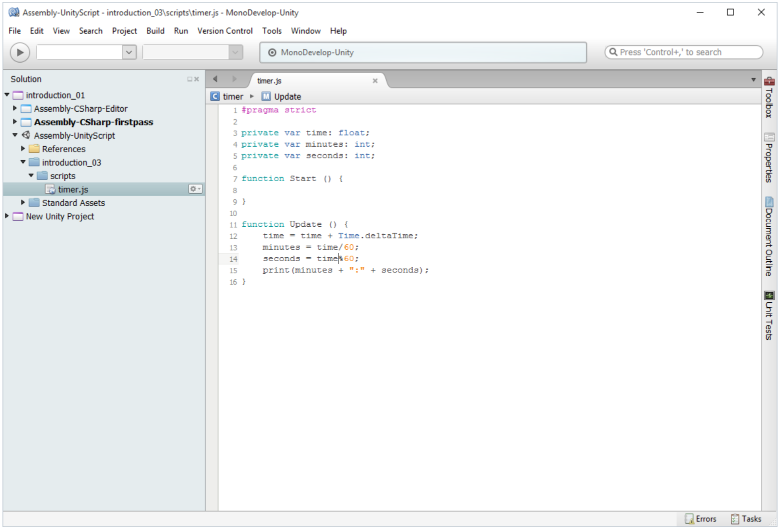
1. Modify the script

```
private var time: float;
private var minutes: int;
private var seconds: int;

function Start ()
{
}

function Update ()
{
    time = time + Time.deltaTime;
    minutes = time/60;
    seconds = time%60;
    print(minutes + ":" + seconds);
}
```

2. Play the scene.



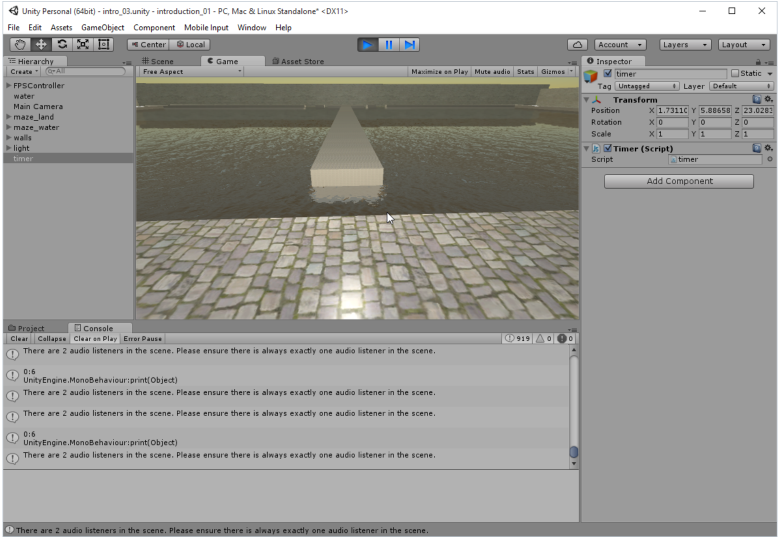
```
#pragma strict

private var time: float;
private var minutes: int;
private var seconds: int;

function Start () {

}

function Update () {
    time = time + Time.deltaTime;
    minutes = time/60;
    seconds = time%60;
    print(minutes + ":" + seconds);
}
```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Project Console
Clear Collapse Clear on Play Error Pause
919 0 0
Add Component

timer						Static
Tag	Untagged		Layer	Default		
Transform						
Position	X 1.73110		Y 5.88658		Z 23.0283	
Rotation	X 0		Y 0		Z 0	
Scale	X 1		Y 1		Z 1	
Timer (Script)						
Script	timer					

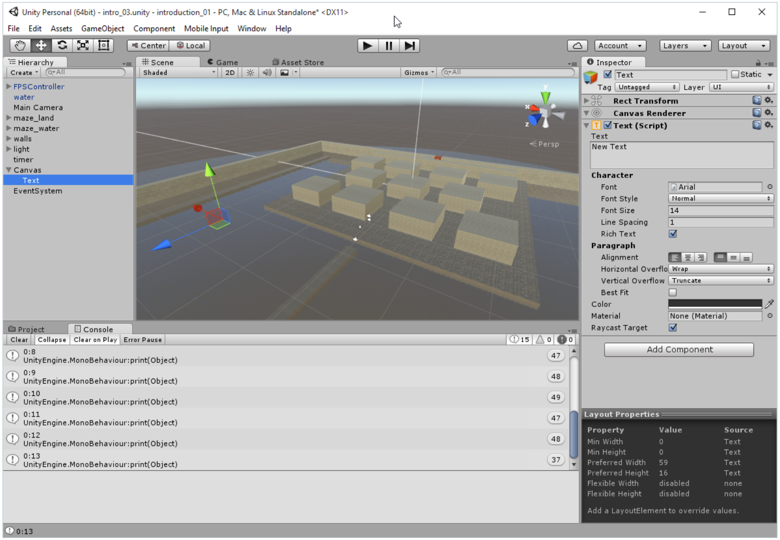
```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
0:6
UnityEngine.MonoBehaviour:print(Object)
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
0:6
UnityEngine.MonoBehaviour:print(Object)
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.

There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
```

Displays the time on the screen

Create a UI.Text object

1. Create a **UI.Text** object: select **GameObject | UI | Text**. This should add **Canvas** with **Text** subelement and **EventSystem** object to our project (see **Hierarchy** window).
2. Rename **Text** object `UI_timer`.
3. Select **UI_timer** object and in **Inspector** window expand **Rect Transform** and select as a reference point **middle-center** and set `(Pos X = 0, Pos Y = 0, Pos Z = 0)`.
4. If we switch to the game view, we should now see the default text *New Text* in the middle of the screen.
5. Change position so that *New Text* would be displayed at the bottom-left corner and use bigger font ().



```
15  0  0
0:8
UnityEngine.MonoBehaviour:print(Object)        47
0:9
UnityEngine.MonoBehaviour:print(Object)        48
0:10
UnityEngine.MonoBehaviour:print(Object)        49
0:11
UnityEngine.MonoBehaviour:print(Object)        47
0:12
UnityEngine.MonoBehaviour:print(Object)        48
0:13
UnityEngine.MonoBehaviour:print(Object)        37

0:13
```

Text Static
Tag Untagged Layer UI
Rect Transform
Canvas Renderer
Text (Script)
Text
New Text

Character

Font	Arial
Font Style	Normal
Font Size	14
Line Spacing	1
Rich Text	✓

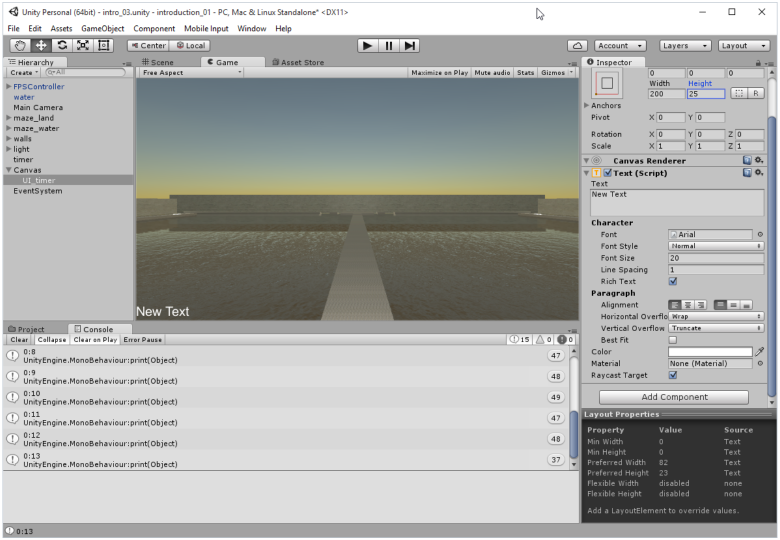
Paragraph

Alignment	
Horizontal Overflo	Wrap
Vertical Overflow	Truncate
Best Fit	
Color	
Material	None (Material)
Raycast Target	✓

Layout Properties

Property	Value	Source
Min Width	0	Text
Min Height	0	Text
Preferred Width	59	Text
Preferred Height	16	Text
Flexible Width	disabled	none
Flexible Height	disabled	none

Add a LayoutElement to override values.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Maximize on Play Mute audio Stats Gizmos
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Project Console
Clear Collapse Clear on Play Error Pause
15 0 0
Inspector
Add Component

```
0:8
UnityEngine.MonoBehaviour:print(Object)                47
0:9
UnityEngine.MonoBehaviour:print(Object)                48
0:10
UnityEngine.MonoBehaviour:print(Object)                49
0:11
UnityEngine.MonoBehaviour:print(Object)                47
0:12
UnityEngine.MonoBehaviour:print(Object)                48
0:13
UnityEngine.MonoBehaviour:print(Object)                37
```

0:13

Width 200, Height 25
Anchors
Pivot X 0 Y 0
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Canvas Renderer

Text (Script)

Text: New Text

Character
Font: Arial
Font Style: Normal
Font Size: 20
Line Spacing: 1
Rich Text: ✓

Paragraph
Alignment
Horizontal Overflo: Wrap
Vertical Overflow: Truncate
Best Fit: ☐
Color
Material: None (Material)
Raycast Target: ✓

Layout Properties

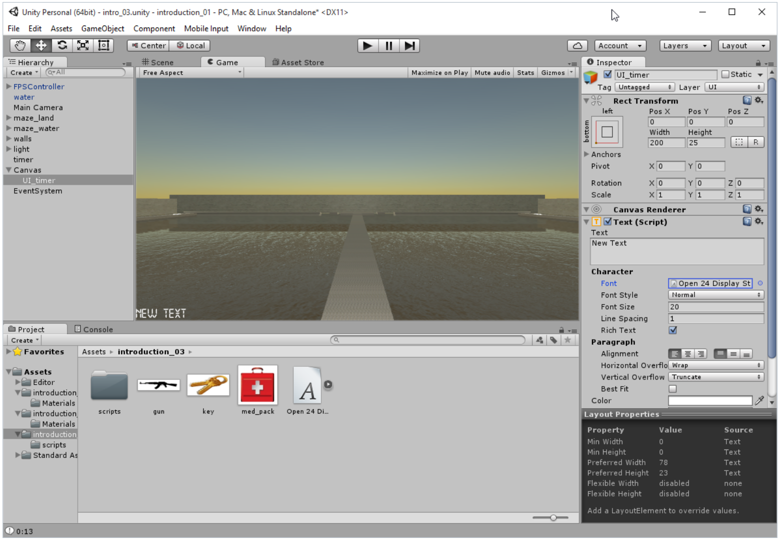
Property	Value	Source
Min Width	0	Text
Min Height	0	Text
Preferred Width	82	Text
Preferred Height	23	Text
Flexible Width	disabled	none
Flexible Height	disabled	none

Add a LayoutElement to override values.

Displays the time on the screen

Changing the font

1. Select the folder `introduction_03`, and import the font you have prepared at the beginning into Unity3D (**Assets | Import New Asset**).
2. Select the **UI.Text** object labeled `UI_timer`.
3. In the **Inspector** window, click on the small circle to the right of the label **Font**.
4. This should open a window labeled **Select** font that includes the new font you have just downloaded. Select this font and close the font selection window. The new font should now appear in the **Font** property of the previous object.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NEW TEXT
Project Console
Create
Favorites
Assets introduction_03
scripts gun key med_pack Open 24 Di...
0:13

Hierarchy:
- FPSController
- water
- Main Camera
- maze_land
- maze_water
- walls
- light
- timer
- Canvas
  - UI_timer
- EventSystem

Project:
- Assets
  - Editor
  - introduction
    - Materials
  - introduction
    - Materials
  - introduction
    - scripts
  - Standard As

Inspector:

UI_timer   Static
Tag Untagged   Layer UI

Rect Transform
left, bottom

Pos X	Pos Y	Pos Z
0	0	0
Width	Height	
200	25	

Anchors
Pivot X 0 Y 0
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Canvas Renderer

Text (Script)
Text
New Text

Character

Font	Open 24 Display St
Font Style	Normal
Font Size	20
Line Spacing	1
Rich Text	✓

Paragraph

Alignment	
Horizontal Overflo	Wrap
Vertical Overflow	Truncate
Best Fit	☐
Color	

Layout Properties

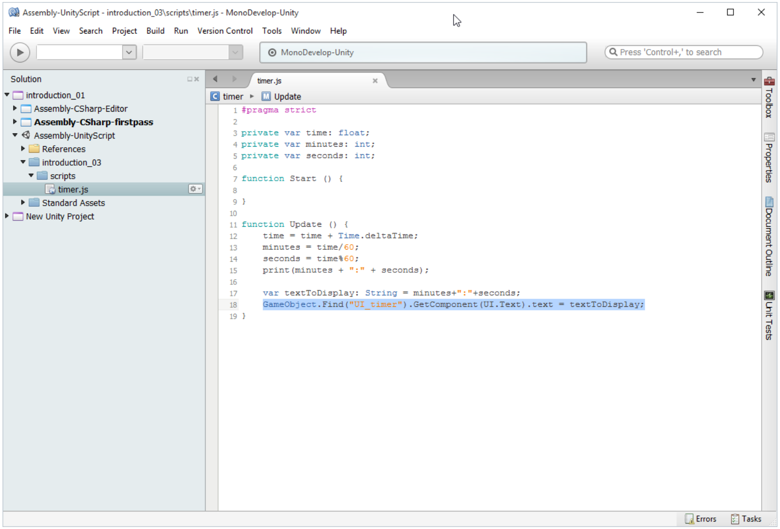
```
Property          Value     Source
Min Width         0         Text
Min Height        0         Text
Preferred Width   78        Text
Preferred Height  23        Text
Flexible Width    disabled  none
Flexible Height   disabled  none

Add a LayoutElement to override values.
```

Displays the time on the screen

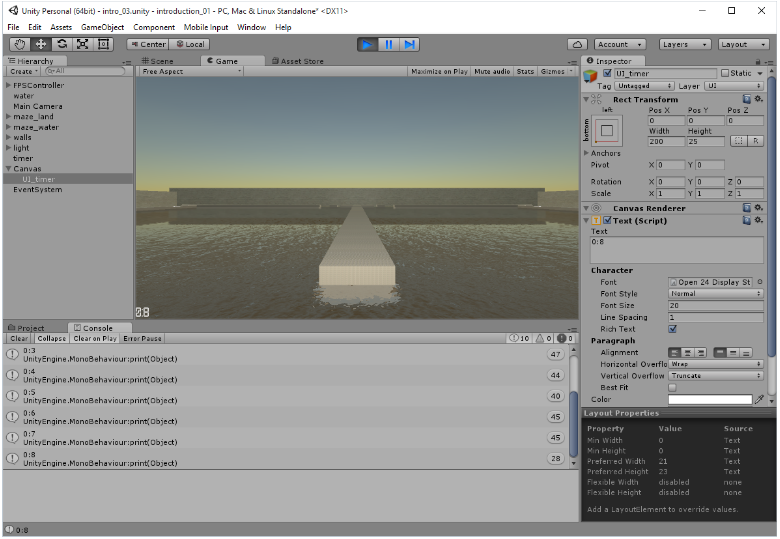
Link timer script to the UI.Text

We get an access to the object **UI_timer** and its **GUIText** component, and modify its attribute **text**. Add the following text at the end of the Update function

```
function Update() {
    ... some existing code ...
    ... add the following at the end of the Update ...

    var textToDisplay:String = minutes+":"+seconds;
    GameObject.Find("UI_timer")
      .GetComponent(UI.Text)
      .text = textToDisplay;
}
```



```
#pragma strict

private var time: float;
private var minutes: int;
private var seconds: int;

function Start () {

}

function Update () {
    time = time + Time.deltaTime;
    minutes = time/60;
    seconds = time%60;
    print(minutes + ":" + seconds);

    var textToDisplay: String = minutes+":"+seconds;
    GameObject.Find("UI_timer").GetComponent(UI.Text).text = textToDisplay;
}
```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EventSystem
Scene Game Asset Store
Free Aspect
Maximize on Play Mute audio Stats Gizmos
0:8
Project Console
Clear Collapse Clear on Play Error Pause
10 0 0
Inspector

```
0:3
UnityEngine.MonoBehaviour:print(Object)        47
0:4
UnityEngine.MonoBehaviour:print(Object)        44
0:5
UnityEngine.MonoBehaviour:print(Object)        40
0:6
UnityEngine.MonoBehaviour:print(Object)        45
0:7
UnityEngine.MonoBehaviour:print(Object)        45
0:8
UnityEngine.MonoBehaviour:print(Object)        28
```

0:8

UI_timer Static
Tag Untagged Layer UI

Rect Transform
left, bottom
Pos X 0 Pos Y 0 Pos Z 0
Width 200 Height 25
Anchors
Pivot X 0 Y 0
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Canvas Renderer

Text (Script)
Text
0:8

Character
Font: Open 24 Display St
Font Style: Normal
Font Size: 20
Line Spacing: 1
Rich Text: ✓

Paragraph
Alignment
Horizontal Overflo: Wrap
Vertical Overflow: Truncate
Best Fit: ☐
Color

Layout Properties

Property	Value	Source
Min Width	0	Text
Min Height	0	Text
Preferred Width	21	Text
Preferred Height	23	Text
Flexible Width	disabled	none
Flexible Height	disabled	none

Add a LayoutElement to override values.

Displays the time on the screen

1. Change the **timer.js** script code as follow

```
#pragma strict

private var time: float;
private var minutes: int;
private var seconds: int;

//private var uiTextToDisplayTime: GameObject;
private var uiTextToDisplayTime: UI.Text;
private var textTime: String;

function Start () {
//uiTextToDisplayTime = GameObject.Find("UI_timer");
uiTextToDisplayTime = GameObject.Find("UI_timer")
    .GetComponent(UI.Text);
}
```

2. To be continued – see next slide.

Displays the time on the screen

. . . continuation of the previous slide

1. Change the **timer.js** script code as follow (continuation)

```
function Update () {
time = time + Time.deltaTime;
    minutes = time/60;
    seconds = time%60;
    textTime = minutes + ":" + seconds;
    //uiTextToDisplayTime.GetComponent(UI.Text)
      .text = textToDisplay;
    uiTextToDisplayTime.text = textTime;
}
```

2. Play the scene and check that our code works properly.

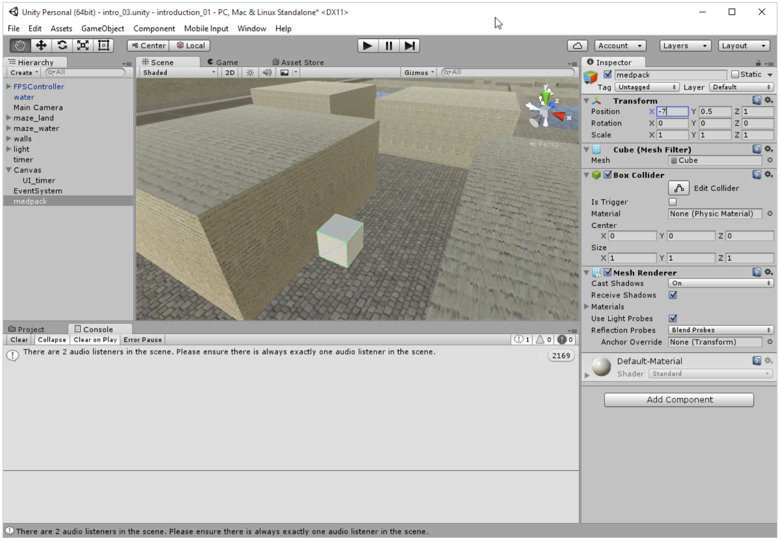
Collecting objects

Preliminaries

1. Create a new cube, rename it `medpack`, then change its position somewhere in the middle of the land maze (in my case: position `(x=-7, y=0.5, z=1)`, and its scale `(x=1, y=1, z=1)`).
2. Apply medpack texture to the cube.
3. Create a new script inside the folder `introduction_03 | Scripts` and rename it `rotate_medpack`.
4. Open this script and add the following code to `Update` function:

```
function Update ()
{
    transform.Rotate(Vector3(0,1,0), 90*Time.deltaTime);
}
```

5. Link the script to the object labeled **medpack**, play the scene and check that the med pack is rotating.

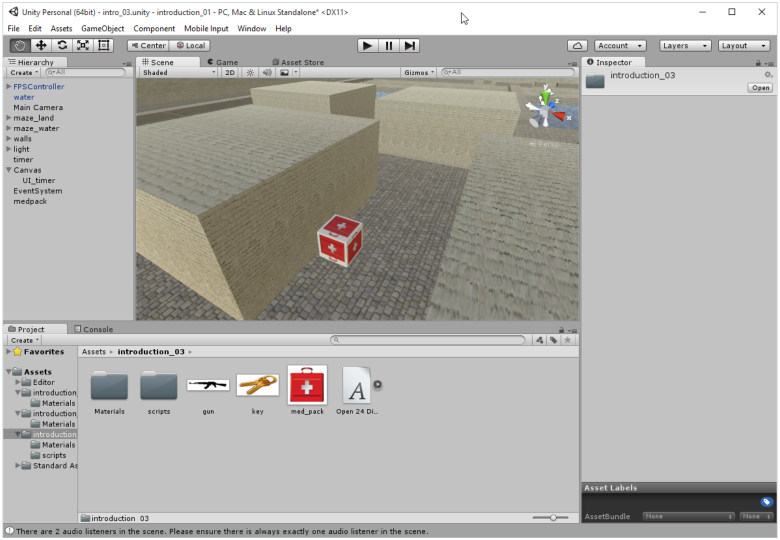


Hierarchy:
```
FPSController
water
Main Camera
maze_land
maze_water
walls
light
timer
Canvas
  UI_timer
EventSystem
medpack
```

Inspector:
```
medpack                      Static
Tag  Untagged     Layer  Default
Transform
Position   X -7   Y 0.5   Z 1
Rotation   X 0    Y 0     Z 0
Scale      X 1    Y 1     Z 1
Cube (Mesh Filter)
Mesh                Cube
Box Collider
Is Trigger
Material            None (Physic Material)
Center
  X 0   Y 0   Z 0
Size
  X 1   Y 1   Z 1
Mesh Renderer
Cast Shadows        On
Receive Shadows     ✓
Materials
Use Light Probes    ✓
Reflection Probes   Blend Probes
Anchor Override     None (Transform)
Default-Material
Shader  Standard
```

Console:
```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.   2169
```

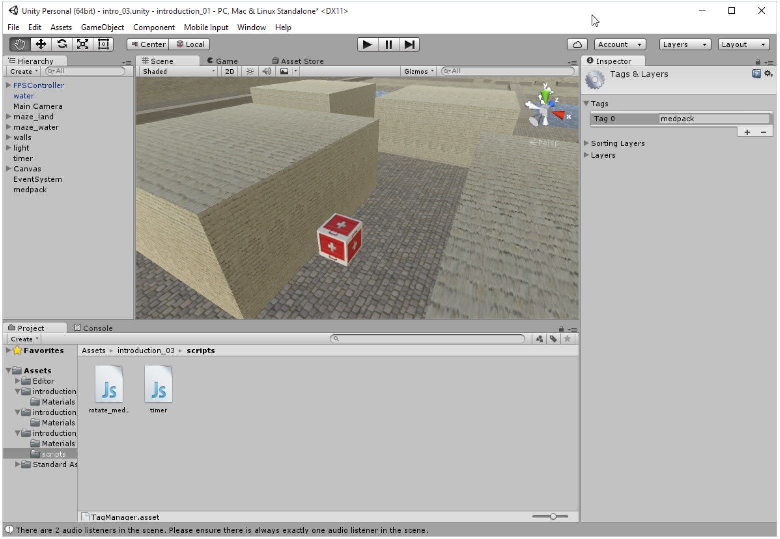
```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
```



There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.

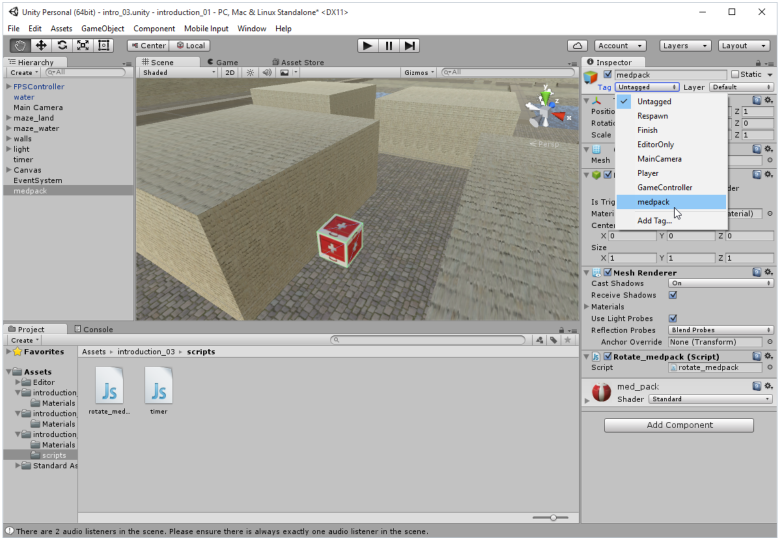
Add a tag so we will have an information on the collider involved in the collision.

1. Select the object labeled **medpack** in the **Hierarchy** window.
2. In the **Inspector** window, click on the drop-down menu to the right of the label **Tag**.
3. From the drop-down menu, select the option **Add tag**.
4. This should open a **Tags & Layers** tab. This will display a list of elements (or tags) available.
5. Click the plus at the bottom of the tags list, type `medpack`, and press **Enter**. This will create a new tag named `medpack`.
6. To apply this tag, click on the object labeled **medpack** in the **Hierarchy** window and click on the drop-down menu to the right of the label **Tag** in the **Inspector** window. This time the new tag **medpack** should appear.
7. Click on this tag to select it for the object.



Tag 0	medpack

There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.


Unity Personal (64bit) - intro_03.unity - introduction_01 - PC, Mac & Linux Standalone* <DX11>

Hierarchy: FPSController, water, Main Camera, maze_land, maze_water, walls, light, timer, Canvas, EventSystem, medpack

Inspector: medpack
Tag: Untagged
Layer: Default

Tag menu: ✓ Untagged, Respawn, Finish, EditorOnly, MainCamera, Player, GameController, medpack, Add Tag...

Position Z 1
Rotation Z 0
Scale Z 1

Center X 0 Y 0 Z 0
Size X 1 Y 1 Z 1

Mesh Renderer
Cast Shadows: On
Receive Shadows: ✓
Use Light Probes: ✓
Reflection Probes: Blend Probes
Anchor Override: None (Transform)

Rotate_medpack (Script)
Script: rotate_medpack

med_pack
Shader: Standard

Assets ▸ introduction_03 ▸ scripts
rotate_med...
timer

There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.

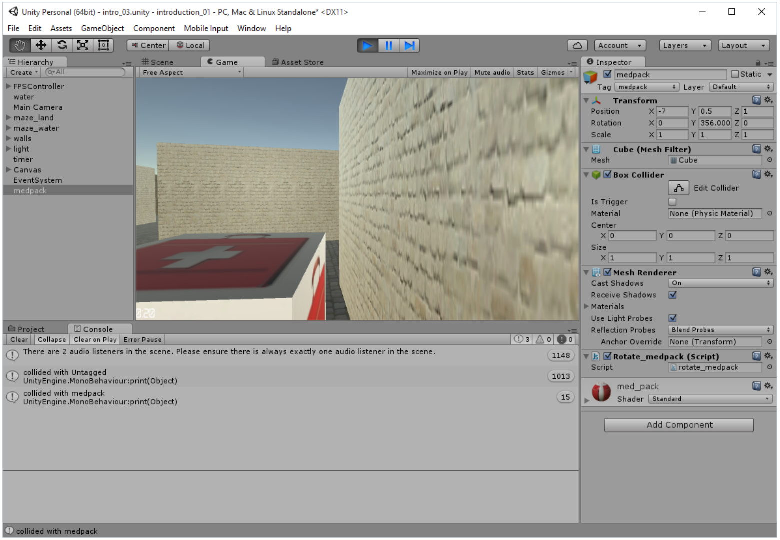
Collecting objects

Detect collisions

1. Create a new script inside the folder **Assets | introduction_03 | scripts** and rename it `collision_detection`.
2. Add the following code to the script:

```
function OnControllerColliderHit(c : ControllerColliderHit)
{
    print("collided with " + c.gameObject.tag);
}
```

3. Attach the script to the **First Person Controller** object, open the Console window (**Shift** + **Ctrl** + **C**) and test the scene (**Ctrl** + **P**). After colliding with the med pack, we should see a message in the **Console** window saying *collided with medpack*.



Unity Personal (64bit) - intro_03.unity - introduction_01 - PC, Mac & Linux Standalone* <DX11>

```
FPSController
water
Main Camera
maze_land
maze_water
walls
light
timer
Canvas
EventSystem
medpack
```

```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.   1148
collided with Untagged
UnityEngine.MonoBehaviour:print(Object)                                                                         1013
collided with medpack
UnityEngine.MonoBehaviour:print(Object)                                                                           15
```

```
medpack                          Static
Tag medpack          Layer Default
Transform
  Position    X -7   Y 0.5       Z 1
  Rotation    X 0    Y 356.000   Z 0
  Scale       X 1    Y 1         Z 1
Cube (Mesh Filter)
  Mesh                 Cube
Box Collider
  Is Trigger           ☐
  Material             None (Physic Material)
  Center      X 0    Y 0    Z 0
  Size        X 1    Y 1    Z 1
Mesh Renderer
  Cast Shadows         On
  Receive Shadows      ✓
  Materials
  Use Light Probes     ✓
  Reflection Probes    Blend Probes
  Anchor Override      None (Transform)
Rotate_medpack (Script)
  Script               rotate_medpack
med_pack
  Shader               Standard
```

collided with medpack

Collecting objects

Detect collisions – some remarks

Because the player is constantly walking (and colliding with the ground), and that the ground has no tag assigned yet, the **Console** window will display the message *collided with untagged*. Because this collision happens constantly (unless the player is jumping), the **Console** window may be flooded with messages. We may enable the option collapse in the **Console** window (button located at the top-left corner of the **Console** window); this will prevent messages from being displayed repeatedly and collapse identical messages accordingly.

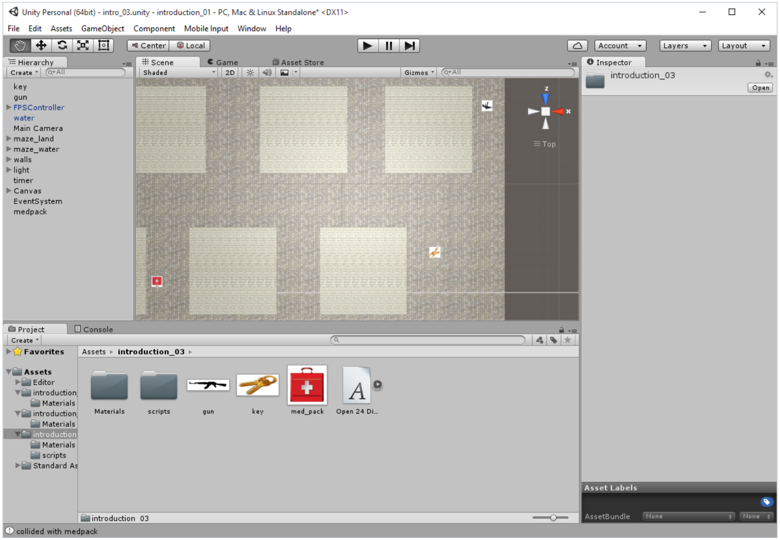
We will now modify the script to destroy the med pack.

1. Add the following code to the script:

```
if (c.gameObject.tag == "medpack") Destroy(c.gameObject);
```

Add more colliding object

- Add **keys** object (box).
- Add **gun** object (box).
- Add. . . what you want.
- Attach the script labeled `rotate` to all of them.



```
collided with medpack
```

Creating and displaying an inventory system

In our game, in addition to med packs, we will be able to collect other types of objects. We will then need to keep track of these objects using variables and graphical representations. This can be done using a basic inventory system. Some objects will have an effect on the player (for example, increase health), while other objects will be used at a later stage. To keep track of these objects we will need to create corresponding variables, update these variables when the corresponding objects have been collected, display a graphical representation of the object(s) collected, and modify the players' attributes (for example, its health). We will be working with the script `collision_detection`. First, let's create variables for the objects to be collected and add the following lines at the start of the script:

```
private var hasKey : boolean;
private var hasGun : boolean;
... variables for other object ...
private var health : int;
```

Creating and displaying an inventory system

Create tags for new colliding objects

1. Add tags for all object you have just added as we did it before for **medpack**.

Creating and displaying an inventory system

Different actions for different objects

```
function OnControllerColliderHit(c : ControllerColliderHit)
{
if (c.gameObject.tag == "medpack"
|| c.gameObject.tag == "key"
    || c.gameObject.tag == "gun")
  {
    print("collided with " + c.gameObject.tag);
    Destroy(c.gameObject);

    if (c.gameObject.tag == "medpack"){
      health = 100;
    }
    else if (c.gameObject.tag == "key"){
      hasKey = true;
    }
    else if (c.gameObject.tag == "gun"){
      hasGun = true;
    }
  }
}
```

Creating and displaying an inventory system

Code for displaying notification message for a few seconds

Now we will create a script named display_message_to_user that will display a notification message about new object on the screen and hide it after few seconds. Add the following code to the script:

```
private var timer: float;
private var displayTime: float;
private var timerIsActive: boolean;
private var message: String;
private var uiText: UI.Text;

function startTimer()
{
    timer = 0.0f;
    uiText.text = message;
    timerIsActive = true;
    displayTime = 3.0f;
}
```

Creating and displaying an inventory system

Code for displaying notification message for a few seconds – continuation

. . . continuation of the previous slide

```
function Start () {
  // We can do this either as we did it before
  //uiText = GameObject.Find("UI_displayMessageToUser")
  //          .GetComponent(UI.Text);
  // or like this
uiText = GetComponent(UI.Text);
}
```

Creating and displaying an inventory system

Code for displaying notification message for a few seconds – continuation

. . . continuation of the previous slide

```
function Update()
{
  if (timerIsActive)
  {
    timer += Time.deltaTime;
    if (timer > displayTime){
      timerIsAcive = false;
      uiText.text = "";
    }
  }
}

function displayText(mes:String)
{
    message = mes;
    startTimer();
}
```

Creating and displaying an inventory system

Code for displaying notification message for a few seconds

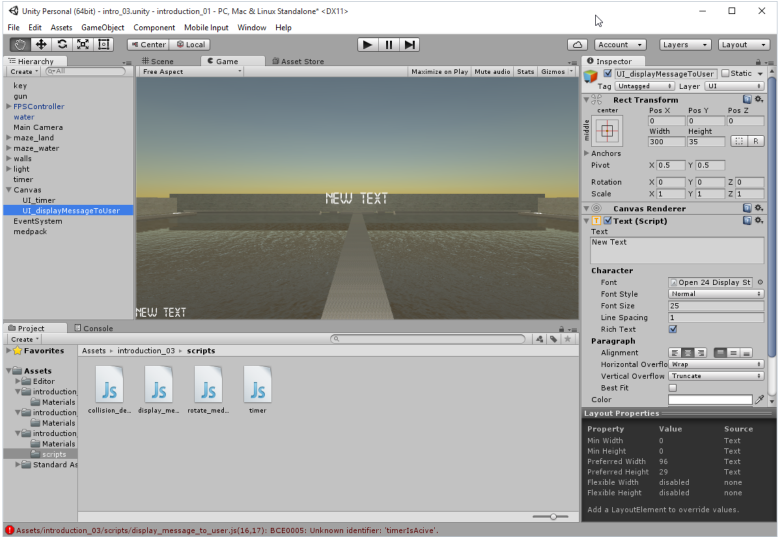
1. Create a **UI.Text** object.
2. Rename it `UI_displayMessageToUser`.
3. Change its position to be displayed in the centre of the screen. You can also change other attributes like font, color etc.
4. Attach the script `display_message_to_user` to this object.
5. Call the function `displayText` whenever the player collects an item – modify the script `collision_detection` and add the following code after the line that starts with `Destroy(c.gameObject)`:

   ```
   GameObject.Find("UI_displayMessageToUser")
   .GetComponent(display_message_to_user)
   .displayText(c.gameObject.tag + " collected!");
   ```

6. Adding the following line of code in the `Start` function of the script `display_message_to_user`.

   ```
   uiText.text = "";
   ```

   to remove default text beeing displayed.



Assets ▸ introduction_03 ▸ scripts

key
gun
FPSController
water
Main Camera
maze_land
maze_water
walls
light
timer
Canvas
  UI_timer
  UI_displayMessageToUser
EventSystem
medpack

UI_displayMessageToUser Static
Tag Untagged Layer UI

Rect Transform
center / middle
Pos X 0 Pos Y 0 Pos Z 0
Width 300 Height 35
Anchors
Pivot X 0.5 Y 0.5
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Canvas Renderer

Text (Script)
Text
New Text

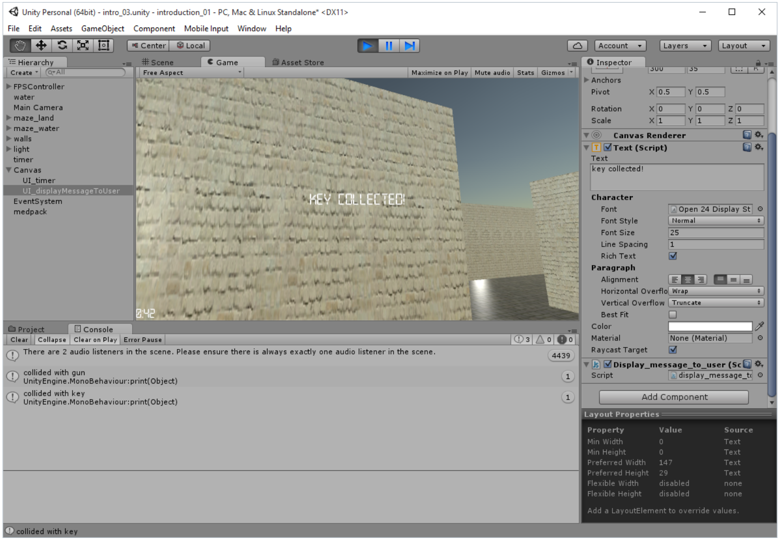
Character
Font: Open 24 Display St
Font Style: Normal
Font Size: 25
Line Spacing: 1
Rich Text: ✓
Paragraph
Alignment
Horizontal Overflo: Wrap
Vertical Overflow: Truncate
Best Fit: ☐
Color

Layout Properties

Property	Value	Source
Min Width	0	Text
Min Height	0	Text
Preferred Width	96	Text
Preferred Height	29	Text
Flexible Width	disabled	none
Flexible Height	disabled	none

Add a LayoutElement to override values.

```
Assets/introduction_03/scripts/display_message_to_user.js(16,17): BCE0005: Unknown identifier: 'timerIsAcive'.
```



```
FPSController
water
Main Camera
maze_land
maze_water
walls
light
timer
Canvas
  UI_timer
  UI_displayMessageToUser
EventSystem
medpack
```

```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.   4439
collided with gun
UnityEngine.MonoBehaviour:print(Object)                                                                            1
collided with key
UnityEngine.MonoBehaviour:print(Object)                                                                            1
```

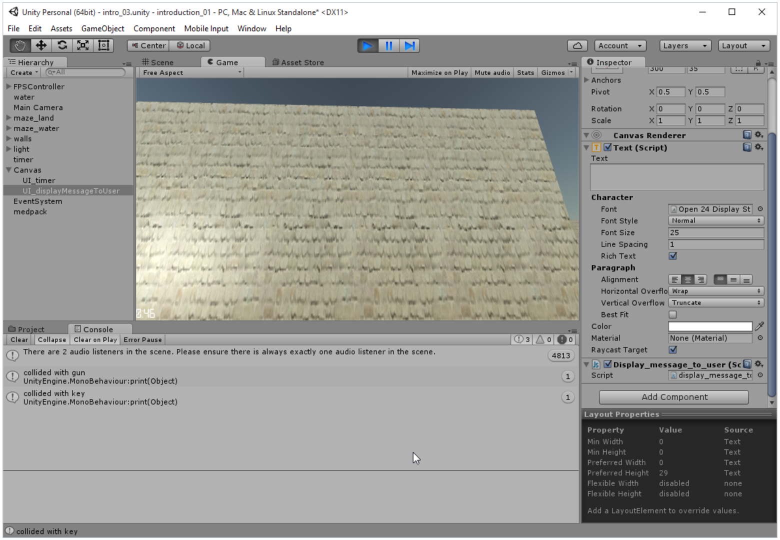
```
collided with key
```

```
Anchors
Pivot            X 0.5   Y 0.5
Rotation         X 0     Y 0     Z 0
Scale            X 1     Y 1     Z 1
Canvas Renderer
Text (Script)
Text
key collected!
Character
  Font                  Open 24 Display St
  Font Style            Normal
  Font Size             25
  Line Spacing          1
  Rich Text             ✓
Paragraph
  Alignment
  Horizontal Overflo    Wrap
  Vertical Overflow     Truncate
  Best Fit              ☐
Color
Material                None (Material)
Raycast Target          ✓
Display_message_to_user (Sc
Script                  display_message_t
```

Layout Properties

Property	Value	Source
Min Width	0	Text
Min Height	0	Text
Preferred Width	147	Text
Preferred Height	29	Text
Flexible Width	disabled	none
Flexible Height	disabled	none

Add a LayoutElement to override values.



```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.   4813
collided with gun
UnityEngine.MonoBehaviour:print(Object)                                                                              1
collided with key
UnityEngine.MonoBehaviour:print(Object)                                                                              1
```

Anchors
Pivot X 0.5 Y 0.5
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Canvas Renderer

Text (Script)

Text

Character

Font	Open 24 Display St
Font Style	Normal
Font Size	25
Line Spacing	1
Rich Text	✓

Paragraph

Alignment	
Horizontal Overflo	Wrap
Vertical Overflow	Truncate
Best Fit	☐
Color	
Material	None (Material)
Raycast Target	✓

Display_message_to_user (Sc

Script display_message_t

Layout Properties

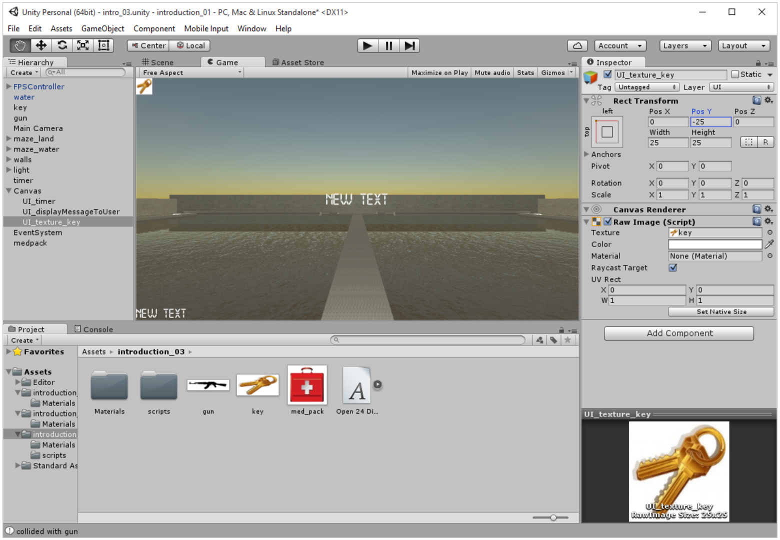
Property	Value	Source
Min Width	0	Text
Min Height	0	Text
Preferred Width	0	Text
Preferred Height	29	Text
Flexible Width	disabled	none
Flexible Height	disabled	none

Add a LayoutElement to override values.

collided with key

Creating and displaying an inventory system

1. Create a new **UI.RawImage** object (**GameObject | UI | Raw Image**) which we will use to hold texture.
2. Rename this **UI.RawImage** object **UI_texture_key**.
3. Locate the icon texture for key in the folder **Assets | introduction_03**.
4. Check that the **Inspector** window of **UI_texture_key** object is visible.
5. Drag-and-drop this texture in the **Inspector** window, to the right of the label **Texture** in the **Raw Image** component of the object **UI_texture_key**.
6. Using the **Inspector**, change the position of this object to display it in the upper-left corner of the screen.
7. Repeat the previous steps for all other objects.


Unity Personal (64bit) - intro_03.unity - introduction_01 - PC, Mac & Linux Standalone* <DX11>
File Edit Assets GameObject Component Mobile Input Window Help
Center Local
Account Layers Layout
Hierarchy Scene Game Asset Store Inspector
Free Aspect
Maximize on Play Mute audio Stats Gizmos
NEW TEXT
NEW TEXT
Project Console
Create
Favorites
Assets introduction_03
Materials scripts gun key med_pack Open 24 Di...
Add Component
Set Native Size
UI_texture_key
UI_texture_key RawImage Size: 25x25

Hierarchy:
- FPSController
- water
- key
- gun
- Main Camera
- maze_land
- maze_water
- walls
- light
- timer
- Canvas
  - UI_timer
  - UI_displayMessageToUser
  - UI_texture_key
- EventSystem
- medpack

Project:
- Assets
  - Editor
  - introduction
    - Materials
  - introduction
    - Materials
  - introduction
    - Materials
    - scripts
  - Standard As

Inspector: UI_texture_key, Static
Tag: Untagged, Layer: UI

Rect Transform (anchor: left, top)

	Pos X	Pos Y	Pos Z
	0	-25	0
	Width	Height	
	25	25	

Pivot	X 0	Y 0	
Rotation	X 0	Y 0	Z 0
Scale	X 1	Y 1	Z 1

Canvas Renderer

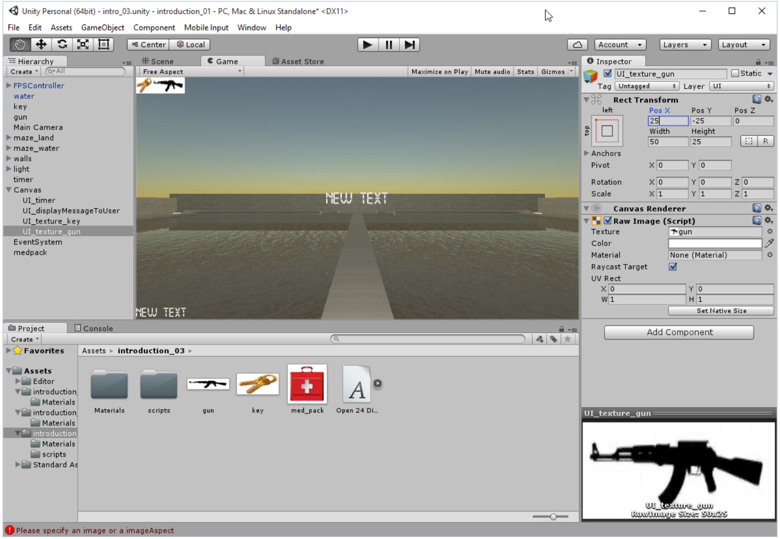
Raw Image (Script)

Texture	key
Color	
Material	None (Material)
Raycast Target	✓

UV Rect

X	0	Y	0
W	1	H	1

collided with gun



Unity Personal (64bit) - intro_03.unity - introduction_01 - PC, Mac & Linux Standalone* <DX11>

Hierarchy
```
FPSController
water
key
gun
Main Camera
maze_land
maze_water
walls
light
timer
Canvas
    UI_timer
    UI_displayMessageToUser
    UI_texture_key
    UI_texture_gun
EventSystem
medpack
```

Game view: Free Aspect

Inspector
```
UI_texture_gun                     Static
Tag Untagged        Layer UI
Rect Transform
  left    Pos X 25     Pos Y -25    Pos Z 0
  top     Width 50     Height 25
  Anchors
  Pivot      X 0   Y 0
  Rotation   X 0   Y 0   Z 0
  Scale      X 1   Y 1   Z 1
Canvas Renderer
Raw Image (Script)
  Texture          gun
  Color
  Material         None (Material)
  Raycast Target   ✓
  UV Rect
    X 0     Y 0
    W 1     H 1
```

UI_texture_gun
UI_texture_gun
RawImage Size: 50x25

Project
```
Assets
  Editor
  introduction
    Materials
  introduction
    Materials
  introduction
    Materials
    scripts
  Standard As
```

Assets ▸ introduction_03 ▸

Materials   scripts   gun   key   med_pack   Open 24 Di...

Please specify an image or a imageAspect

Creating and displaying an inventory system

Display icons

Add the following code to `collision_detection` script:

```
function changeUITexture(what: String, display: boolean){
  GameObject.Find("UI_texture_" + what)
     .GetComponent(UI.RawImage)
     .enabled
     = display;
}
```

Creating and displaying an inventory system

Display icons

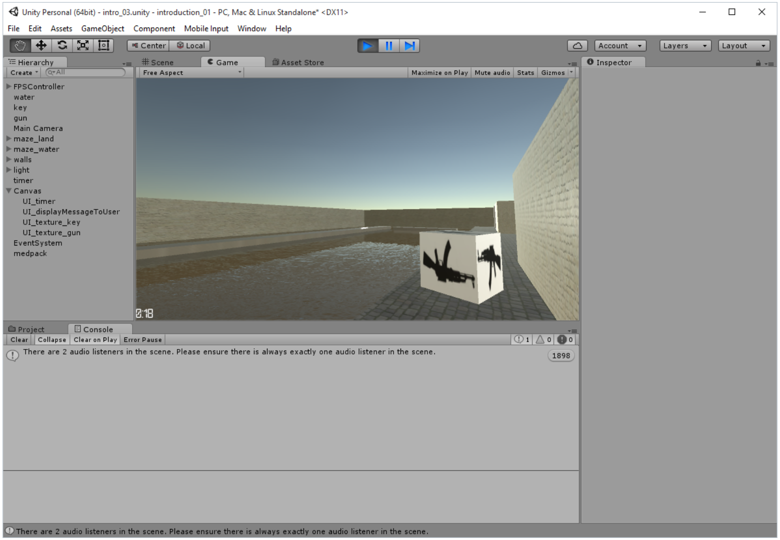
Modify the code according to the following snippet:

```
function OnControllerColliderHit(c : ControllerColliderHit){
  ...
  if (c.gameObject.tag == "medpack"){
    health = 100;
  }
  else if (c.gameObject.tag == "key"){
    hasKey = true;
    changeUITexture("key", hasKey);
  }
  else if (c.gameObject.tag == "gun"){
    hasGun = true;
    changeUITexture("gun", hasGun);
  }
  ...
```

Creating and displaying an inventory system

Hide icons at the start of the scene

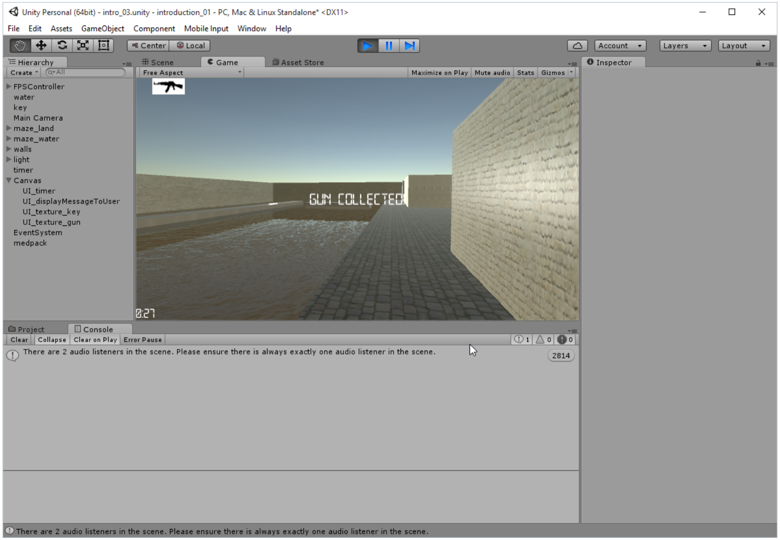
```
function Start () {
  hasGun = false;
  hasKey = false;
  health = 0;
  changeUITexture("key", hasKey);
  changeUITexture("gun", hasGun);
}
```


Unity Personal (64bit) - intro_03.unity - introduction_01 - PC, Mac & Linux Standalone* <DX11>
File Edit Assets GameObject Component Mobile Input Window Help
Center Local
Account Layers Layout
Hierarchy Scene Game Asset Store Inspector
Create
Free Aspect
Maximize on Play Mute audio Stats Gizmos
Project Console
Clear Collapse Clear on Play Error Pause
1 0 0
1898
0:18

FPSController
water
key
gun
Main Camera
maze_land
maze_water
walls
light
timer
Canvas
UI_timer
UI_displayMessageToUser
UI_texture_key
UI_texture_gun
EventSystem
medpack

```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
```

```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
```



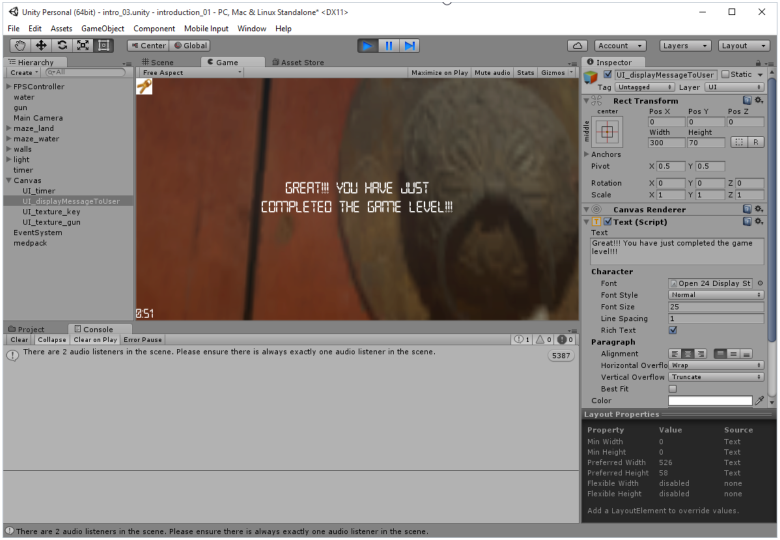
```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
```

```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
```

Finishing the game

1. Create a new tag titled `exit_door`.
2. Add the tag to the object named `exit_door`.
3. Modify the script `collision_detection` by adding the following lines within the function `OnControllerColliderHit`:

```
function OnControllerColliderHit(c : ControllerColliderHit){
if (c.gameObject.tag == "medpack"){
...
  }
  else if (c.gameObject.tag == "exit_door"){
    if (hasKey){
      GameObject.Find("UI_displayMessageToUser")
        .GetComponent(display_message_to_user)
        .displayText("Great!!! You have just completed the game lev
    }
    else {
      GameObject.Find("UI_displayMessageToUser")
        .GetComponent(display_message_to_user)
        .displayText("Sorry, you need the key to open this door");
    }
}
}
```


Unity Personal (64bit) - intro_03.unity - introduction_01 - PC, Mac & Linux Standalone* <DX11>

Hierarchy:

- FPSController
- water
- gun
- Main Camera
- maze_land
- maze_water
- walls
- light
- timer
- Canvas
  - UI_timer
  - UI_displayMessageToUser
  - UI_texture_key
  - UI_texture_gun
- EventSystem
- medpack

Game view:

GREAT!!! YOU HAVE JUST
COMPLETED THE GAME LEVEL!!!

0:51

Inspector: UI_displayMessageToUser — Static
Tag: Untagged — Layer: UI

Rect Transform

center / middle	Pos X 0	Pos Y 0	Pos Z 0
	Width 300	Height 70	
Anchors			
Pivot	X 0.5	Y 0.5	
Rotation	X 0	Y 0	Z 0
Scale	X 1	Y 1	Z 1

Canvas Renderer

Text (Script)

Text: Great!!! You have just completed the game level!!!

Character

Font	Open 24 Display St
Font Style	Normal
Font Size	25
Line Spacing	1
Rich Text	✓

Paragraph

Alignment	
Horizontal Overflo	Wrap
Vertical Overflow	Truncate
Best Fit	
Color	

Layout Properties

Property	Value	Source
Min Width	0	Text
Min Height	0	Text
Preferred Width	526	Text
Preferred Height	58	Text
Flexible Width	disabled	none
Flexible Height	disabled	none

Add a LayoutElement to override values.

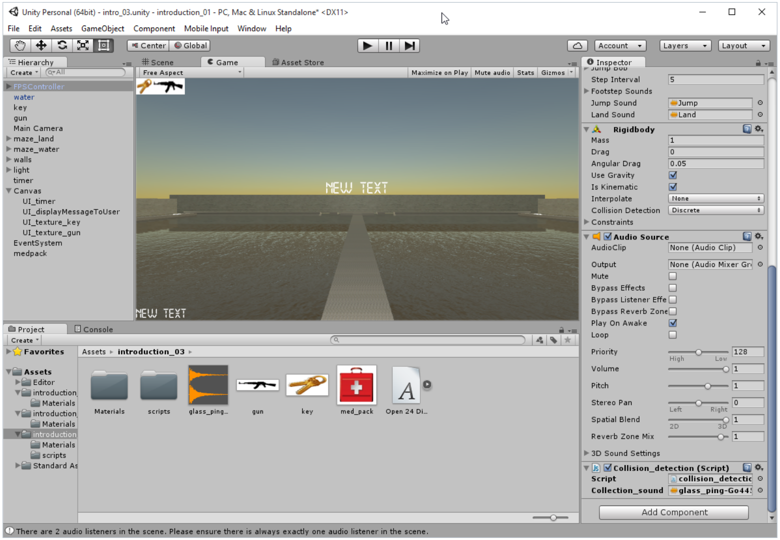
```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.    5387
```

```
There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.
```

Adding audio

1. Open the script `collision_detection`.
2. Add / change the following lines at the start of the script

   ```
   // use for old version
   //@script RequireComponent (AudioSource)
   #pragma strict
   public var collecting_sound: AudioClip;
   ```
3. Import the sound file to the folder **Assets | introduction_03**.
4. In the **Hierarchy** window, click on the **FPSController** object. In the **Inspector** window, drag-and-drop the sound file to the variable `collecting_sound` in the component **Collision_detection** of the object **FPSController**.
5. Check that the **FPSController** object is still selected.
6. Check if **Audio Source** component is available. If not, select **Component | Audio | Audio Source**. This should add an **Audio Source** component to the **FPSController** in the **Inspector** window.
7. Check that the option **Play** on **Awake** is not selected for this component.


Unity Personal (64bit) - intro_03.unity - introduction_01 - PC, Mac & Linux Standalone* <DX11>
File Edit Assets GameObject Component Mobile Input Window Help
Center Global
Account Layers Layout
Hierarchy Scene Game Asset Store Inspector
Create All
Free Aspect
Maximize on Play Mute audio Stats Gizmos
NEW TEXT
NEW TEXT
Project Console
Create
Favorites
Assets Editor introduction Materials introduction Materials introduction Materials scripts Standard As
Assets ▸ introduction_03 ▸
Materials scripts glass_ping... gun key med_pack Open 24 Di...
Add Component

Hierarchy:

FPSController
water
key
gun
Main Camera
maze_land
maze_water
walls
light
timer
Canvas
UI_timer
UI_displayMessageToUser
UI_texture_key
UI_texture_gun
EventSystem
medpack

Inspector:

Step Interval	5
Footstep Sounds	
Jump Sound	Jump
Land Sound	Land

Rigidbody

Mass	1
Drag	0
Angular Drag	0.05
Use Gravity	✓
Is Kinematic	✓
Interpolate	None
Collision Detection	Discrete
Constraints	

Audio Source

AudioClip	None (Audio Clip)
Output	None (Audio Mixer Gr
Mute	☐
Bypass Effects	☐
Bypass Listener Effe	☐
Bypass Reverb Zone	☐
Play On Awake	✓
Loop	☐
Priority (High – Low)	128
Volume	1
Pitch	1
Stereo Pan (Left – Right)	0
Spatial Blend (2D – 3D)	1
Reverb Zone Mix	1
3D Sound Settings	

Collision_detection (Script)

Script	collision_detectic
Collection_sound	glass_ping-Go44!

There are 2 audio listeners in the scene. Please ensure there is always exactly one audio listener in the scene.

Adding audio

Play the sound on collision

1. Open the script `collision_detection`.
2. Add the following line to the script:

```
function OnControllerColliderHit(c : ControllerColliderHit){
if (c.gameObject.tag == "medpack"
|| c.gameObject.tag == "key"
    || c.gameObject.tag == "gun")
    {
        Destroy(c.gameObject);
        var audio: AudioSource = GetComponent.<AudioSource>();
        audio.clip = collecting_sound;
        audio.Play();

    ...
```

Summary

You should know

- how to create scripts using JavaScript,
- how to detect collision.