

Documentation Part 4:

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10-Graphics

10-1 Static / non static object

Depending on the situation, use static objects or non-static objects.

Static objects:

- For objects that do not move
- Illuminated by lightmaps
[\(more info about how to calculate lightmaps \)](#)
- Requires less computer resources
- Better visual result
- Can be combine
[\(more info about how to combine static objets in section...\)](#)

This included:

Floor, roofs, wall and stairs
All objects that don't need to move
Lights objects
Furnitures **except for drawers, doors and wardrobes door**

Non Static objects:

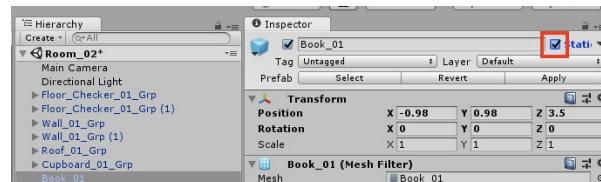
- For objects that move
- Illuminated by realtime/mixed light and lightprob
[\(more info about how to create lightprob in section...\)](#)
- Requires more computer resources
- Can't be combine

This included :

Doors
Drawers and wardrobe door
Objects shown in the 3D viewer
Objets included in drawer and wardrobe door
Puzzle moving elements

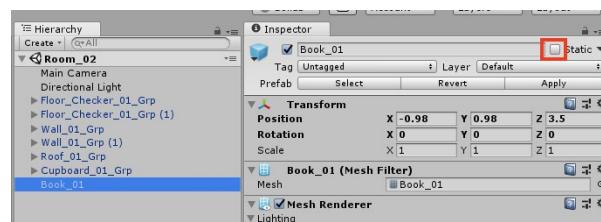
To put an object in static:

- Select objects in hierarchy tab
- In inspector tab check the box **static**



To put an object in non static:

- Select objects in hierarchy tab
- In inspector tab uncheck the box **static**



10-2 Create a room with prefabs included in asset

1 Go to **Edit > Snap Settings.**

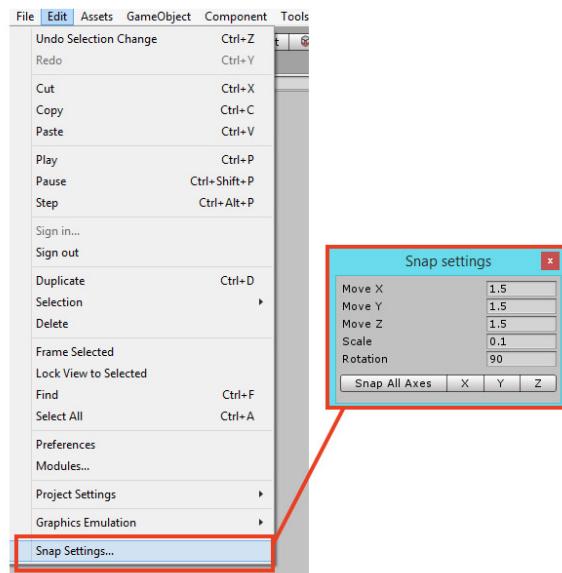
Adjust snap settings:

Move X: 1.5

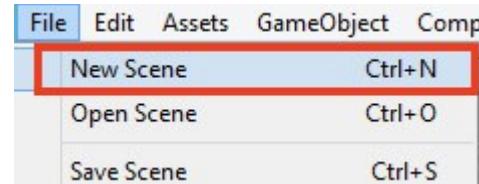
Move Y: 1.5

Move Z: 1.5

Rotation: 90



2 Go to **File > New Scene.**

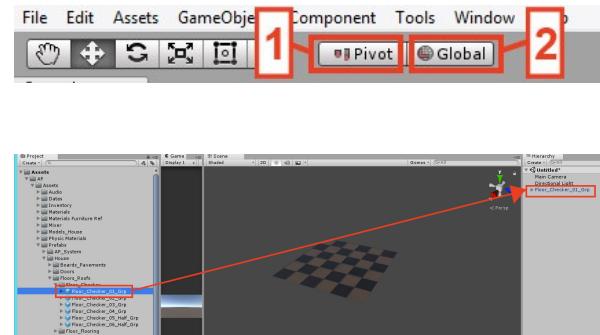


3 Choose Pivot mode (spot 1)

4 Choose Global mode (spot 2)

5 From project tab drag and drop **Floor_Checker_01_Grp** in hierarchy tab

Assets → AP → Assets → Prefabs → House → Floors_Roofs → Floor_Checker



6 Press the **W key** to switch to the Move mode.

7 Duplicate **Floor_Checker_01_Grp** by pressing **CTRL + D**

8 While keeping the **CTRL key** pressed:

-move on Z axis twice.

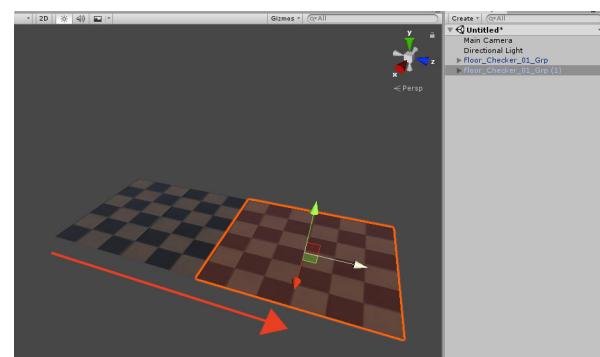
When an object is moved while holding down the **Ctrl key the snapping mode is used**

The position of the new duplicated floor must be

X: 0

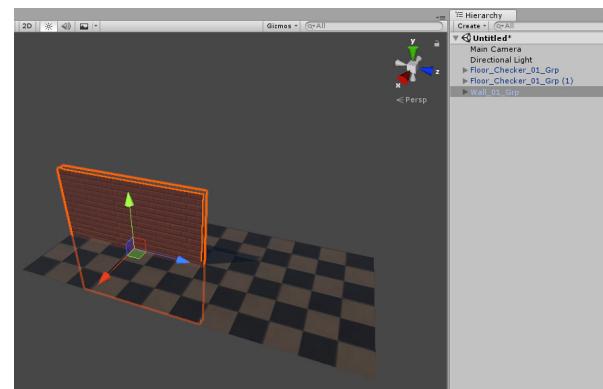
Y: 0

Z:3



9 From project tab drag and drop **Wall_01_Grp** in hierarchy tab

Assets → AP → Assets → Prefabs → House → Walls

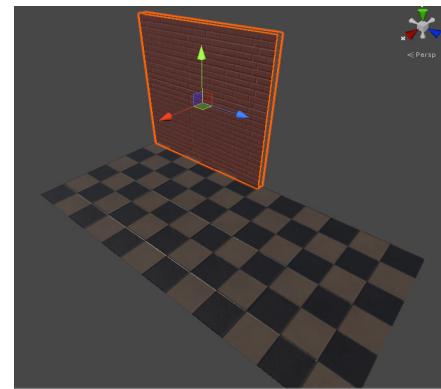


10 While keeping the **CTRL key** pressed:

- move on Y axis once
- move on X axis once

The position of the wall must be

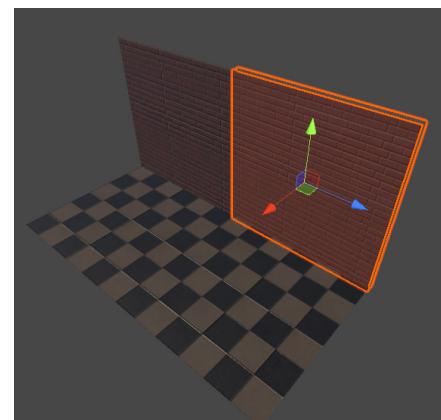
X: -1.5
Y: 1.5
Z: 0



11 Duplicate the wall

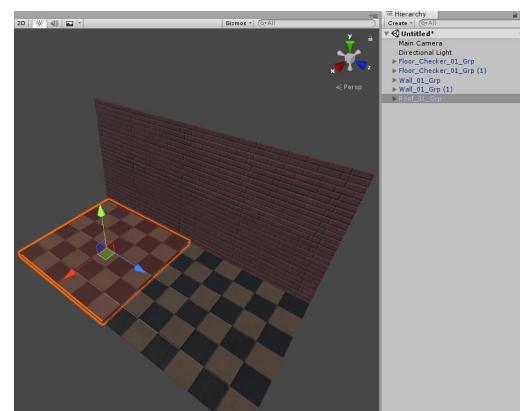
12 Using the snap (while keeping the **CTRL key** pressed):

- move wall as shown in the picture



13 From project tab drag and drop **Roof_01_Grp** in hierarchy tab

Assets → AP → Assets → Prefabs → House → Floors_Roofs → Roofs



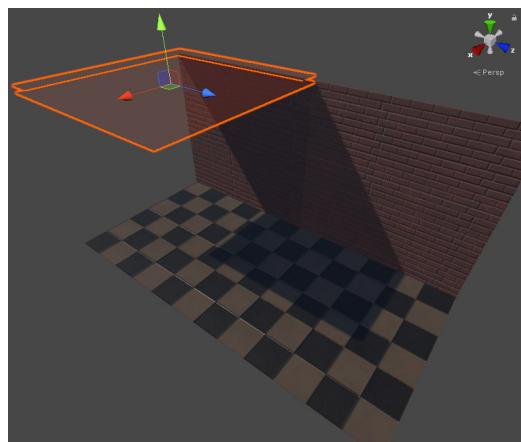
14 While keeping the **CTRL key** pressed:
-move on Y axis twice

The position of the roof must be

X: 0
Y: 3
Z:0

Note: the roof object is not visible from above but is visible from below.

Important: do not use the snap to rotate puzzles as this could cause problems

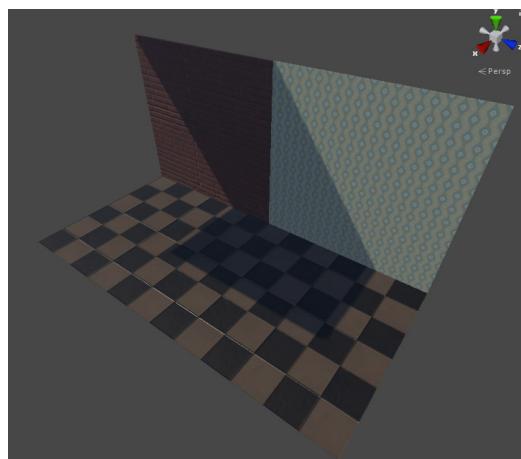


15 In project tab select **Wall_02** material

Assets → AP → Assets → Materials → Materials_Grp → 01_Wall

16 While keeping the **Mouse Left click** pressed:
-Move the mouse over the right wall (in the scene view)
When the texture of the wall changes, release the left mouse button.

This system makes it possible to have two different textures on each side of a wall, which is very useful when creating multiple rooms.



10-3 Lightings

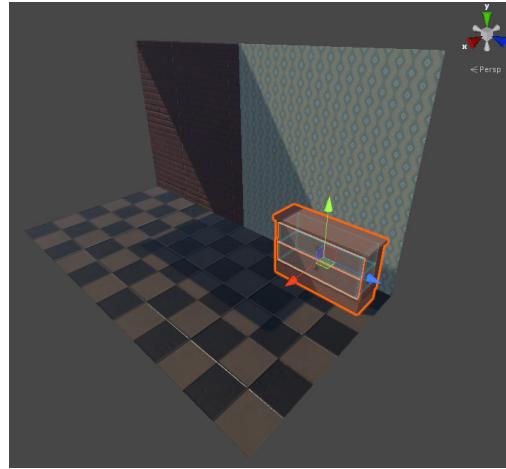
Info: If you did not do the first part of the tutorial, you can open the scene *Graphics_Tuto_01*
Assets → AP → Assets → Scenes → Tutos → Tuto_Graphics

- 1 From project tab drag and drop **Cupboard_01_Grp** in hierarchy tab

Assets → AP → Assets → Prefabs → House → Furnitures → *Props*

Set transform position to:

X: -1
Y: 0.5
Z: 3.6

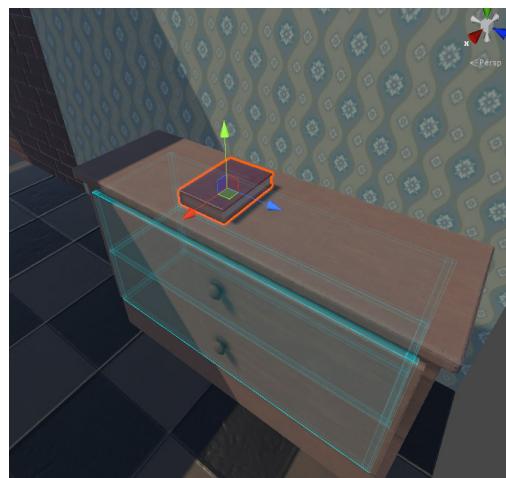


- 2 From project tab drag and drop **Book_01** in hierarchy tab

Assets → AP → Assets → Prefabs → House → Objects

Set transform position to:

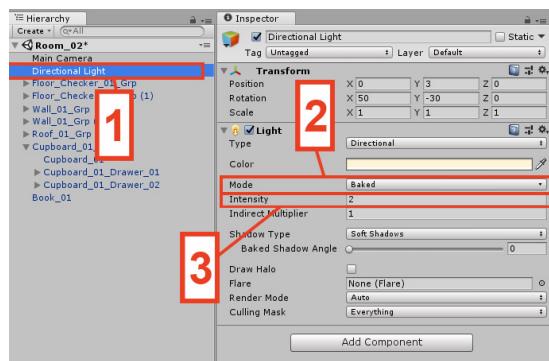
X: -0.98
Y: 0.98
Z: 3.5



- 3 In hierarchy tab select **Directional Light** (spot 1)

- 4 Set **Mode** to **Bake** (spot 2)

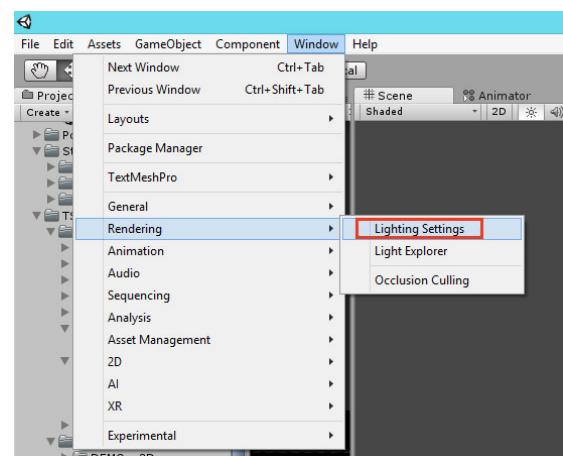
- 5 Set **Intensity** to **2** (spot 3)



Calculate lightmap.

1 Open lighting panel.

Window > Rendering > Lightings Settings

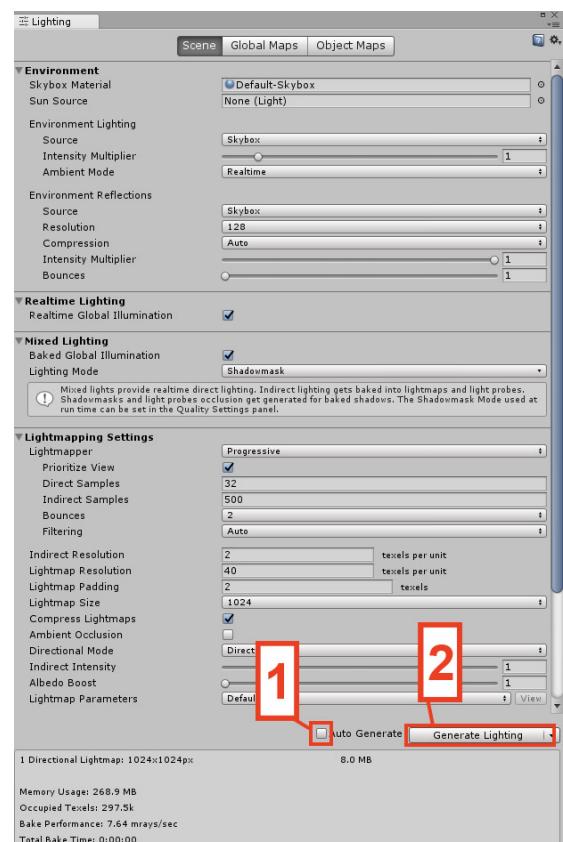


2 Uncheck box **Auto generate** at the bottom of lighting tab (spot 1)

3 Press button **Generate Lightings** (spot 2)

Precompute lightmap process is starting.

When the precompute process is running, a blue progress bar will appear in the bottom right of the Editor.



After calculating the lightmaps:

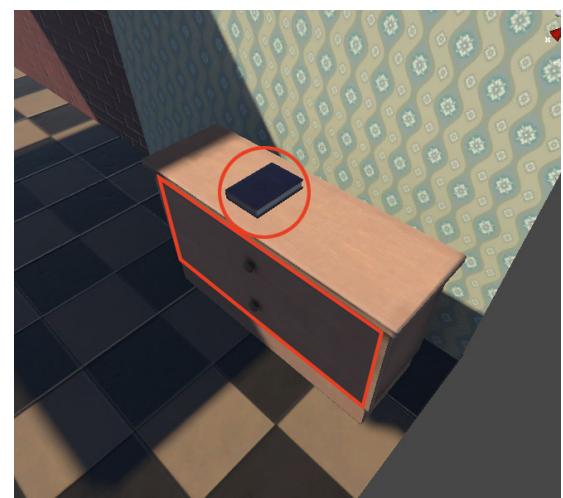
The static objects are correctly illuminate:

- floor
- walls
- external parts of the furniture

Non-static objects are not properly illuminate:

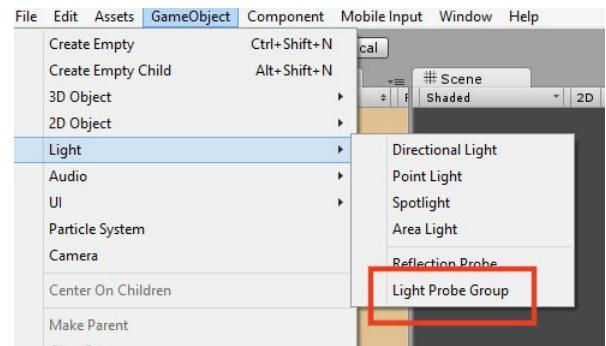
- book
- drawers

To properly illuminate non-static objects, add lightprob is necessary.

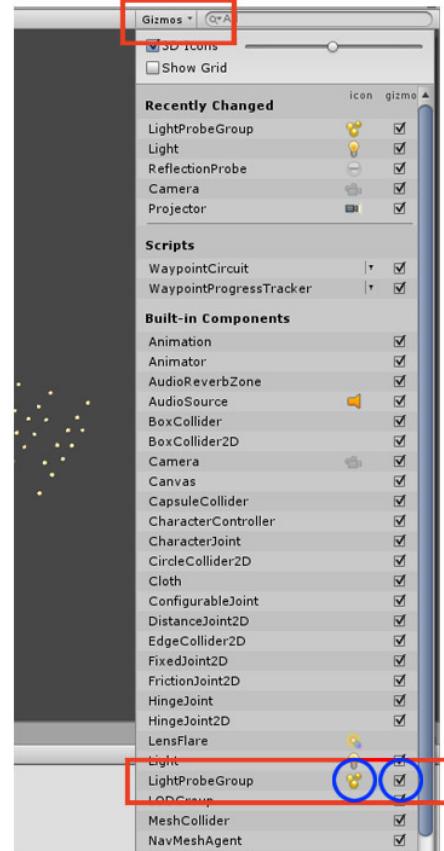


Add lightprobs:

- 1 Go to **GameObject > Light > Light Prob Group**.



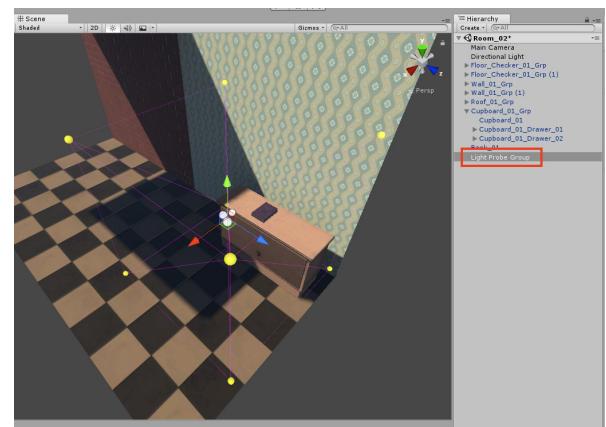
If the light prob doesn't appear check that the lightprobGroup option is selected in Gizmos window.



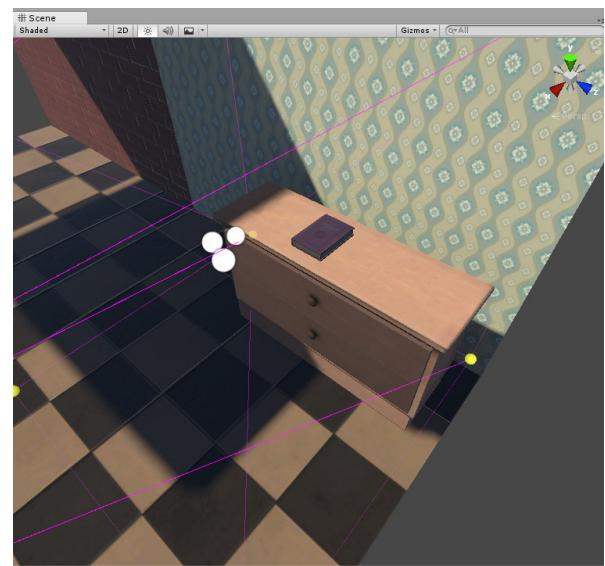
- 2 In hierarchy tab select **Light Probe Group**

Set transform position to:

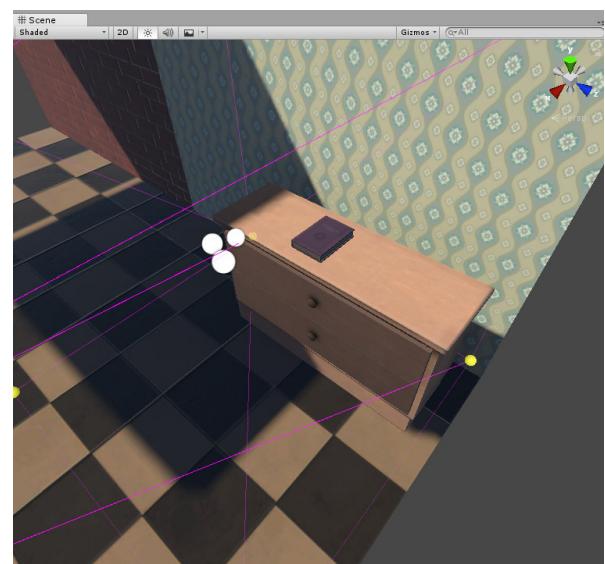
X: -0.4
Y: 1.2
Z: 3.4



3 In Lighting Tab press button **Generate Lightings** to recreate lightmaps.

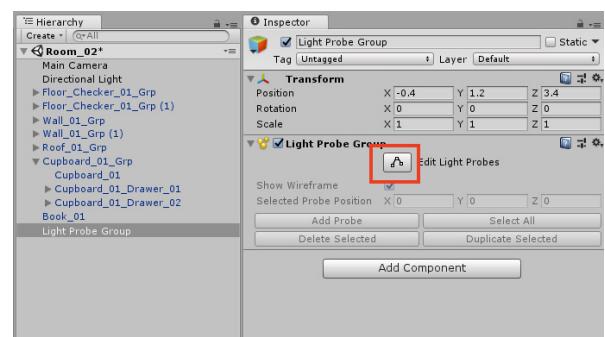


Now all objects are correctly illuminate.



Duplicate Light Probs balls:

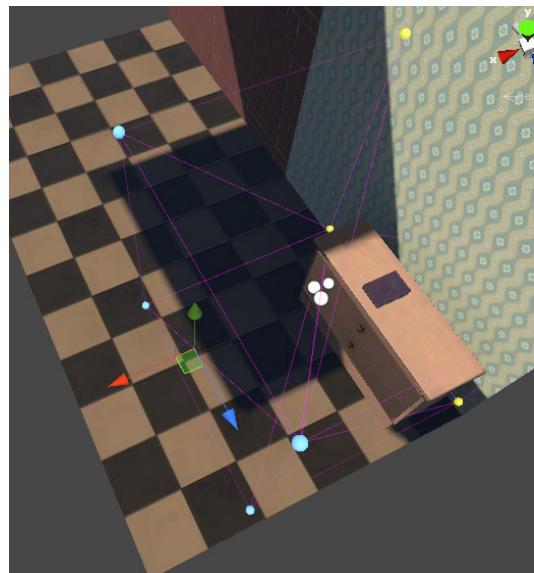
4 In hierarchy tab select **Light Probe Group**



5 In inspector tab press **Edit Light Probes** button

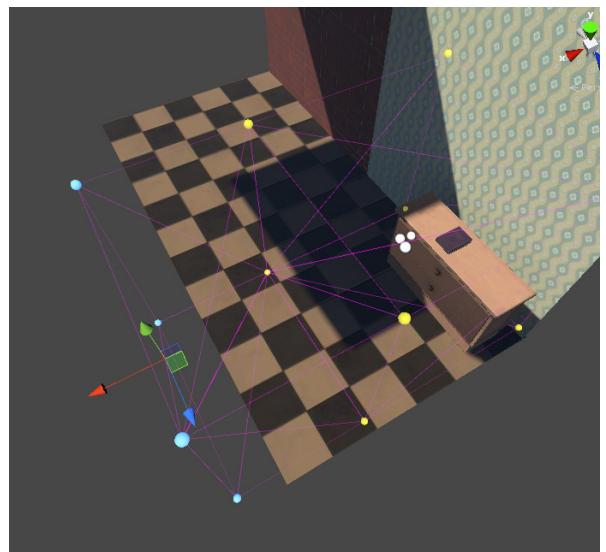
6 In scene view select 4 balls

7 Duplicate the balls by pressing **CTRL + D**



8 In scene view:

-Move the new 4 balls in X axis



Tips:

1-It is possible to move each ball independently.

2-Place the lightprobs in strategic places:

-where one passes from darkness to light
-if an object remains black: try to move the lightprobs balls to another place.

3-If your scene is large (for example a house with several floors) use several lightprobs : all lightprobs in the scene connect together automatically.

4-If a place needs more details, add more lightprobs balls.

Add a lamp:

1 From project tab drag and drop **Lamp_01_Grp** in hierarchy tab.

Assets → AP → Assets → Prefabs → House → Lights

Set transform position to:

X: -0.6

Y: 0.95

Z: 1.9

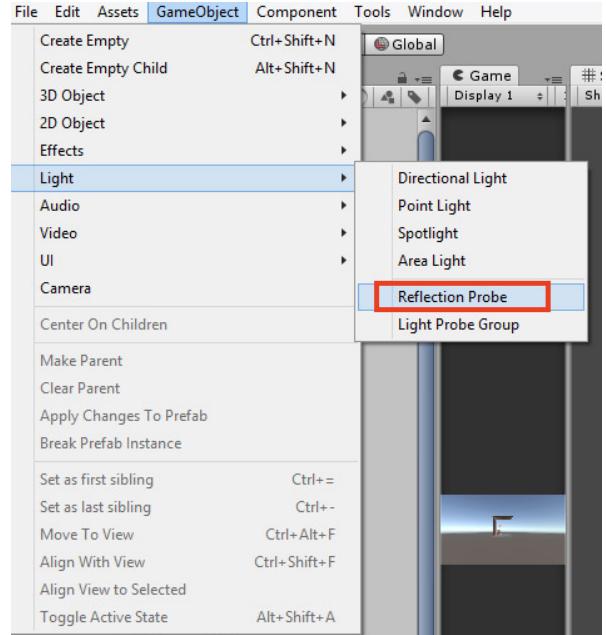
2 In Lighting Tab press button **Generate Lightings** to recreate lightmaps.



Add a Reflection prob:

We must add a reflection Prob to have correct reflections.

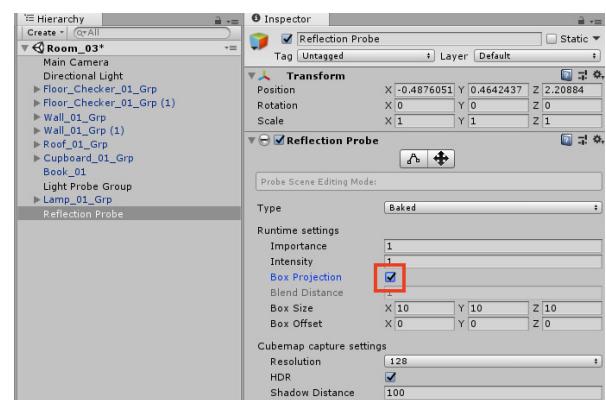
1 Go to **GameObject > Light > Reflection Prob**



2 In hierarchy tab select **reflection Prob**

3 In Inspector tab check **Box Projection** box

Info: To see the finished scene open **Graphics_Tuto_02**
Assets → AP → Assets → Scenes → Tutos → **Tuto_Graphics**



Tips:

-The Reflection Prob must encompass all objects.

-If there are multiple areas (for example, several rooms in a house), use one Reflection Prob per zone.

In Inspector tab use **Box Size** and **Box Offset** parameters to enlarge and move Reflection Prob



Lighting of object in 3D viewer:

In every gameplay scene of your project a white sphere is created automatically. When the player looks at an object in the 3D viewer, a copy of the object is automatically created in the center of that sphere. The lighting of the object is done in this sphere using the lights probs.

So even though in the game the player is in a dark place, the object in the 3D viewer is always well lit.

10-4 Combine mesh

A combiner mesh script is included in this asset.

Assets → AP → Assets → Script → MeshCombiner → Meshcombinervtwo

Combiner mesh script combine all the meshes that have the same material on a single new mesh.
This a good solution to **drastically reduce drawcalls and reduce lightmaps precomputed time.**

1 Open scene Graphics_Tuto_03

Assets → AP → Assets → Scenes → Tutos → Tuto_Graphics

2 Create 2 Empty Group

3 Rename it for example **Combine_01** and **Combine_02**

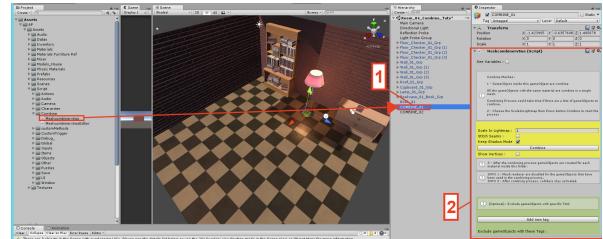


4 Select **Combine_01**

5 From project tab drag and drop **Meshcombinervtwo** script to **Combine_01** group

Assets → AP → Assets → Script → MeshCombiner

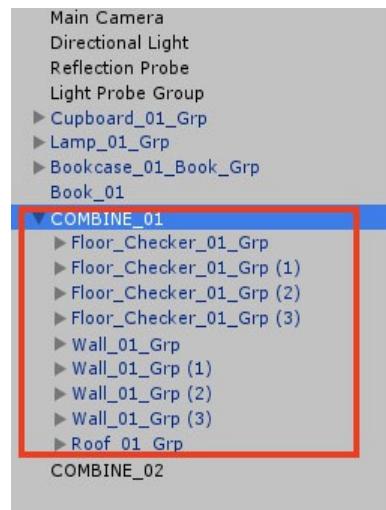
Mesh combiner script is added to **Combine_01**(spot 2)



Do step 4 and 5 with **Combine_02** group

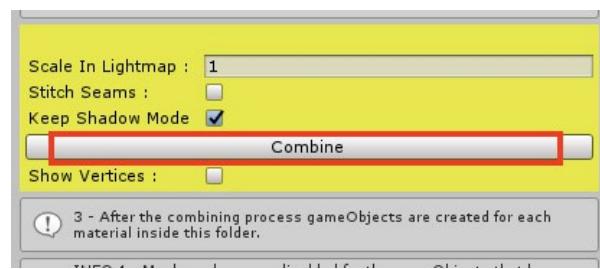
6 Put the following objects in the group **Combine_01**:

Floor_Checker_01_Grp
Floor_Checker_01_Grp(1)
Floor_Checker_01_Grp (2)
Floor_Checker_01_Grp (3)
Wall_01_Grp
Wall_01_Grp (1)
Wall_01_Grp (2)
Wall_01_Grp (3)
Roof_01_Grp



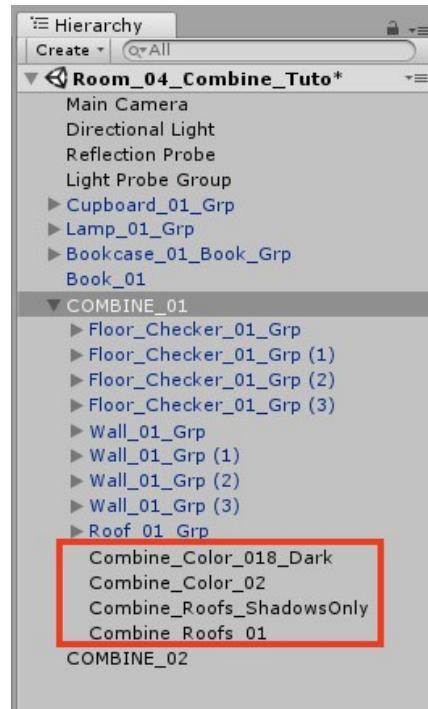
7 Select **Combine_01**

8 In Inspector tab press **Combine** button

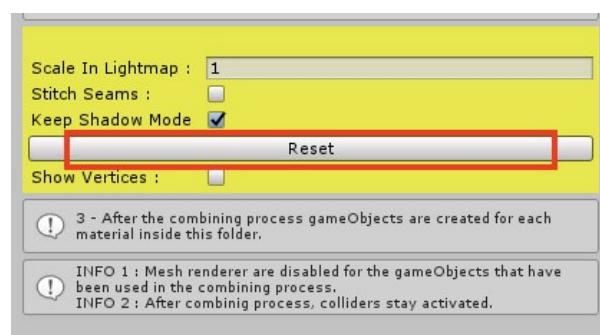


After the process new Combine gameObjects are created inside **Combine_01** group (spot 1)

All other objects in the group are hide.



If you want to reverse the process press **Reset** button or **CTRL+Z**

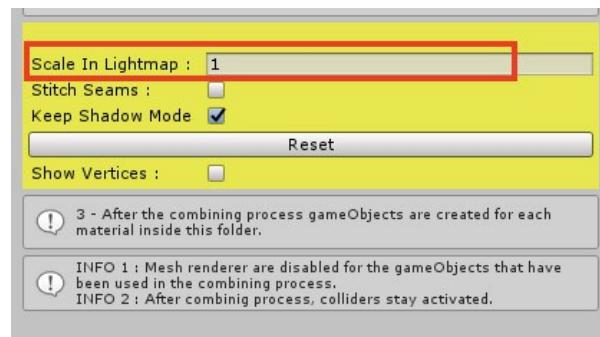


Options:

Scale in lightmaps

Some objects, especially those with rounded edges require more lightmap definition.

To increase the definition of these objects increase **Scale in lightmap** value.



Tips: Create combine group specially for round objects. Choose a higher **Scale In Lightmap** value for this combine group.

Caution: If you change the value after combining: you must decombine (reset) and then recombine the group (combine).

To increase the quality of lightmaps for the whole scene, increase **lightmap resolution** value in **lightings settings** tab.

On the other hand the size of the lightmaps will be larger and the lightmaps precomputing time too.

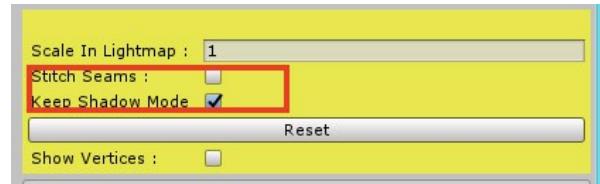
So it's best to use a low value of **lightmap resolution** in **lightings settings** tab and choose a **scale in lightmap** value depending on the type of objects (smooth or sharp).

Stitch seams

Stitch seams improves the quality of lightmaps

Keep shadow Mode

Keep shadow Mode allows you to keep the shadows options after the combining process (for example cast shadow: off)

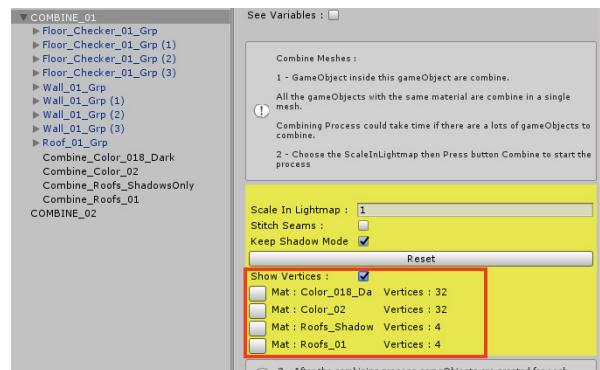


Show vertices

Check **Show Vertices** box to see the number of vertices by material.

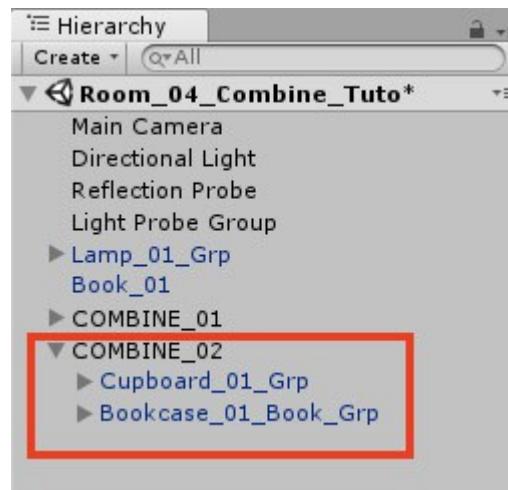
The number of vertices in a combined object must not exceed 65,000 vertices.

If there are too many vertices, split them into two groups.



9 Put the following objects in the group **Combine_02**:

Cupboard_01_Grp
Bookcase_01_Book_Grp

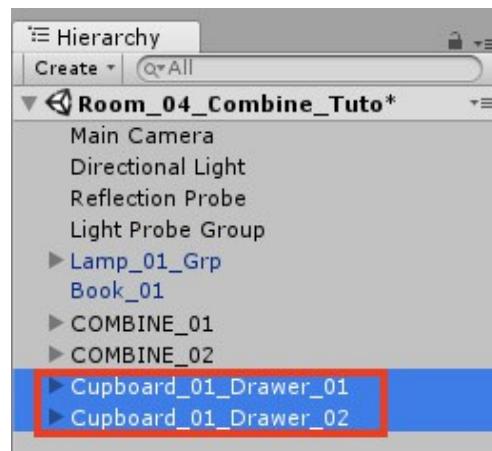


You must not combine objects that move.

That's why we are going to remove the drawers from the **Combine_02** group

10 Remove from group **Combine_02** the following objects:

Cupboard_01_Drawer_01
Cupboard_01_Drawer_02



11 Select **Combine_02**

12 In Inspector tab press **Combine** button



Info: To see the finished scene open *Graphics_Tuto_04*
Assets → AP → Assets → Scenes → Tutos →
Tuto_Graphics

Learn more about object that can be combined or
object that can not be combined.[\(more info\)](#)

10-5 Sprites and textures

Paint on texture:

It can be useful to paint on textures (for example to create a new puzzle).

Some textures are provided with uvs layout layer (.Psd files)

Assets → AP → Assets → Textures → Textures_Mat→ 01_Uvs

Example with Photoshop:

1 In Project tab make a copy of Uvs_Floor_Albedo

Assets → AP → Assets → Textures → Textures_Mat→ 01_Uvs

2 Open Uvs_Floor_Albedo 1 in your favorite drawing package .

3 Show Uvs layer to see uvs layout.

4 Paint on the picture

5 Save the file

Import sprite:

For puzzles it is possible to use objects but also sprites. You can use those included in the asset but also import yours.

1 Create a sprite in your favorite drawing package

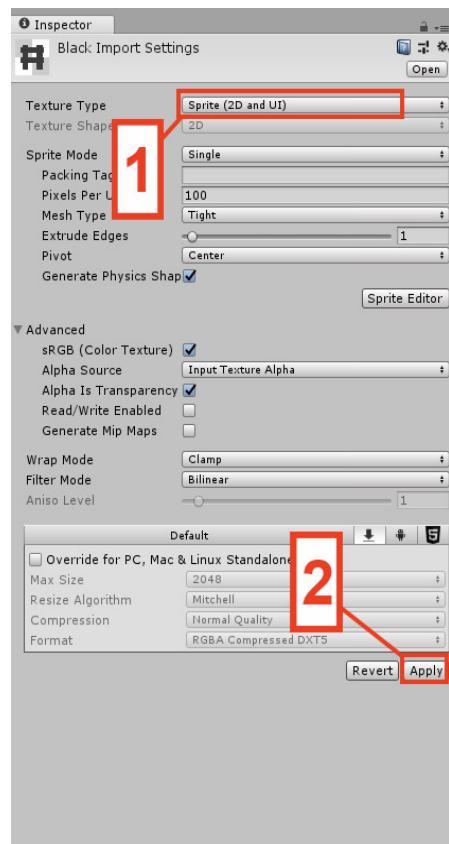
The size of the sprites included in the asset is 256x256. It is not mandatory but the creation of the puzzle will be faster if you respect this size.

2 Import a sprite in your project (for example in Texture folder)

3 In Project tab select your sprite

4 In inspector tab in **Texture Type** select **Sprite (2D and UI)** (spot1)

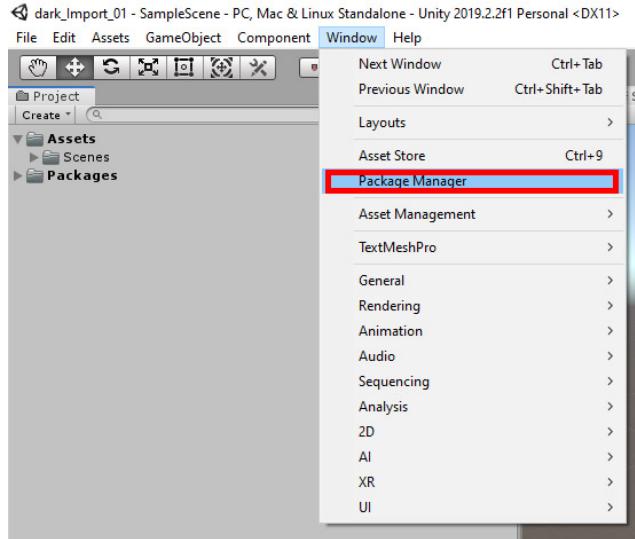
5 Press **Apply** button (spot 2)



From 2019.2 version of Unity, the post effects system has changed
If you are using version 2019.2 or later, follow these instructions:

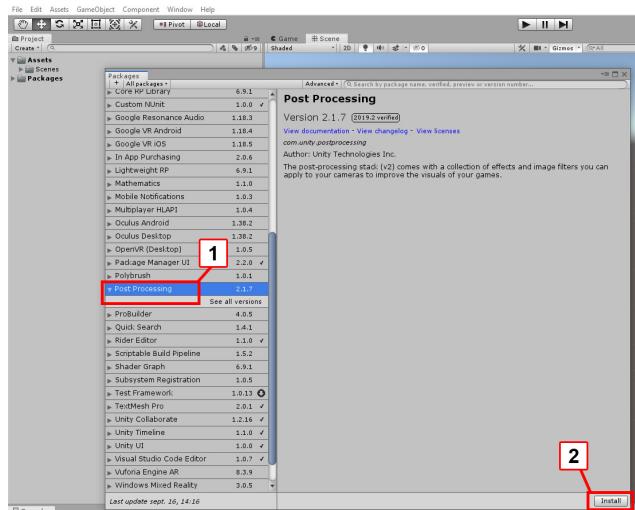
10-6 Effects (only for desktop)

1 Go to Window > Package Manager



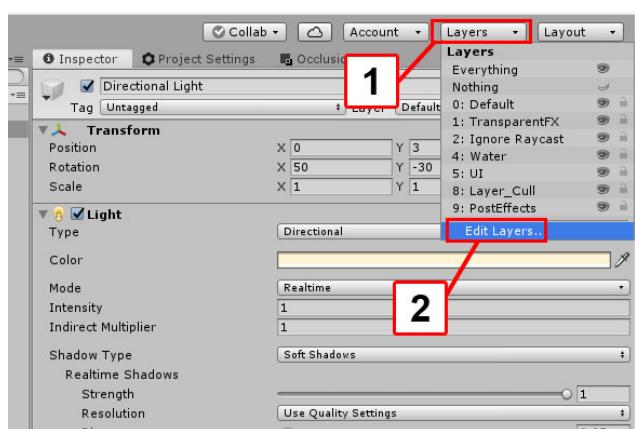
2 Select Post-Processing (spot 1)

3 Press button Install (spot 2)

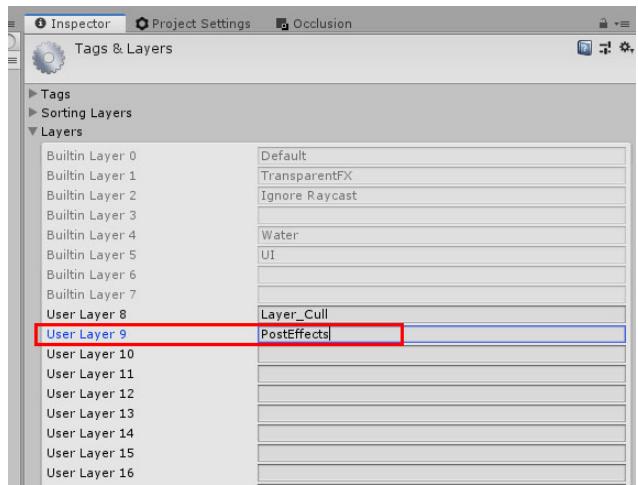


4 Top right select Layer (spot 1)

5 Press button EditLayer (spot 2)



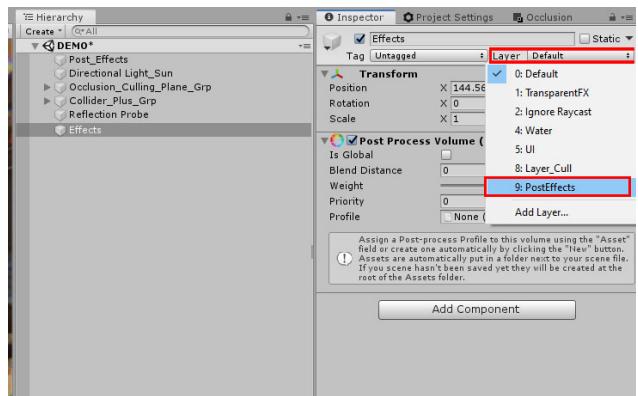
6 Create a new layer
Name it for example : PostEffects



7 In hierarchy tab create an empty object

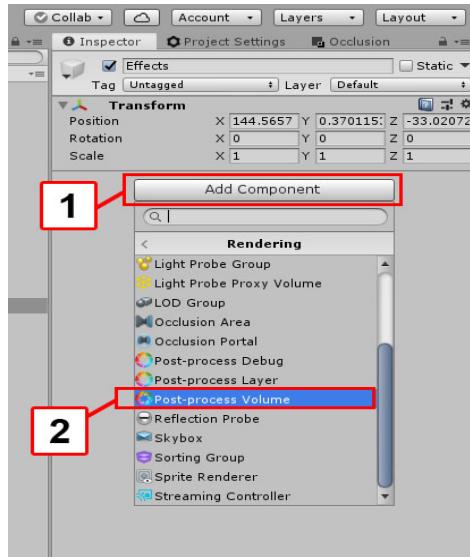
8 Rename it for example : Effects

9 In Hierarchy tab select Effects



10 In Inspector tab press button Add Component (spot 1)

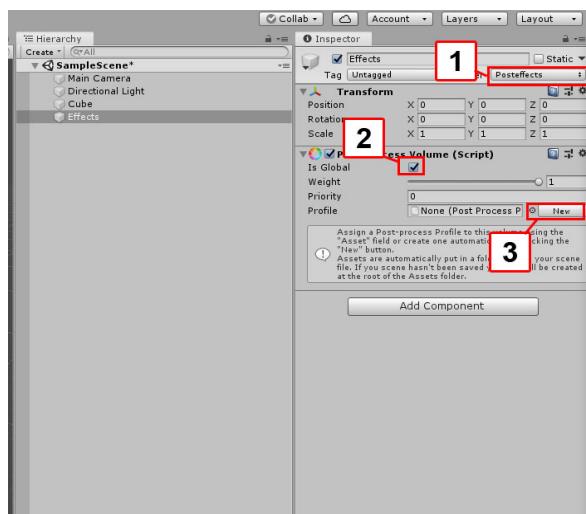
11 Choose Rendering > Post-process Volume (spot 2)



12 In Inspector tab choose layer: PostEffects (spot 1)

13 Check is global checkbox (spot 2)

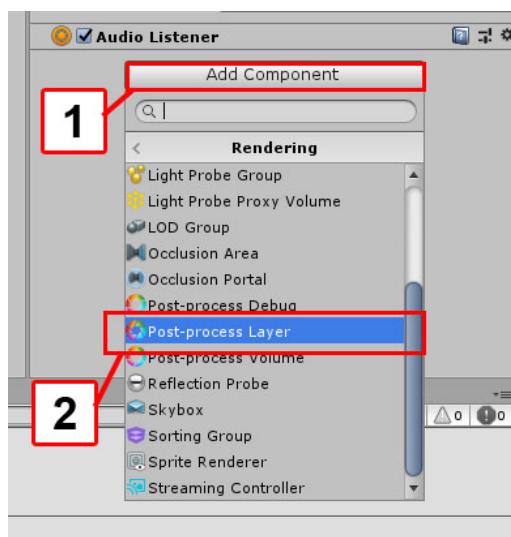
14 press button New (spot 3)
A new profile is create in Project tab



15 In hierarchy tab select your camera

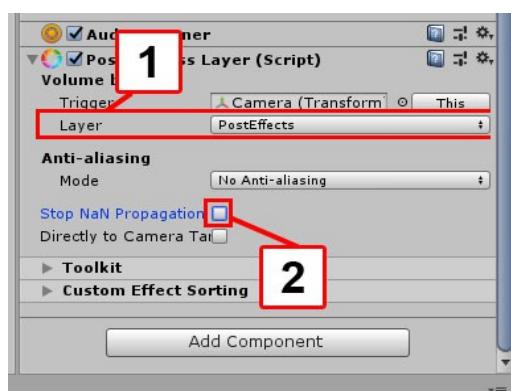
16 In Inspector tab press button Add Component (spot 1)

17 Choose Rendering > Post-process Layer (spot 2)



18 Choose Layer > PostEffects (spot 2)

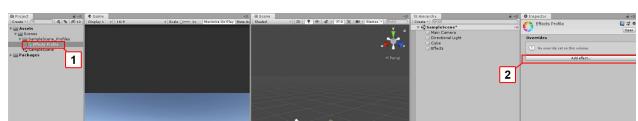
19 Optional : UnCheck Stop NaN Propagation checkbox (spot 2)



20 In Project tab select your post process profile (spot1)

21 In Inspector tab press button Add effect (spot 2)

22 Add the effects you want.

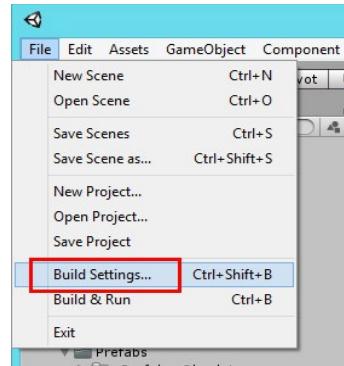


10-7 Export to Mobile

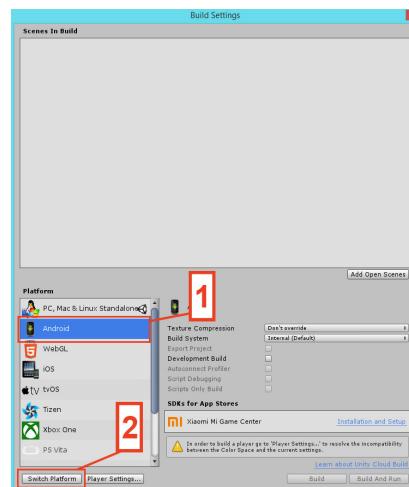
Follow this step to export your project to mobile
(example for Android)

This example of export to mobile is based on the
project demo included in the asset

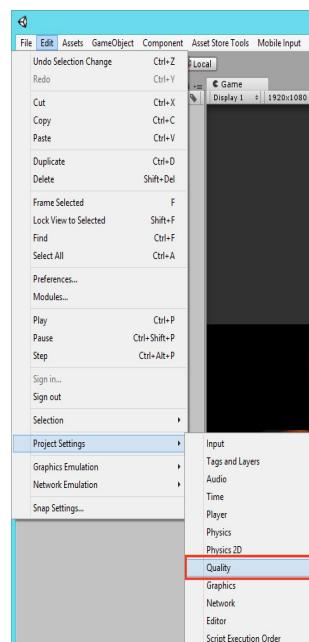
1 Go to **File** → **Build_Settings**.



2 Select **Android** (spot 1)



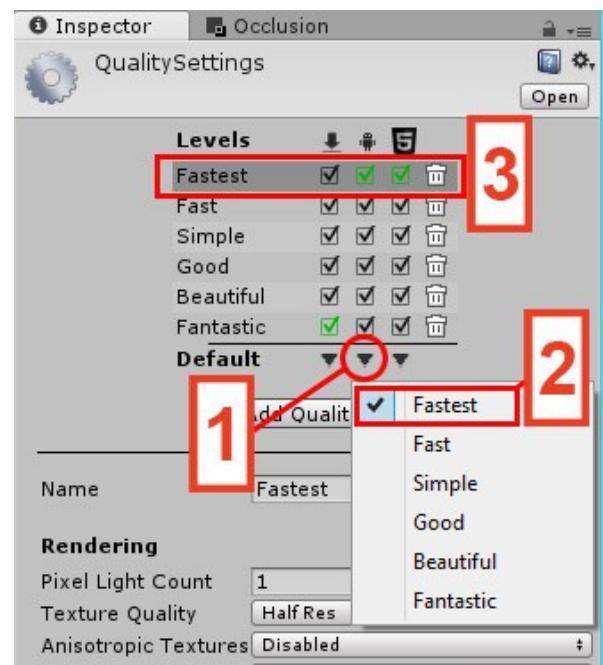
3 Press button **Switch Platform** (spot 2)



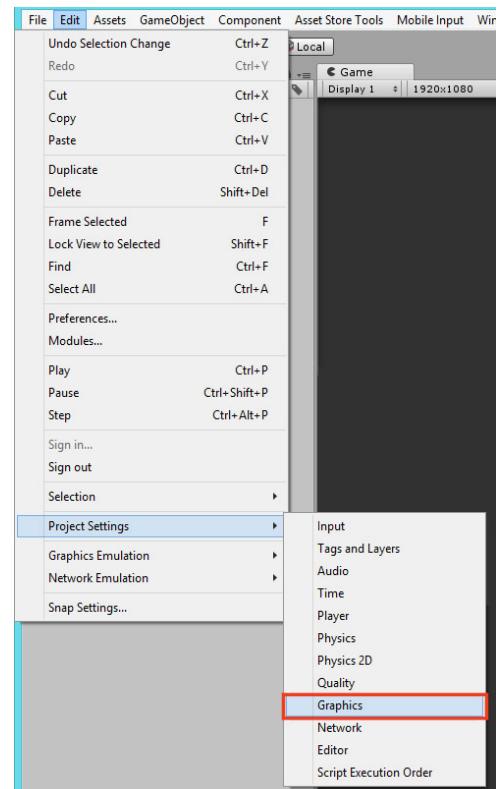
5 Press the triangle (spot 1)

6 Select **Fastest** to choose fastest when build (spot 2)

7 Press **Fastest** to choose fastest visualization in unity viewport (spot 3)



8 Go to **Edit → Project_Settings → Graphics**

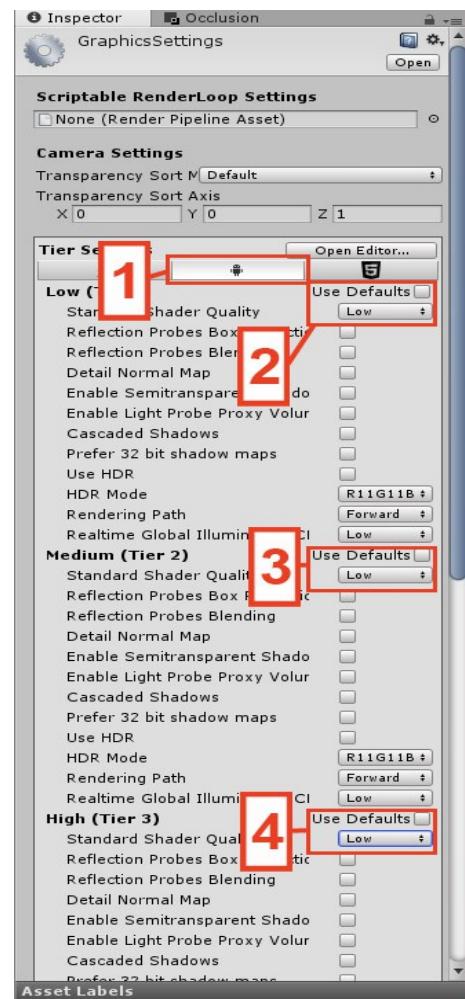


9 Choose Android (press android small icon) (spot 1)

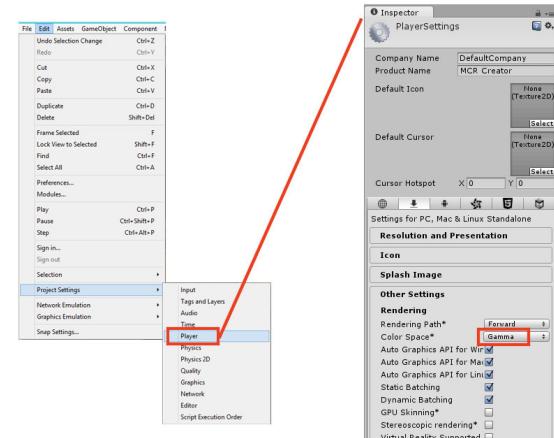
10 Uncheck **Use Default** checkbox
Then choose **Low** (spot 2)

11 Uncheck **Use Default** checkbox
Then choose **Low** (spot 3)

12 Uncheck **Use Default** checkbox
Then choose **Low** (spot 4)



13 Open **Edit → Project Settings → Player**
In Inspector window change **Color Space** to **Gamma**



14 Optimize materials for mobile

- First Quit Unity (close software)

On your Pc/ Mac Desktop:

- Open folder

Assets\AP\Assets\Materials\Material_Mobile

- Select all files in folder

- Copy

- Open folder

Assets\AP\Assets\Materials\Material_Grp

- Paste

- Restart Unity and open you project

Tips:

If you want to reverse the process copy materials

from

Assets\AP\Assets\Materials\Material/Desktop

Paste in Assets\AP\Assets\Materials\Material_Grp

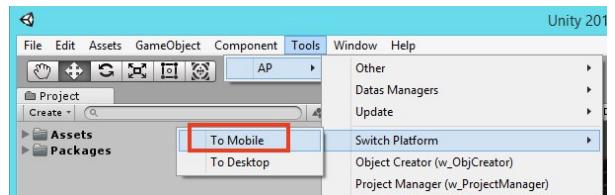
15 Open scene 00_MainMenu

Assets → AP → Assets → Scenes → Your project name

16 Go to Tools → AP → Switch Platform → To Mobile

It allows to automatically:

- Setup UI for Mobile (display needed Mobiles buttons)

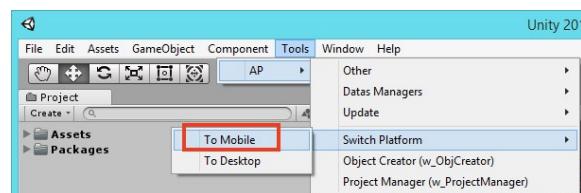


17 Save scene.

18 Open scene 01_DefaultScene

Assets → AP → Assets → Scenes → Your project name

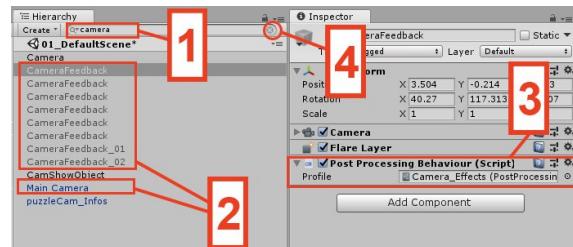
19 Go to Tools → AP → Switch Platform → To Mobile



20 If you use Effects on camera delete Post-Processing Behaviour script on all the cameras.

To select all the camera:

- In hierarchy tab write “camera” (spot1)
 - Select one camera at a time (spot2)
 - Delete Post Processing behaviour(Script)(spot3)
 - Do this for all the feedback camera and Main camera
 - Click on the cross icon (spot4)

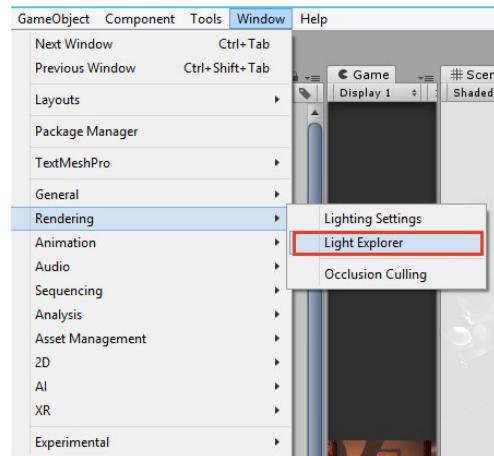


(More info about Effects)

21 Convert all the mixed and realtime lights to baked lights.

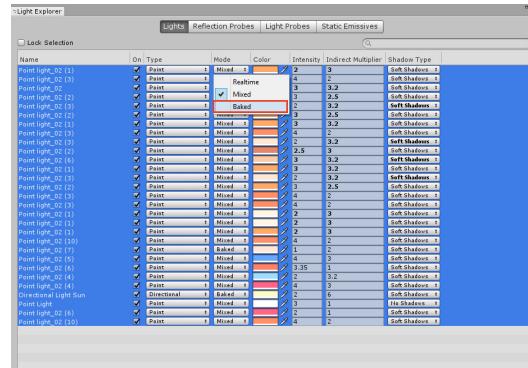
To easily modify all the lights:

Go to Window → Rendering → Light Explorer



In Light explorer window:

Select all the lights on the left then choose **baked** in **Mode Column**



22 Open Lighting Tab

Window → Rendering → Lighting Settings

23 Set **Lighting Mode** to **Subtractive** (spot 1)

24 Set **lightmap resolution** to **15** (spot 2)

Tips:

The higher the number, the higher the quality of the lightmaps.

*In return the size of the lightmaps will be larger.
Lightmaps precomputed time will be longer too.
[\(more infos about lightmaps\)](#)*

If you use the combiner script included in this asset you can easily increase the quality of lightmaps with less calculation time.

[\(more infos about Combiner script\)](#)

25 Set **Directional Mode** to **Non Directional** (spot 3)

26 Save scene.

27 Calculate the lightmaps by pressing **generate lighting** in lighting tab

28 Save scene.

If there is more than one gameplay scene in your project, you need to do step **18** to **28** for each scene

Your project is ready to export to mobile

