2D Game Design in Unity

Lab 1 – Introduction to the Unity 2D Environment

Prepared by Sarah Amer

The Importance of Concept and PLANNING AHEAD

Not every video game requires a strong storyline to be entertaining, but every game has to be entertaining to play!

1)Before you start on your project, sit down and think about what you want your game to be:

- Is it a ‘minutes to kill’ or puzzle-solver? (e.g. Fruit ninja, Angry Birds, Tetris, Sudoku)
  - Entertainment > Story+Art
- Is it a classic platformer? (e.g. Super Mario Bros, DuckTales Remastered, Cloudberry Kingdom)
  - Entertainment+Art > Story
- Is it an adventure/visual novel? (e.g. Layton Brothers Mystery Room, 999)
  - Story+Art+Entertainment
- Is it a combination of 2 or more of the above? (e.g. Professor Layton, Legend of Zelda)
  - Story+Art+Entertainment

The Importance of Story/Premise and PLANNING (Cont.)

2)After you've decided the genre, use your favorite games as inspiration

- What are the things your favorite games did GREAT? Re-use the successful concepts and add your own innovations!
- What are the things you didn't like about those games? Bad controls? Ugly backgrounds? Uninteresting story? Avoid repeating their mistakes
- Every work of art is inspired by a work of art that came before it. Do not be afraid to take ideas and lessons from your favorite games. Recycle ideas but don't plagiarize!

3)**READ** about game design. Learn the rules that make a game worth playing. Only when you know the rules, you can experiment by breaking them.

4)Plan your game before you start implementing it. It is normal to make changes while you work, but make sure you at least have a basic map to follow.

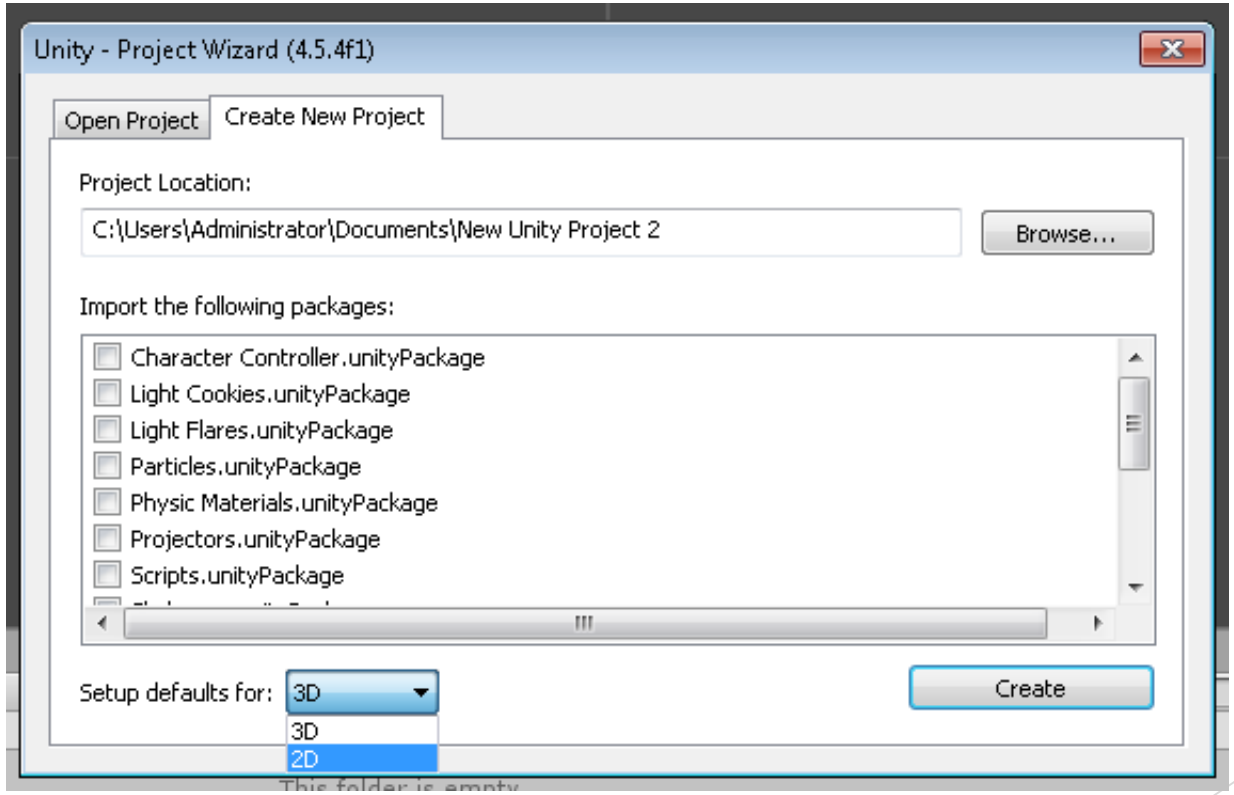
Do These Quotes Mean Anything to You?

"If I have seen further than others, it is by standing upon the shoulders of giants." – Isaac Newton

"Creativity is knowing how to hide your sources" –C.E.M Joad

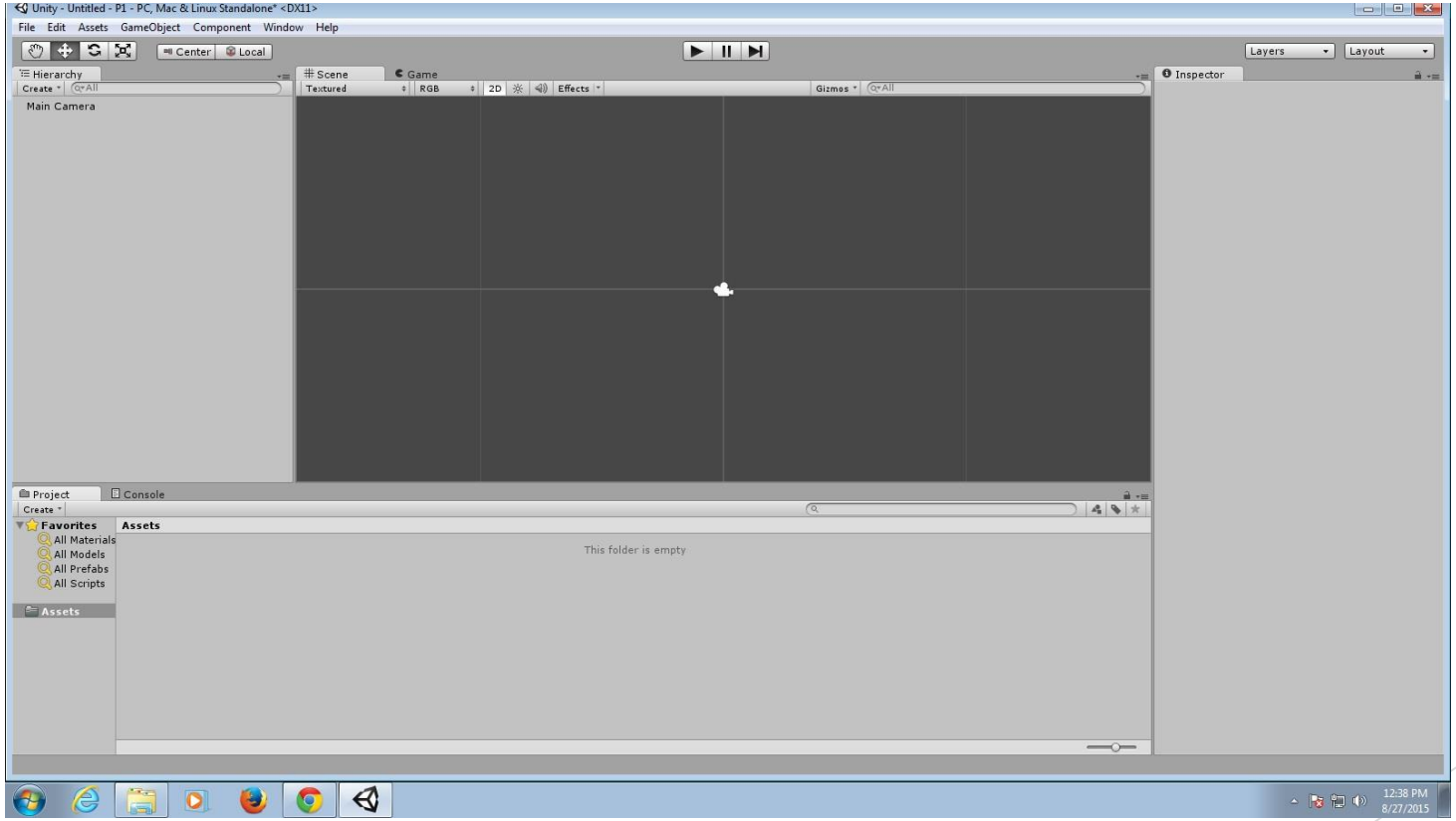
First Look

- Open Unity to create a new project. Name the project and set the environment to **2D**.



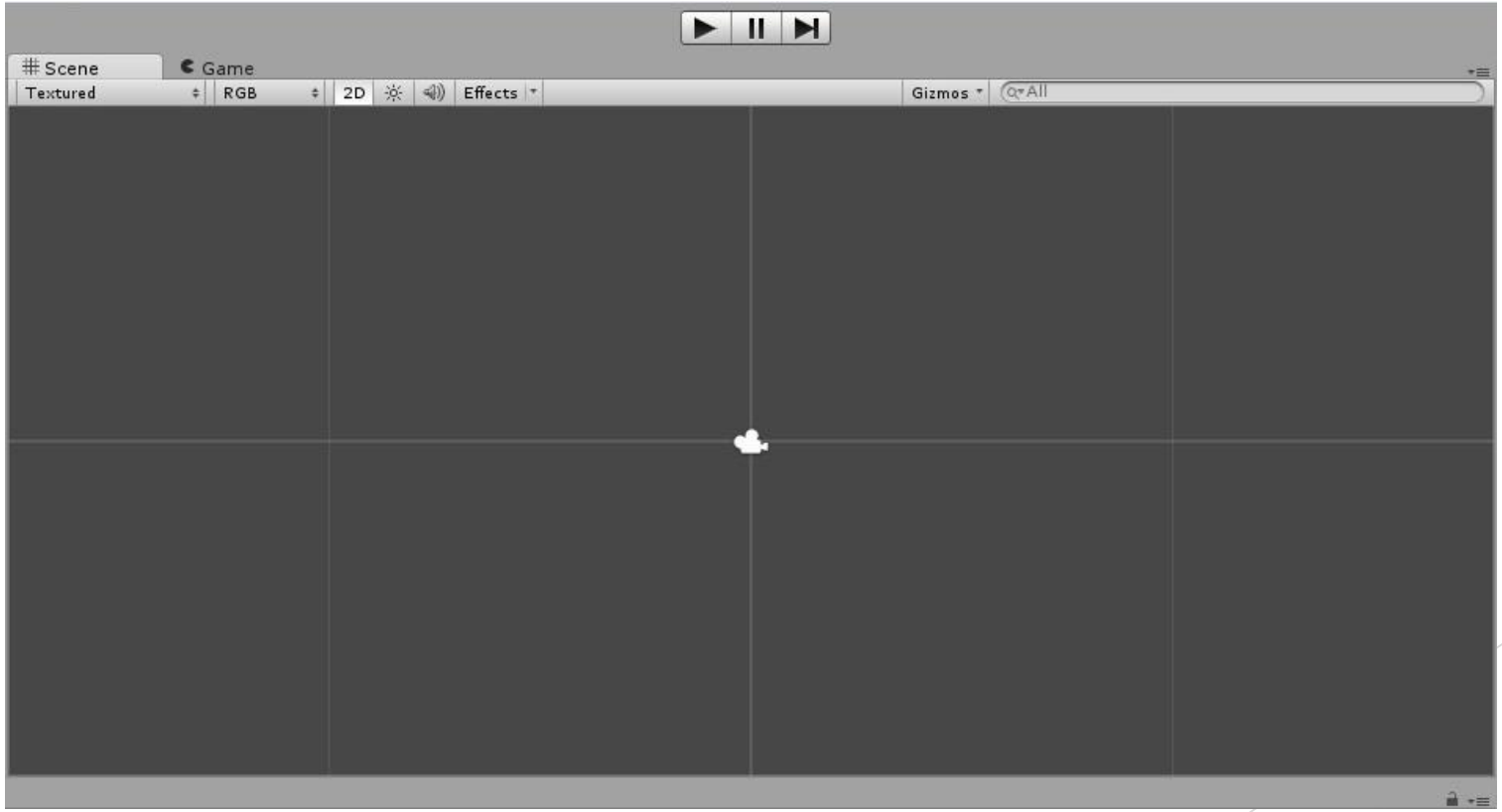
First Look

- This is your default workspace.



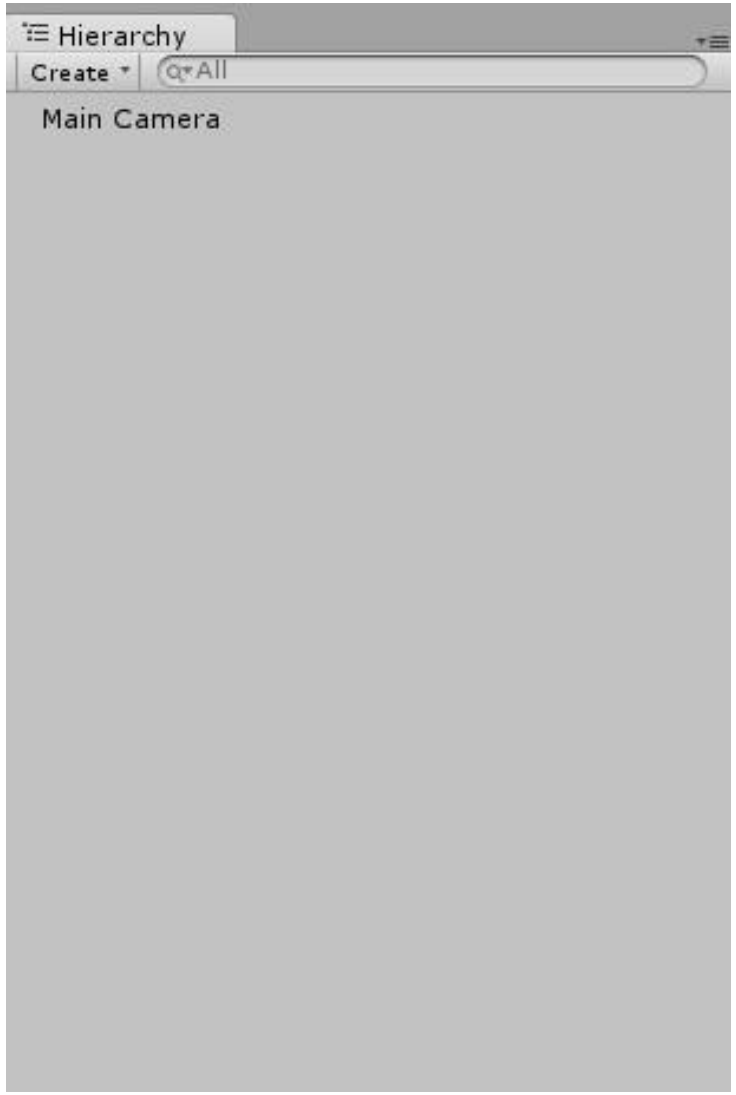
First Look (Cont.)

- Scene/Game panes
  - This is where you assemble all the elements of your scenes in the game



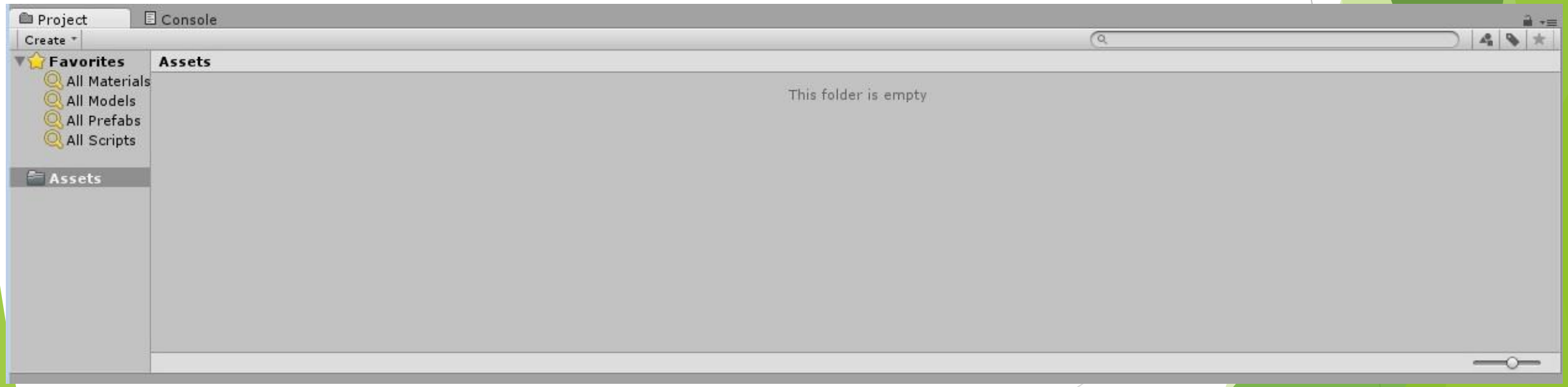
First Look (Cont.)

- Hierarchy Pane
  - Lists all the elements that exist in your scene, and establishes parent-child relationships between them



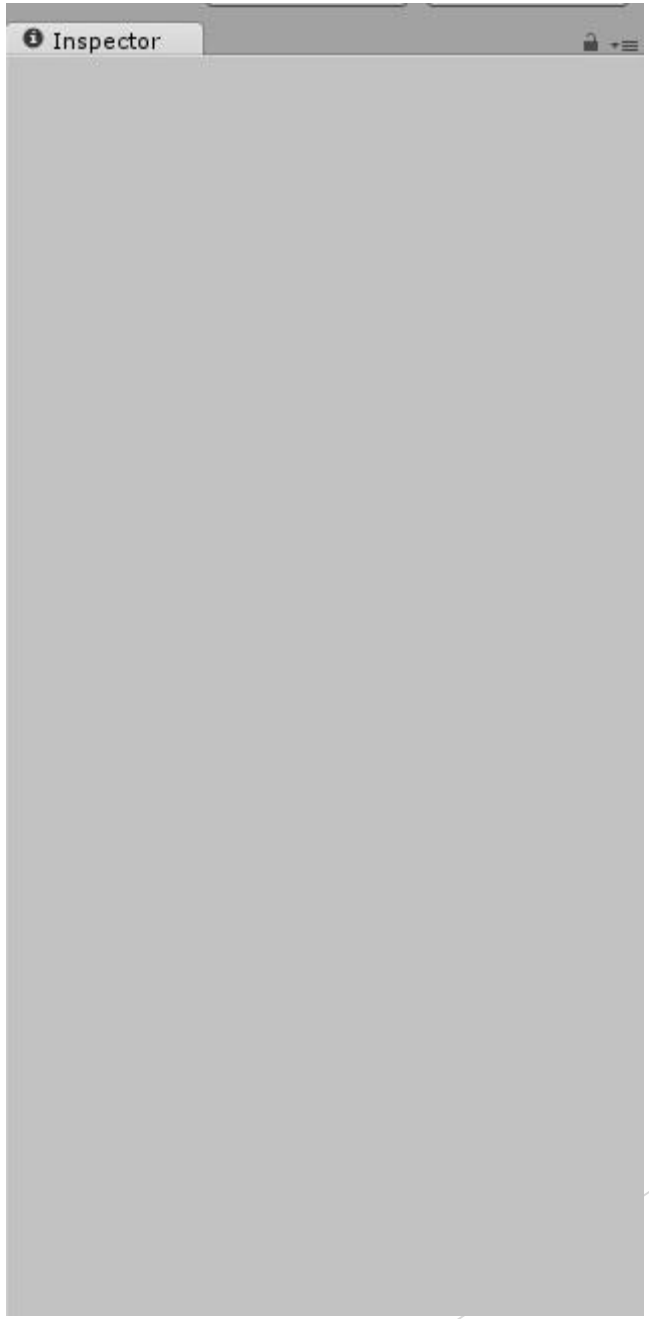
First Look (Cont.)

- Project Pane
  - This is where you organize all the GameObjects that you'll be using in your scene, from character sprite sheets to animation to background imagery to code. Note: keep your assets organized by putting them in folders! (e.g. Codes, CharacterSprites, etc.)



First Look (Cont.)

- Inspector pane
  - This is where you can see and edit the properties of any element you've selected to work on



First Look (Cont.)

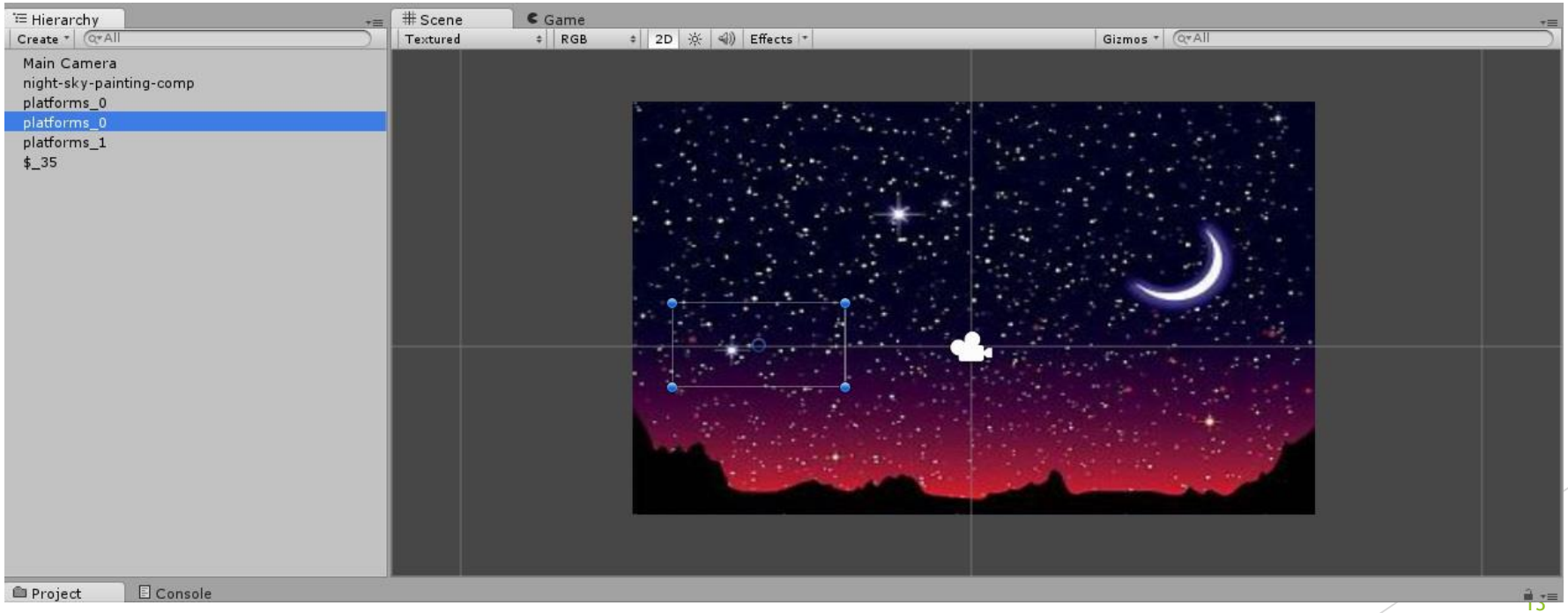
- Transform tools
  - Easy-access tools to change the position, size and orientation of any element in your scene
  - The hand tool moves the entire scene pane canvas
  - The move tool moves a selected element around the scene pane
  - The rotate tool rotates a selected element around the x or y axis
  - The transform/scale tool allows for increasing the size of an element along the x axis, y axis or both
  - **Note: if these tools are not accurate enough, use the x and y axes values in the inspector pane instead!**

Exercise #01 – Create a Simple BG

- Go online and choose several elements to compose a pleasant foreground and background. E.g. trees, grass, mountains, birds, blue sky, etc. Be creative!
- Create a folder in your project pane. Name it Background_Sprites
- Drag and drop sprites into the folder
- Drag and drop the sprites from the folder to the project pane. They'll automatically also appear in the scene pane. Assemble everything to create an interesting background
- Use the transform tools in the toolbar to help you rotate, resize, etc.

Exercise #01 – Create a Simple BG (Cont.)

- You may find that the images are not being assembled the way you want (e.g. the suspended platform is hiding behind the sky)

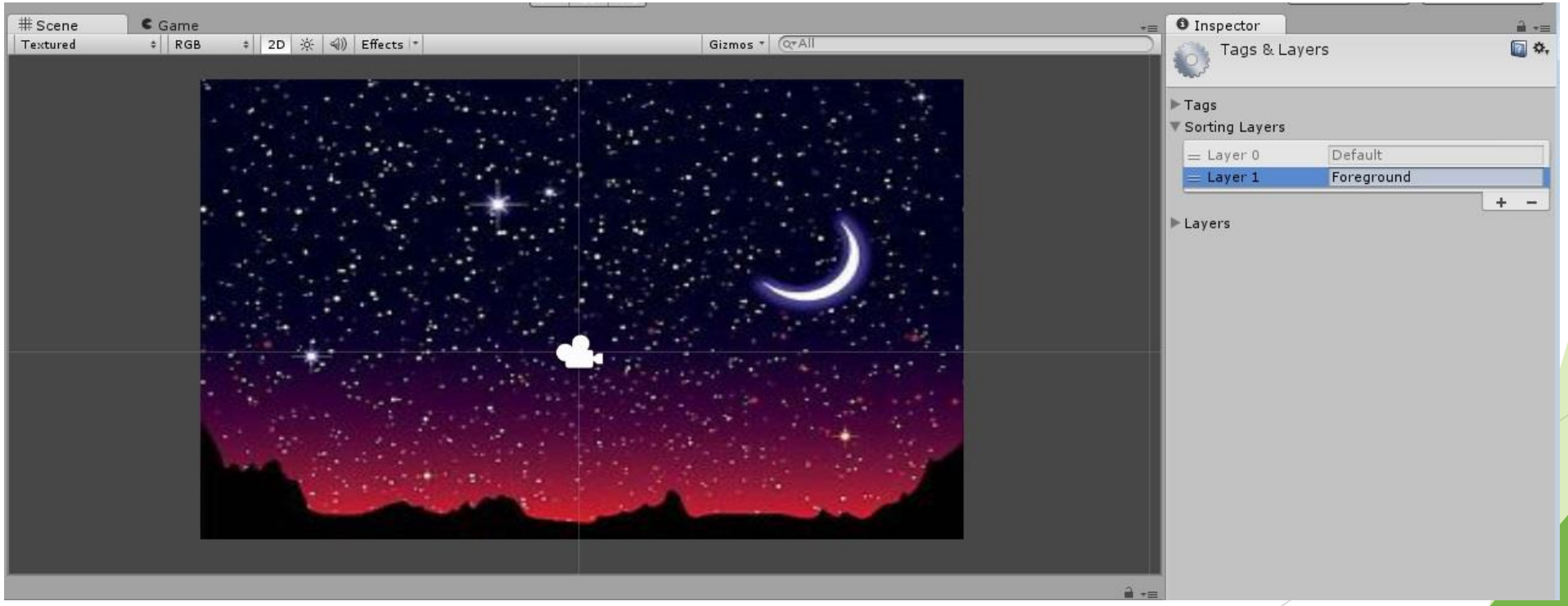


Exercise #01 – Create a Simple BG (Cont.)

- To re-assemble them correctly, select the platform and go to the inspector pane
- Choose Sorting Layer > Add Sorting Layer

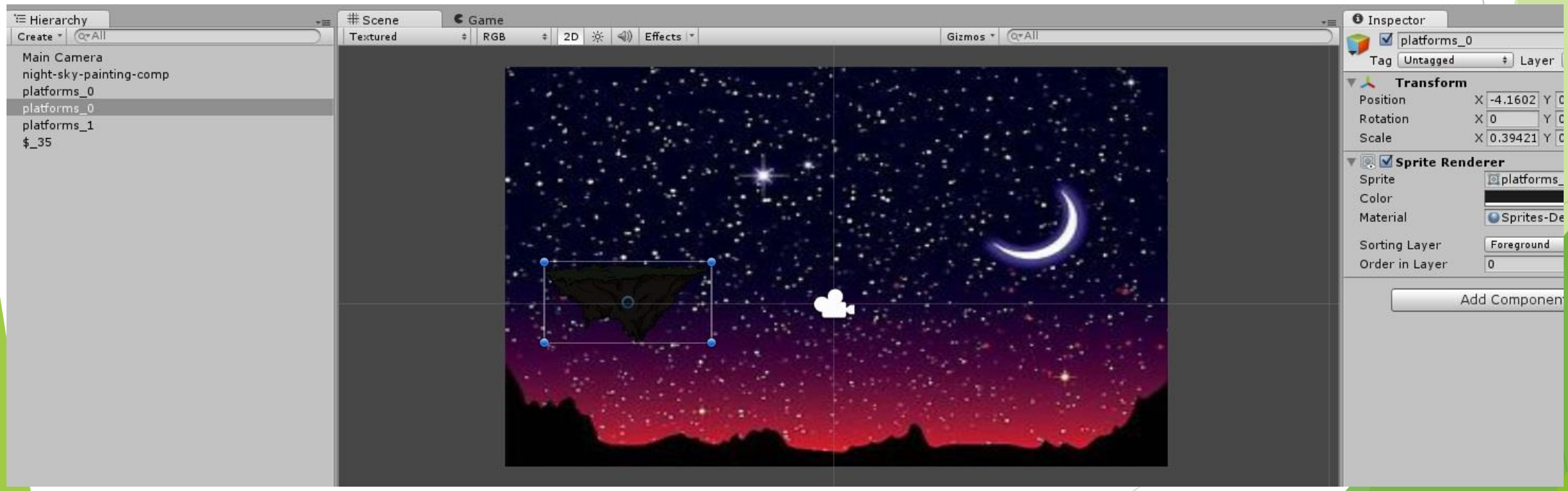
Exercise #01 – Create a Simple BG (Cont.)

- Click the + sign, and add a new layer named Foreground. The horizontal lines on the left of each layer allow you to re-assemble if needed



Exercise #01 – Create a Simple BG (Cont.)

- Re-click on the platform's sprite name in the hierarchy pane, and change its sorting layer from Default to Foreground
- Now create another sorting layer and name it Background. Place all your background elements like the sky in it

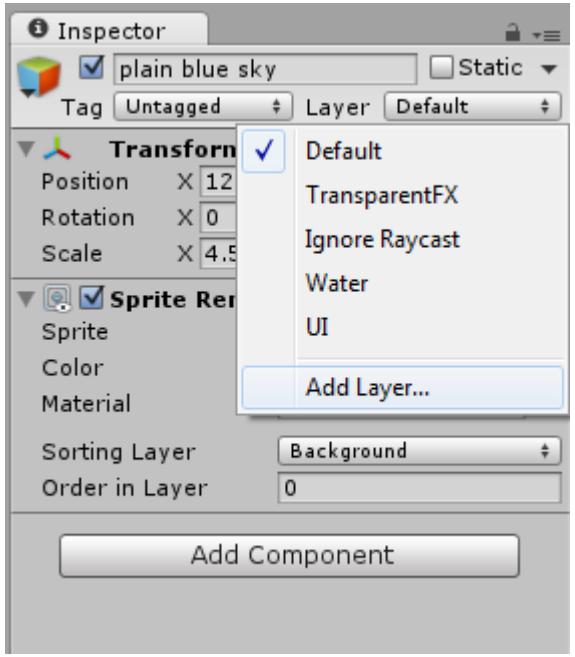


Exercise #01 – Create a Simple BG (Cont.)

- To see what your scene looks like so far, click the Game pane

Exercise #01 – Create a Simple BG (Cont.)

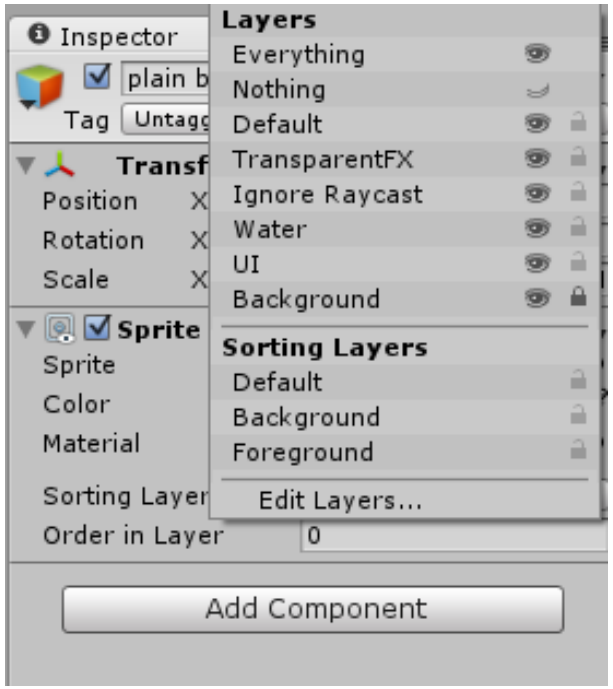
- To lock a layer and avoid accidentally moving it around, go to Layer in the Inspector pane. Choose Add Layer, and create a new one (e.g. Background)



- After it's created, select it from the list instead of Default

Exercise #01 – Create a Simple BG (Cont.)

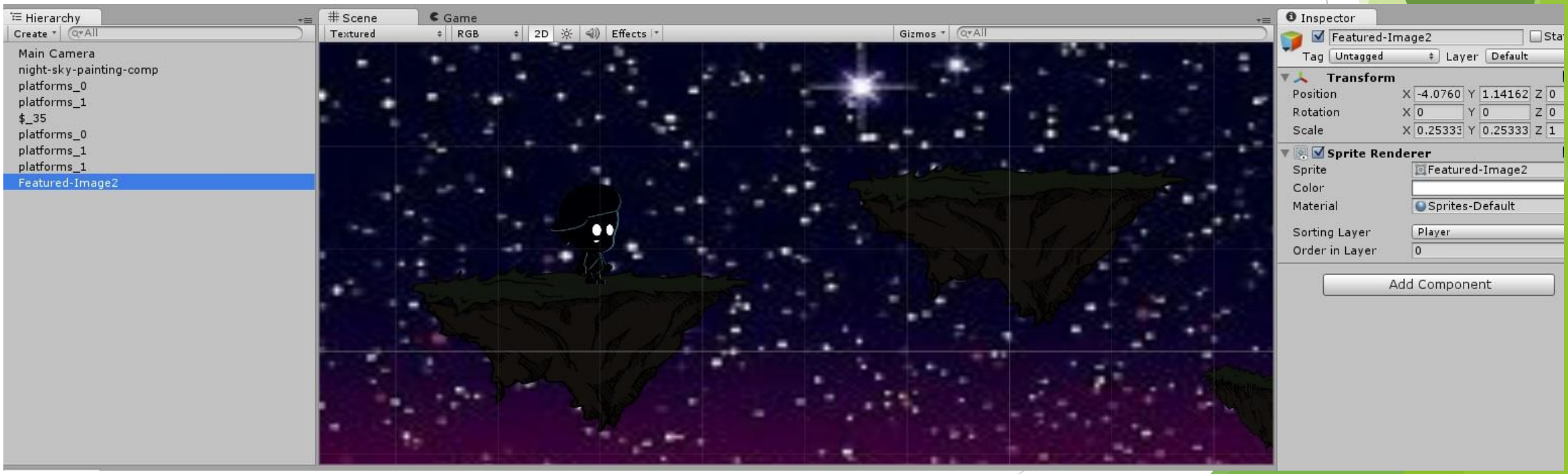
- Go to the Layers drop-down list above the Inspector pane and choose Background (or whatever layer you had created)



- To lock the layer, click the Lock icon
- Now click outside the sprite you wanted to lock. When you try selecting it again, it will not be highlighted or moved

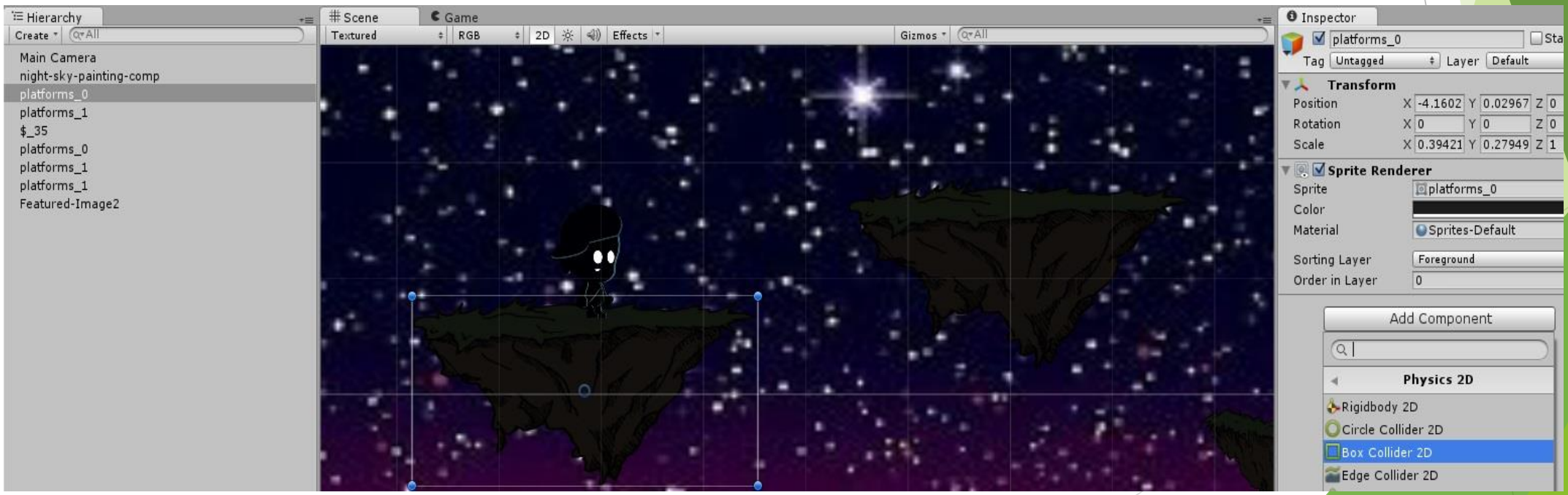
Exercise #02 – Add a Character

- Choose a character sprite from the internet and position them in your scene
- You may again have a problem with layers. Create a new sorting layer, name it Character/Player and position it above both foreground and background



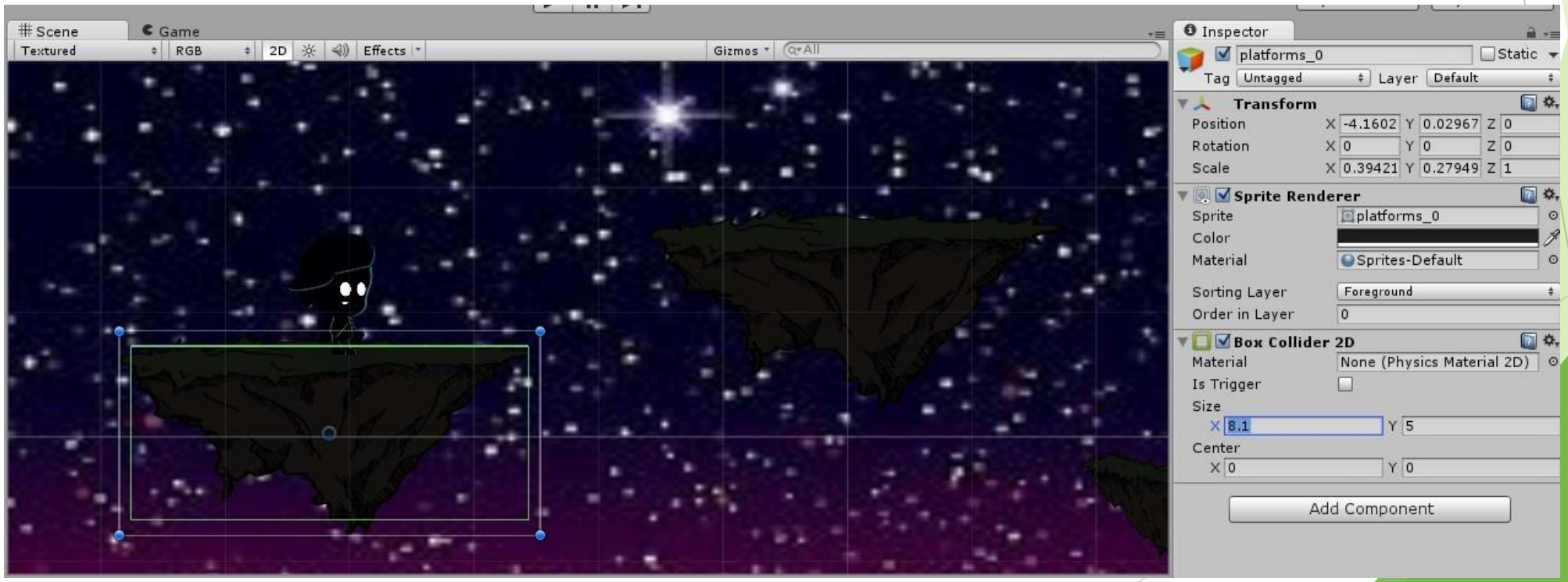
Exercise #03 – Make the Ground Solid

- You'll need to make the ground solid for your character to stand on
- Select ground>Inspector pane>Add Component>Physics2D>BoxCollider2D



Exercise #03 – Make the Ground Solid (Cont.)

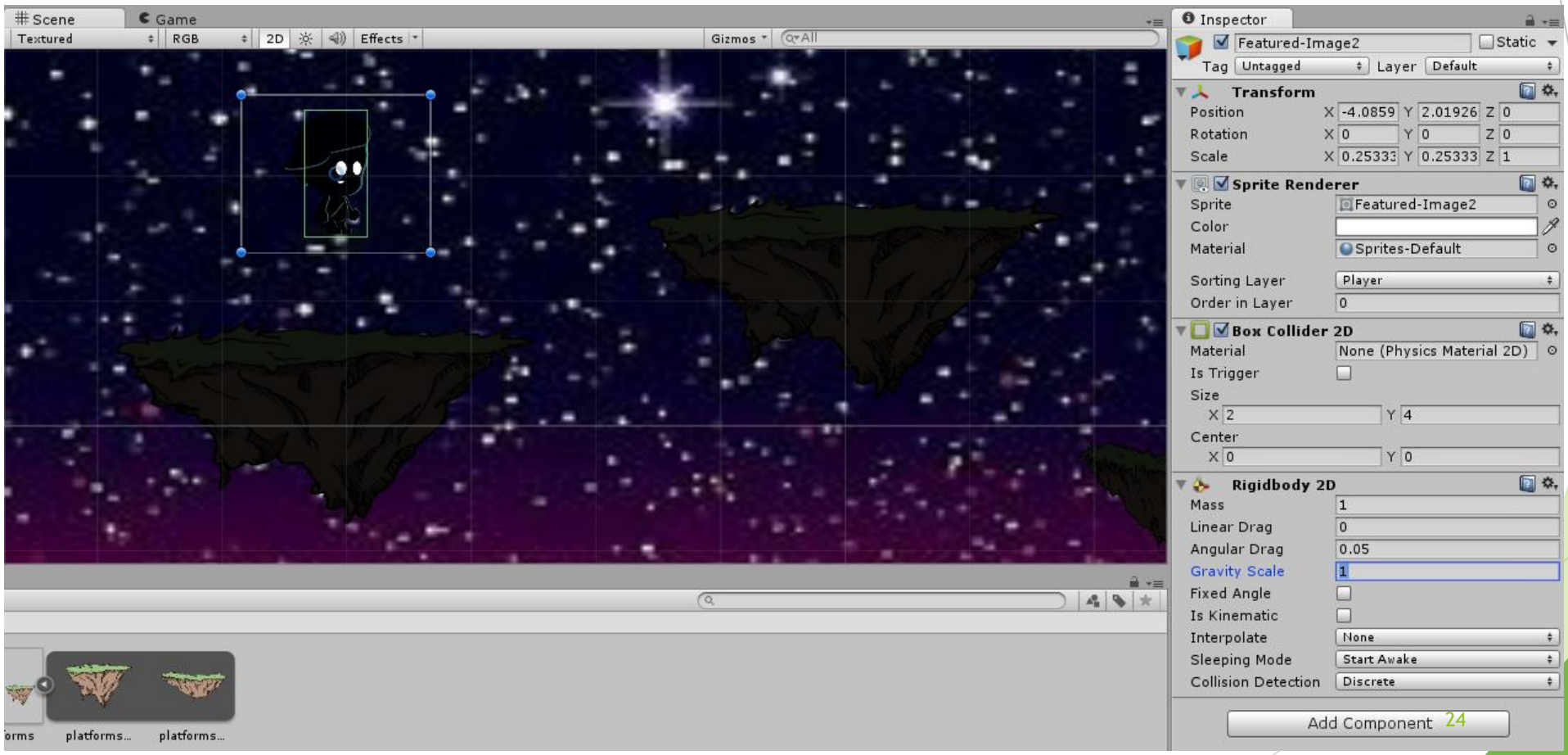
- To adjust the size of the (green) collider around the ground exactly the way you want, play with the values of the x and y axes in the Inspector pane
- Now the ground is solid



Exercise #04 – Make the Character Solid

- Using exercise #03 as an example, add a suitable collider to your player character
- Click the Play button, but still nothing happens!
- To make the player character respond to physics, a RigidBody must be added
- Select player sprite>Add Component>Physics2D>RigidBody2D
- As you'll see, the Rigidbody component has many useful settings. Experiment with Gravity. Suspend the character up in the sky, then click the Play button to see them fall and hit the ground
- Click the play button again to stop Game Mode and change the gravity's value. Click play again. What happens?

Exercise #04 – Make the Character Solid (Cont.)

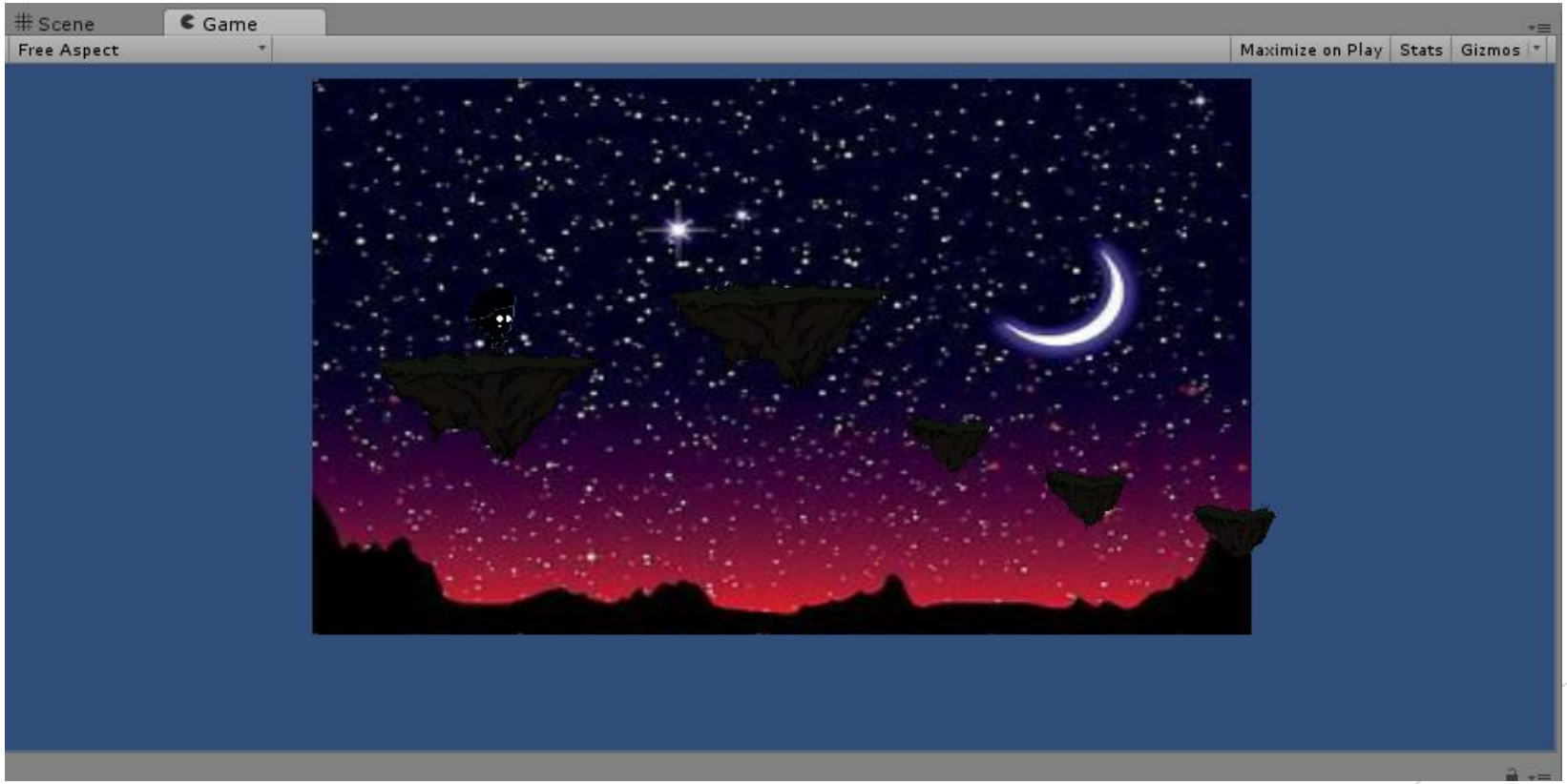


Camera

- In 2D games, the camera type is **Orthographic**
- If there is a problem with how your scene appears in front of the camera, click on the camera in the project pane to open its settings in the inspector pane
- Change the Size setting to whatever's suitable

Camera (Cont.)

- Size set to 5. Too big!



Camera (Cont.)

- Size set to 3. Just right.

Quick Note

- **Never** make changes to your scene while the Play button is clicked (Game Mode on), because they won't be saved

Game of the Week: Cloudberry Kingdom

Game Intro: https://www.youtube.com/watch?v=JfhwyipDxrk

Useful References:

- Game Conceptualization and Design:
  - Johnson, M., Hasankolli, R., & Henley, J. A. (2014). *Learning 2D Game Development with Unity: A Hands-on Guide to Game Creation*. Pearson Education
  - **The Big List of Game Design. URL retrieved from:** http://www.pixelprospector.com/the-big-list-of-game-design/
  - **Game Background Art on Pinterest. URL retrieved from:** https://www.pinterest.com/explore/game-background-art/
  - **How to design levels for a platformer. URL retrieved from:** http://devmag.org.za/2011/07/04/how-to-design-levels-for-a-platformer/
  - **11 Tips for making a fun platformer. URL retrieved from:** http://devmag.org.za/2011/01/18/11-tips-for-making-a-fun-platformer/

Useful References:

- Game Development Tutorials:
  - **How to make a 2D Platformer - Unity Tutorial by Brackeys. URL retrieved from:**https://www.youtube.com/playlist?list=PLPV2KyIb3jR42oVBU6K2DIL6Y22Ry9J1c
  - **How to make a 2D RPG Game in Unity. URL retrieved from:** https://www.youtube.com/playlist?list=PL_4rJ_acBNMH3SExL3yIOzaqj5IP5CJLC
  - **Unity 2D Tile Mapper. URL retrieved from:** https://www.youtube.com/watch?v=_x0bMTxP7Yw
  - **Unity Tutorial - 2D RPG Tutorial. URL Retrieved from:** https://www.youtube.com/playlist?list=PL_S_hCof18KzyQ2sl4AfjSvmo1ILCuywH