



TECH 1711 - Mixed Reality Studio

Most Up-to-date Syllabus:

A grayscale photograph showing several abstract geometric shapes resting on a surface with a strong perspective effect. In the foreground, there's a large, translucent-looking torus. Behind it, a smaller cylinder and a cone are visible. The background consists of many parallel, slightly curved lines that converge towards the top left.

<https://github.com/ivaylopg/MixedRealityStudio>

I will do my best to keep the Moodle page updated, but I can promise that most up-to-date class materials will be here:
<https://github.com/ivaylopg/MixedRealityStudio>

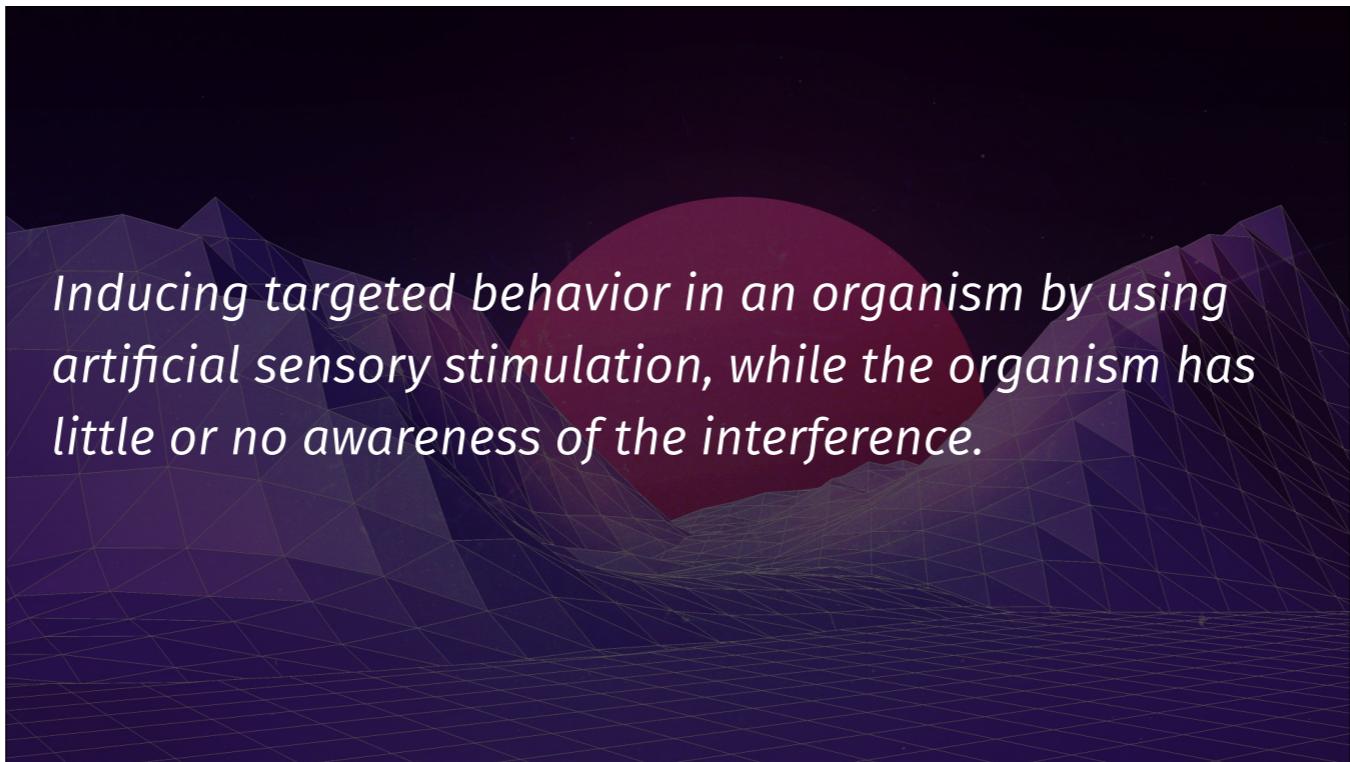
Contact Me

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310.384.6382



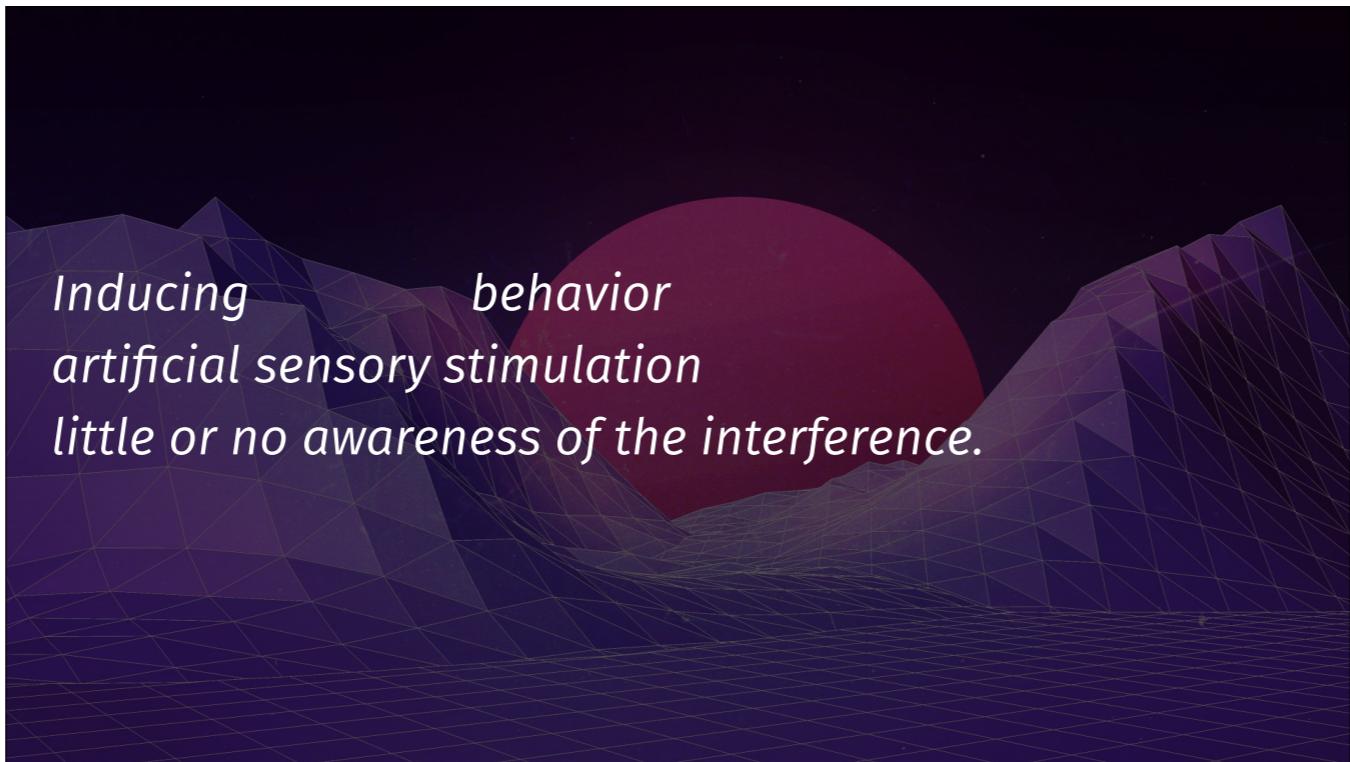
Recap from last time: what do we mean by Augmented/Virtual/Mixed Reality?



Inducing targeted behavior in an organism by using artificial sensory stimulation, while the organism has little or no awareness of the interference.

Definition by Steven M. LaValle, Professor, University of Illinois, Chief Scientist of VR/AR/MR at Huawei Technologies Co. Ltd.

Intentionally Broad



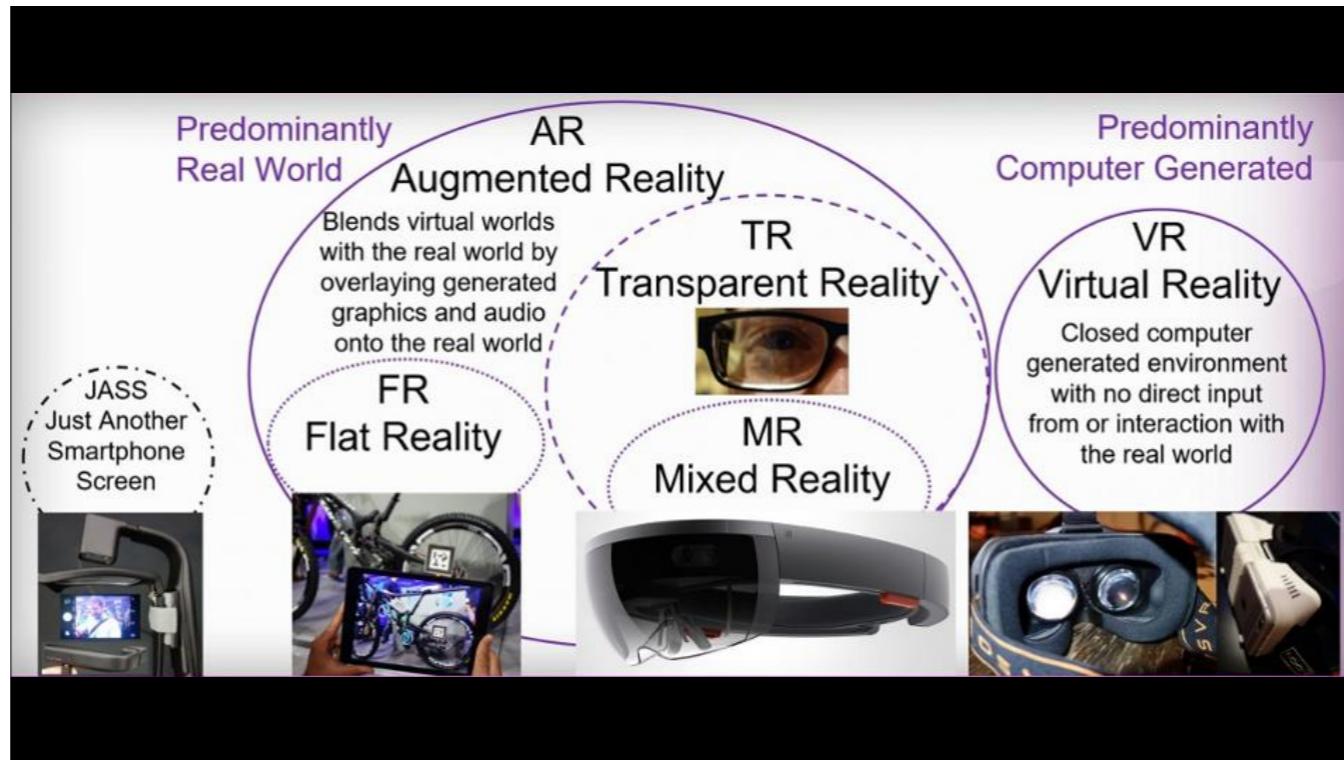
*Inducing behavior
artificial sensory stimulation
little or no awareness of the interference.*

Think about this outside of just code: we are emphasizing “behavior” and creating a reality for user’s experience.



- *Inducing behavior*
- *artificial sensory stimulation*
- *little or no awareness of the interference.*

Think about this outside of just code: we are emphasizing “behavior” and creating a reality for user’s experience.



So much out there is marketing term or people trying to be the first to coin phrases.



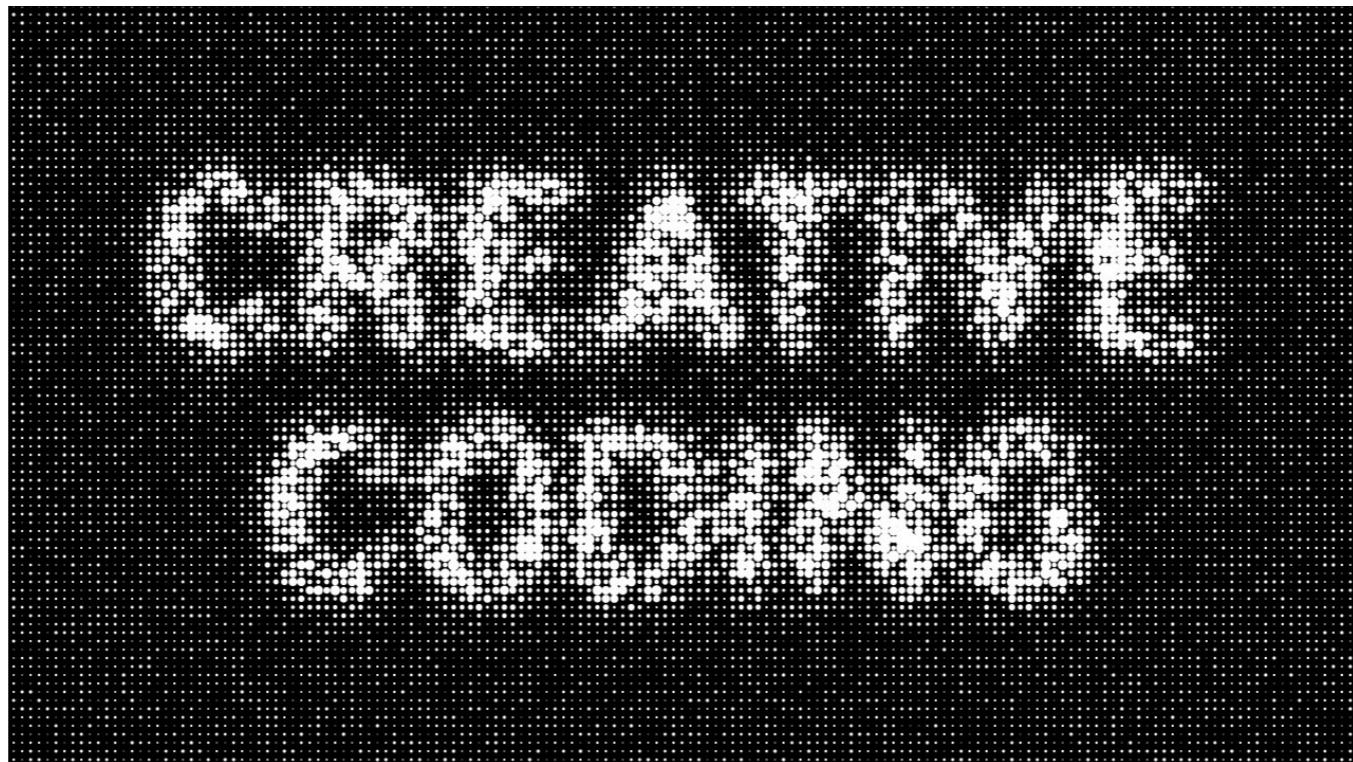
As far as this class is concerned, we're drawing the line here:

VR = everything the user sees/hears is controlled by the experience. It is a world built from the ground up, and you (as the creators) are responsible for creating all the rules of how this world behaves and what the expectations are.

AR = you are *adding* things to the real world. The rules/expectations of the real world still apply, and you can leverage that to your advantage.

What about MR?

"Mixed Reality" is a **type of** Augmented reality, where the physical (ie - the real world) and the virtual can interact and affect each other. More than just an overlay onto your field of view, MR knows what you are looking at.



What is creative coding?



Creative coding is a type of computer programming in which the goal is to create something expressive instead of something functional.

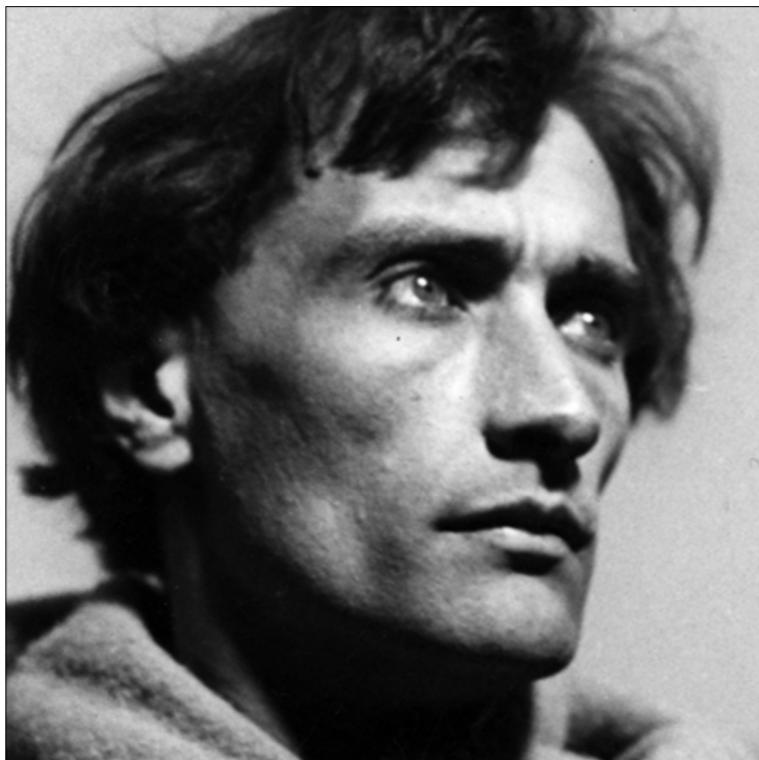
use code to enable/empower/drive our creative and aesthetic projects.

- * Coding as writing
- * Coding as prototyping quickly instead of planning out the long term



Remember - our definition of MR is about creating realities, not about exporting an .exe or iPhone app

Immanuel Kant - 1781 - Critique of Pure Reason



*[T]he theater is a mirage....
And the principle of theater...
should be understood as the
expression of an identity...in
which the characters,
objects, images, and all that
constitutes the **virtual reality**
of the theater develops, and
the purely fictitious and
illusory world [is] evolved.*

Remember - our definition of MR is about creating realities, not about exporting an .exe or iPhone app

Antonin Artaud - The Theatre and Its Double Part III: The Alchemical Theater - 1938.

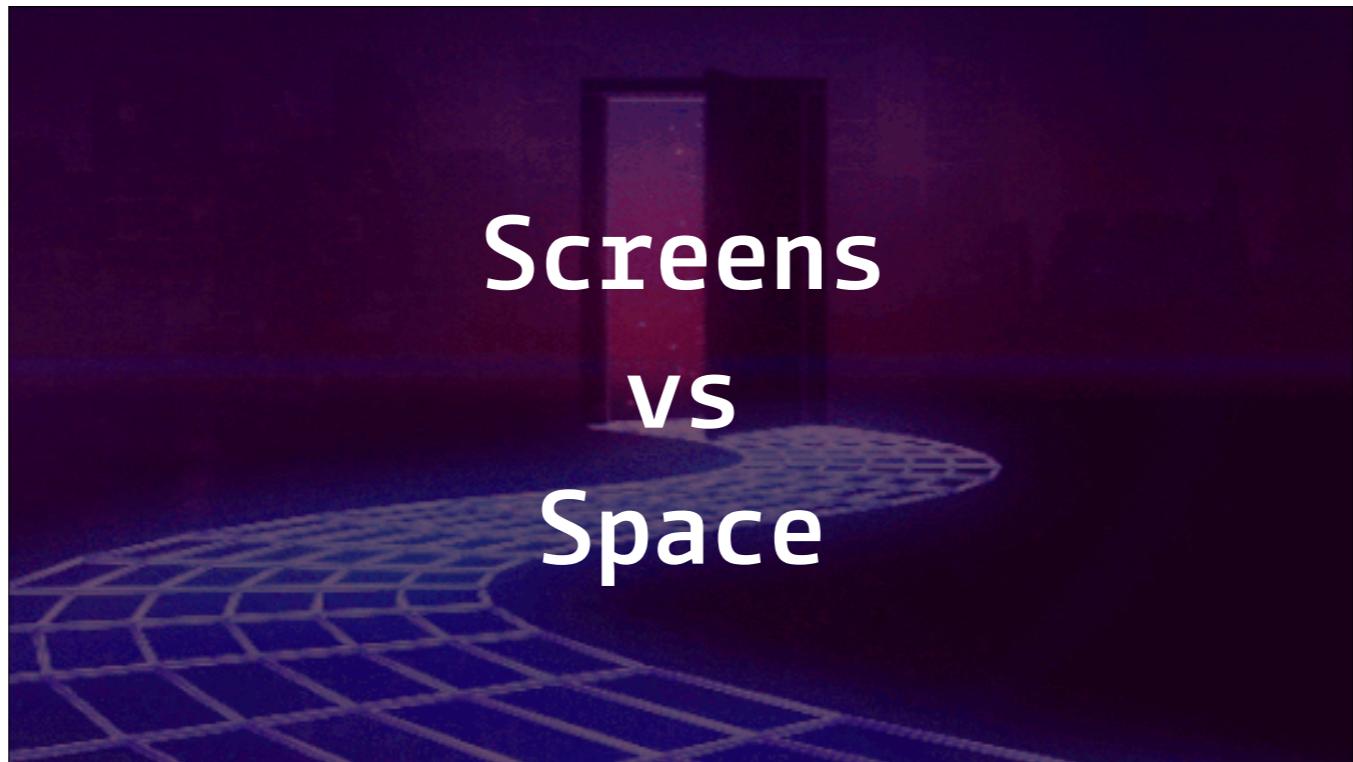
Attack on theatrical convention: opposing the **viewer's sensual experience** vs **theatre as a contrived literary form**



<http://www.creativeapplications.net>

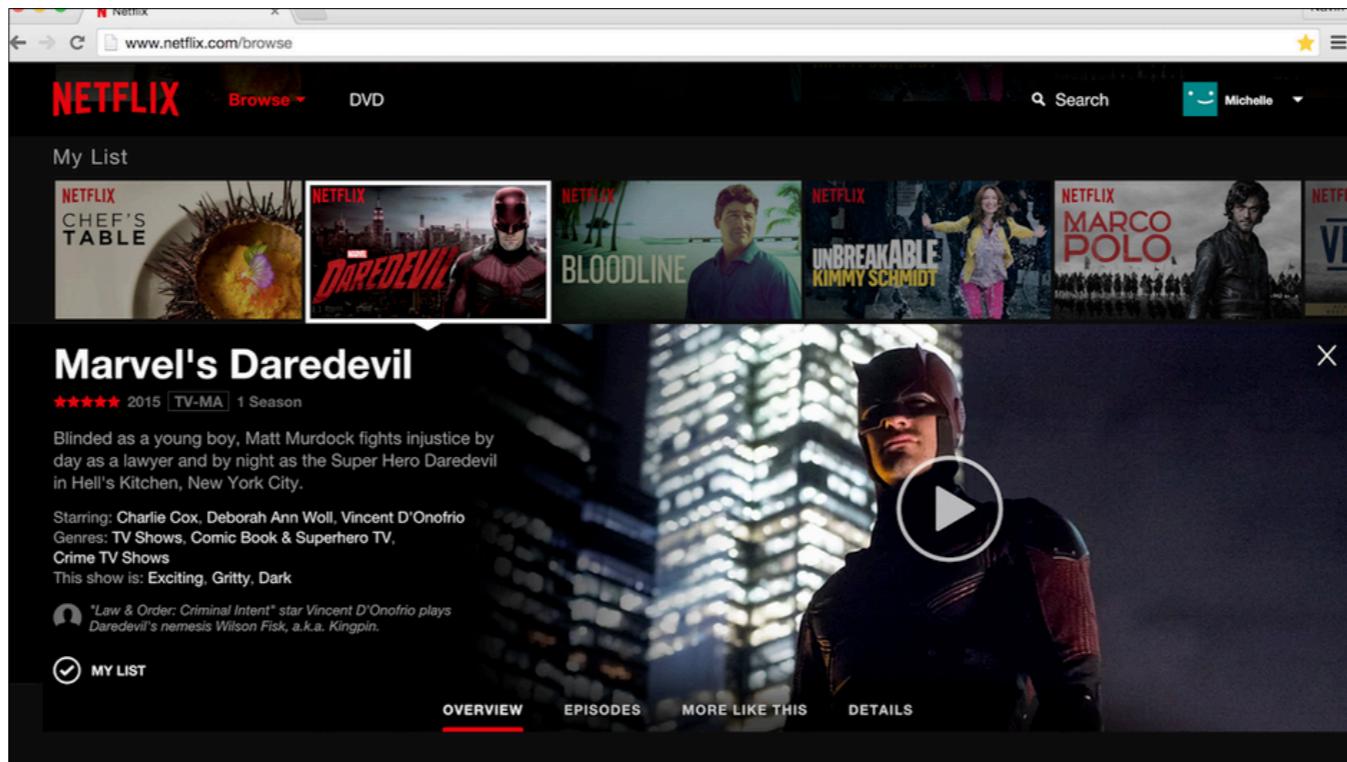
<http://prostheticknowledge.tumblr.com/>

These websites have some great projects for inspiration.



A little more recap:

All of a sudden we have to think about a spatial context for what we make
We are not limited by pixels or the dimensions of a rectangle, but by the available space.



VR - deals with it by creating new environments

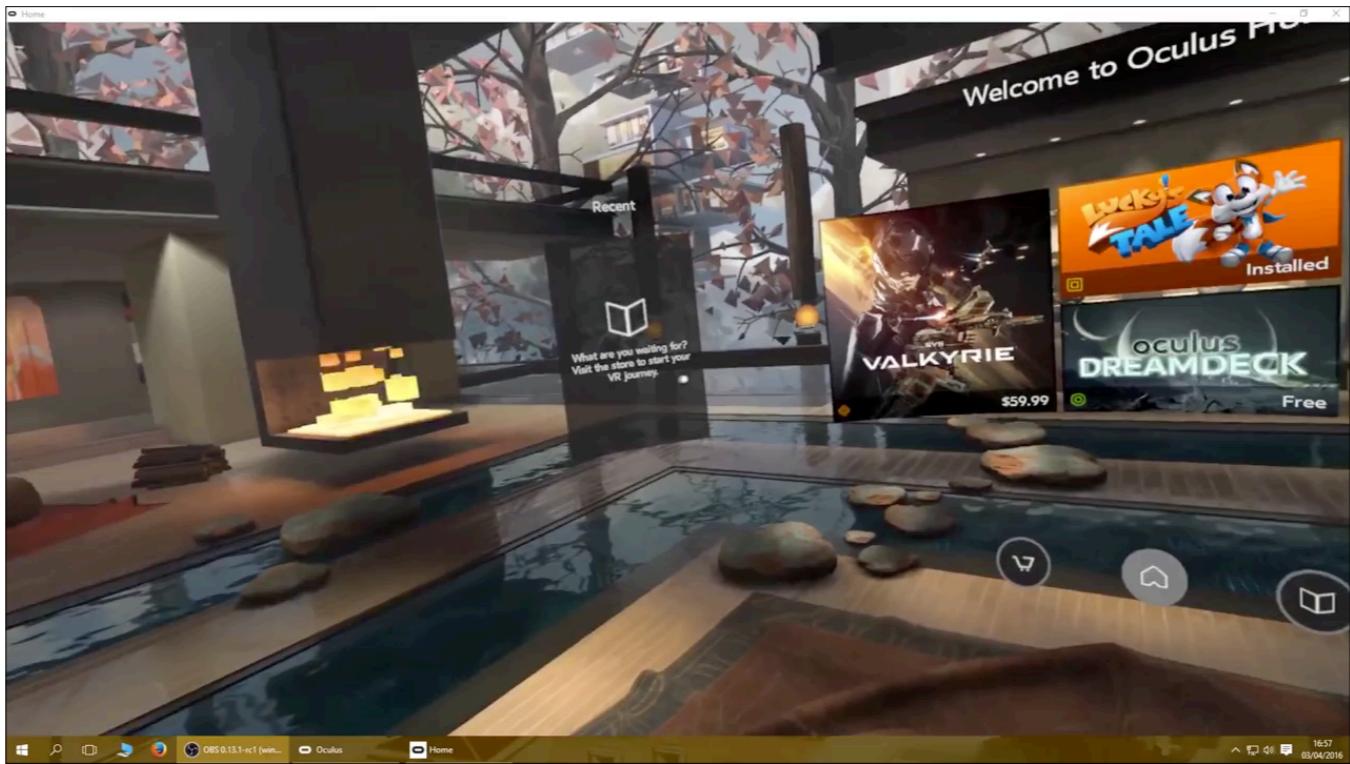
Netflix web interface...



..vs Netflix VR interface

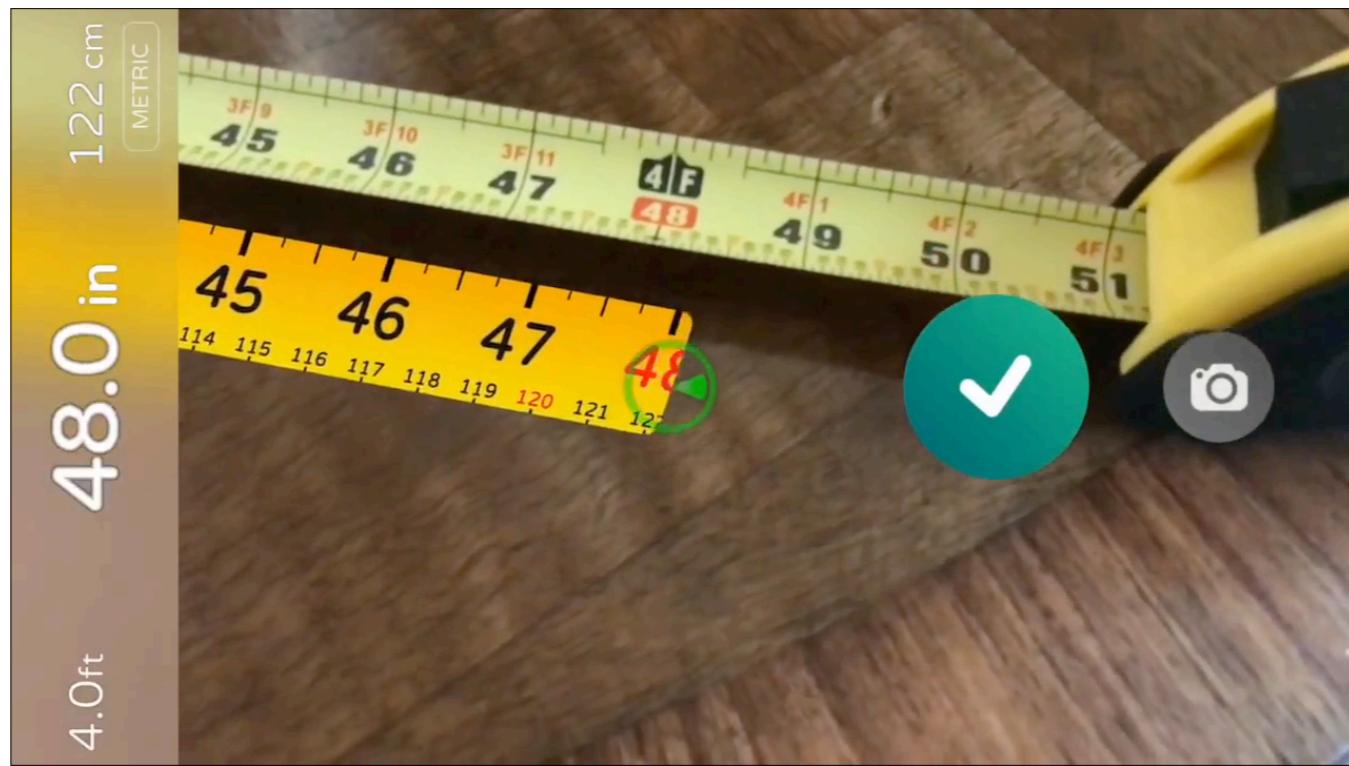
Anticipating a future where we can comfortably sit in VR for a long time, Netflix creates the ideal context in which to watch movies (All of it's existing content is 2D)





Oculus VR “Home” for your apps instead of a desktop/list.

Biggest criticism was that people couldn't change this home environment to suit their personality. Oculus changed this at last year's announcements.

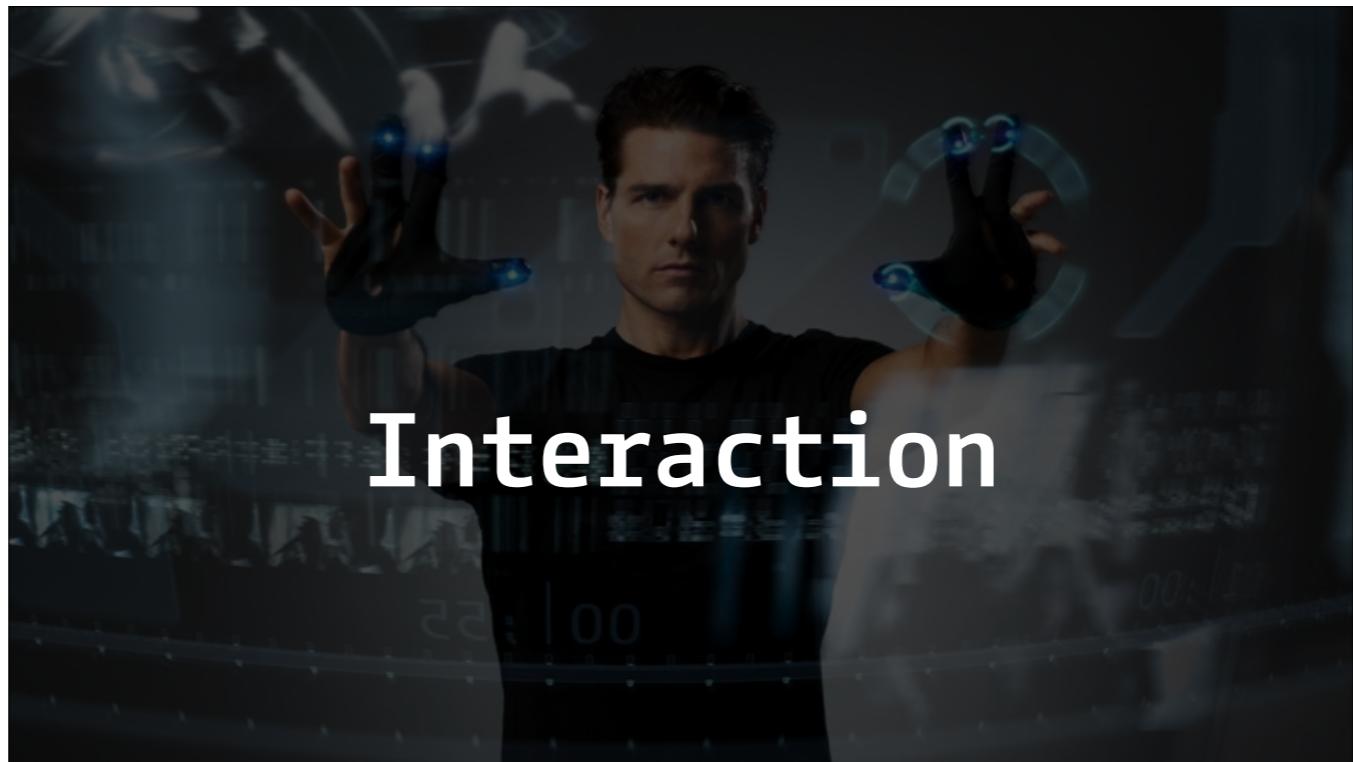


1:1 relationship with real-world scale

AR apps that can measure the environment

Scale is very important

Real world units



Interaction



Manipulation

Exploration

Two main concepts to keep coming back to: **Manipulation** and **Exploration**

Expectations

With new types of interface, we must teach users *how* to perform new kinds of interactions.

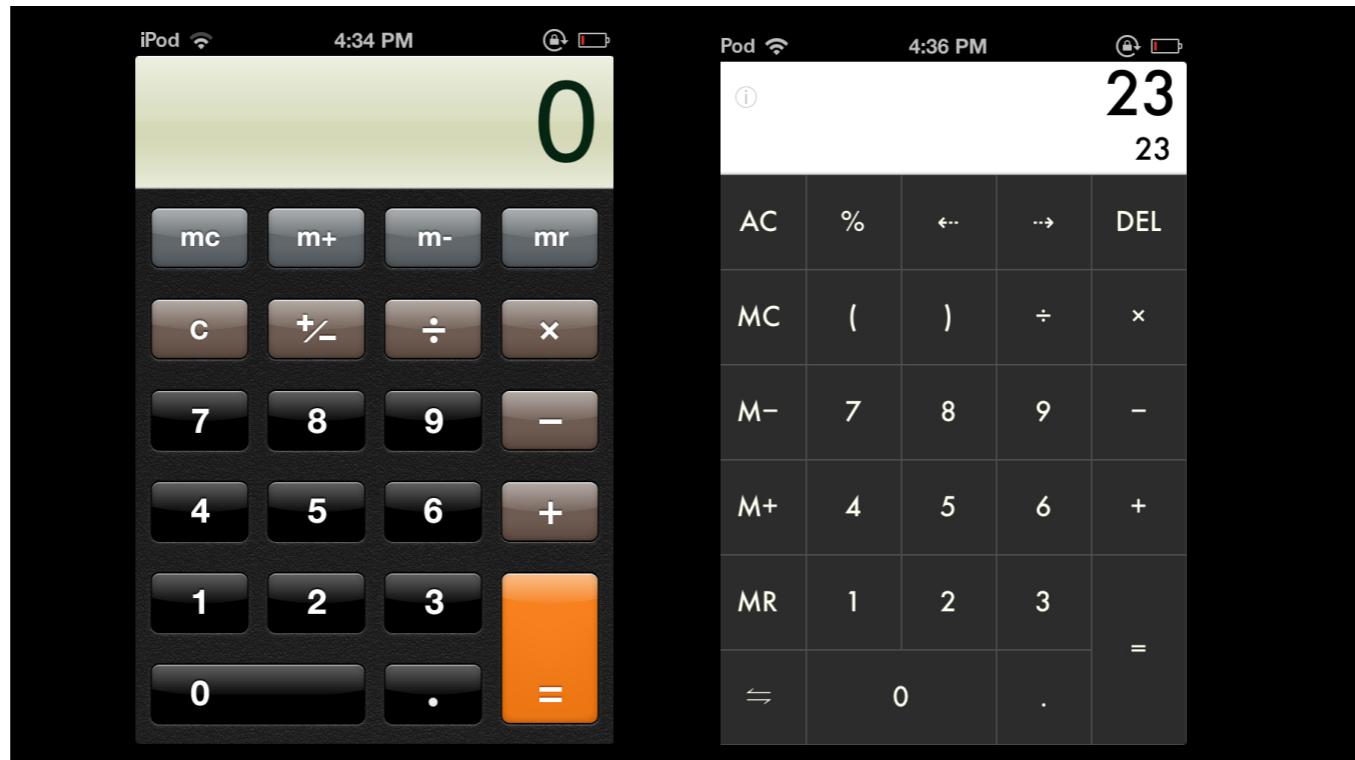


Baby trying to pinch/zoom on magazine after using iPad - 2011

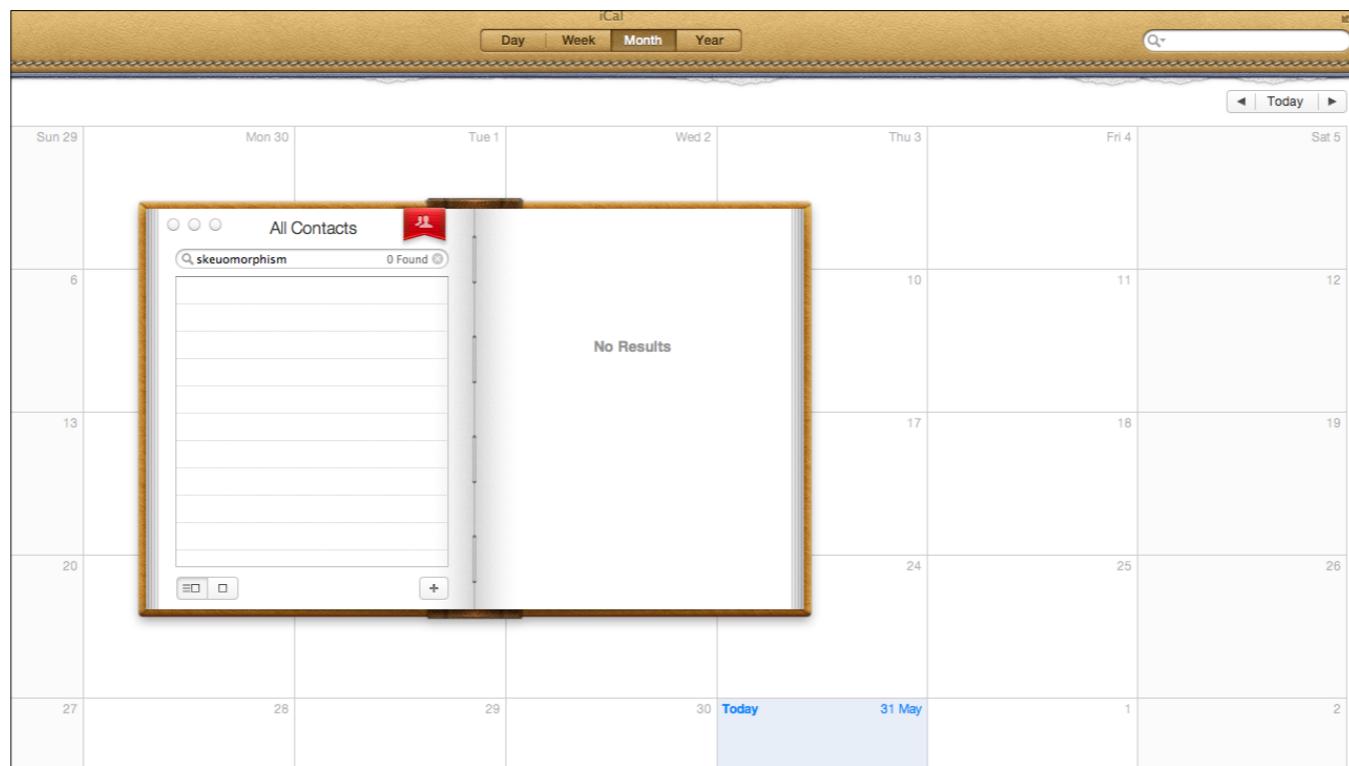
We have to be *taught* the possibilities and limitations



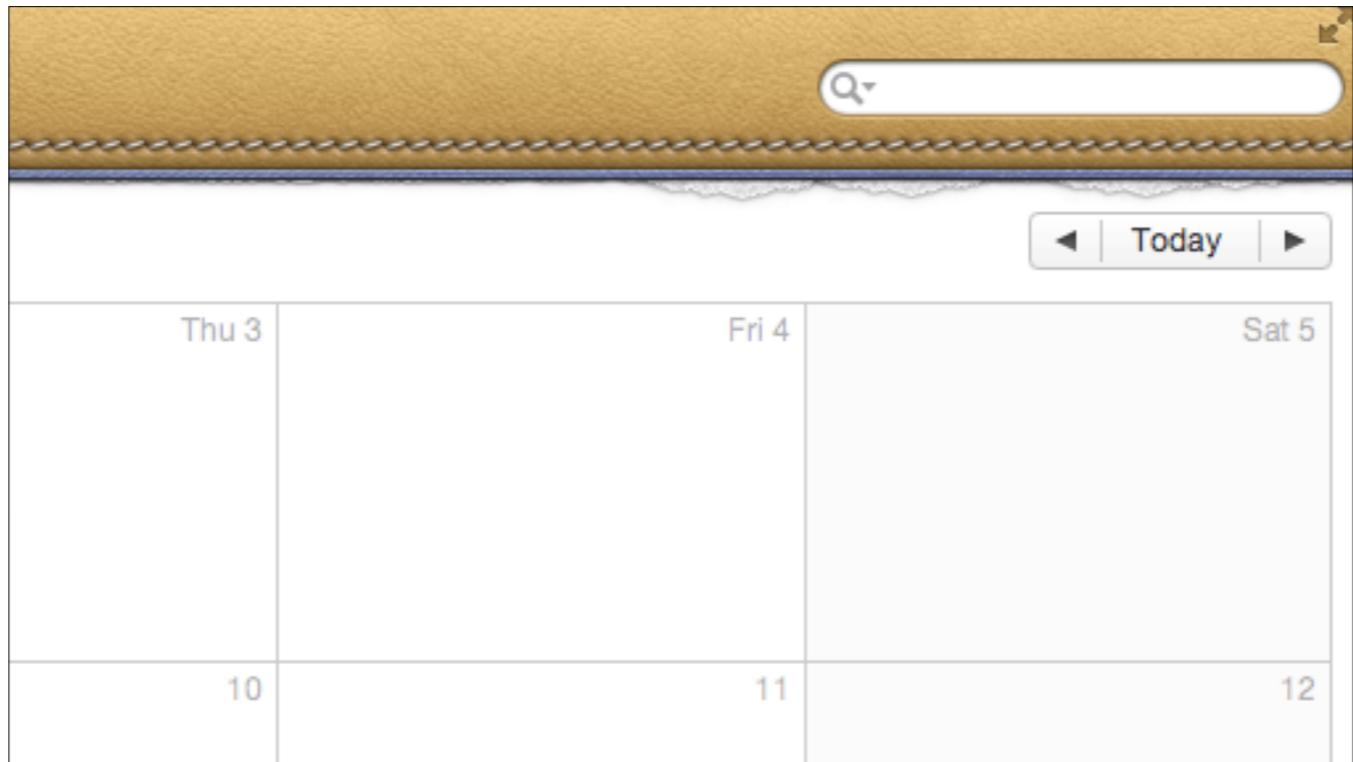
One approach is Skeuomorphism - creating interfaces that resemble their physical counterparts.



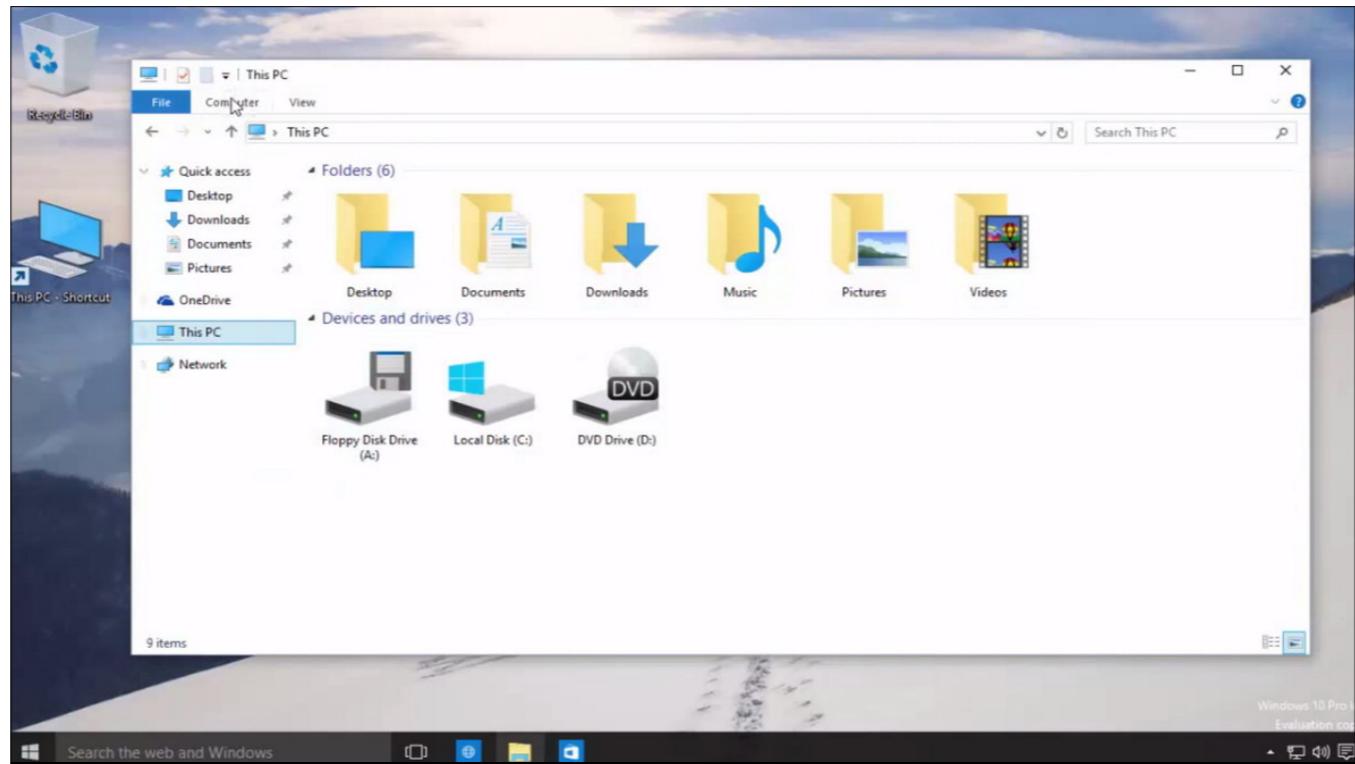
Textured leather calculator with bulgy/reflective buttons to cue people that they can be pressed.



Can easily be taken too far. Why is this calendar leather-bound?



Why does it have a ripped page?!



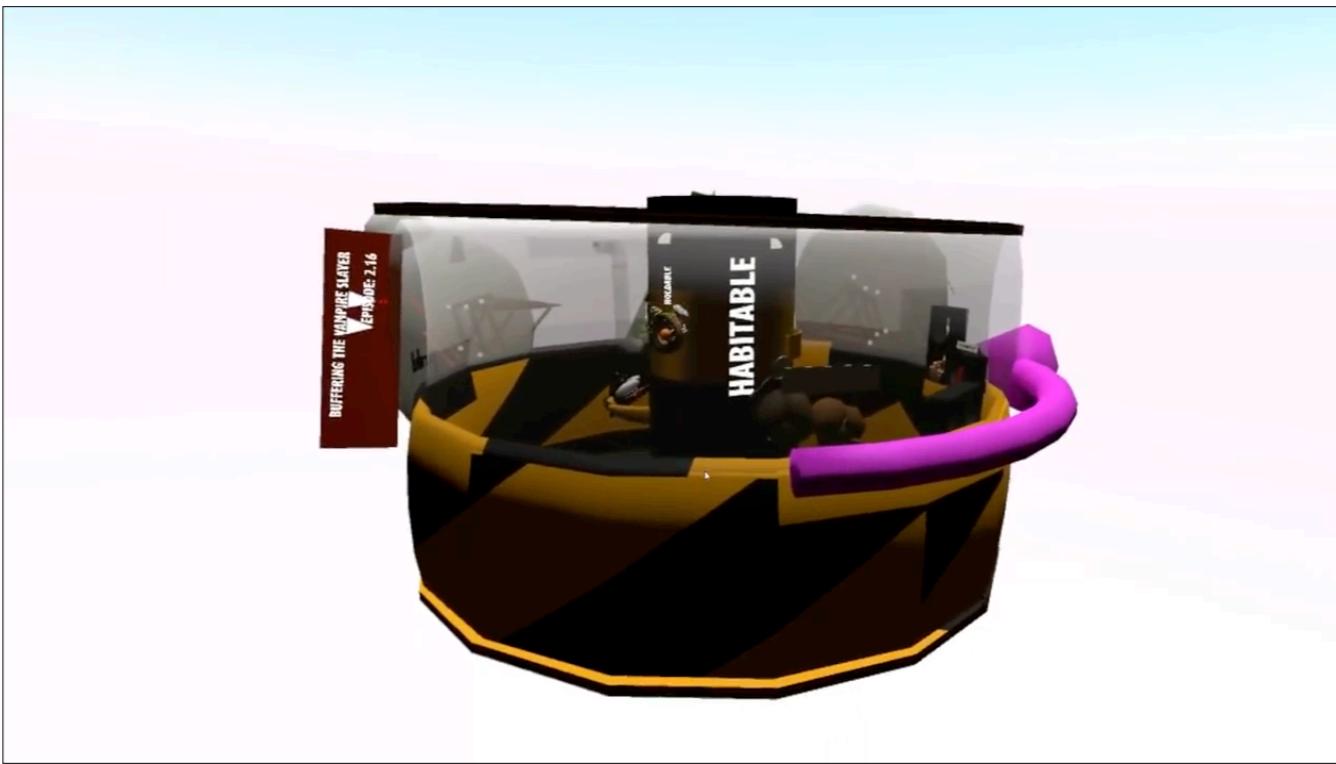
The computer desktop itself is a skeuomorphic design: file-folders full of documents on a desktop, with an adjacent trash-bin for waste.



Designing for Interaction

Design to the available tools or invent new tools

Don't try to find a new interface for email, REPLACE EMAIL



M EIFLER, AKA BLINKPOPSHIFT.

<http://elevr.com/studio-metaphor-an-embodied-software-paradigm/>

Different scales allow different interactions. Podcast app as a space you can go inside

This relates to something called **Modality** - we will explore this in a later session

Modality - A particular mode in which something exists or is experienced or expressed.

(Basically, the way that you do something.)



Two main concepts to look at today: **Manipulation** and **Exploration**



Manipulation

What is the interface?



Physical interface/action and it's relationship to the effect it has

two-dimensional



Attempts at 3D interfaces go way back.



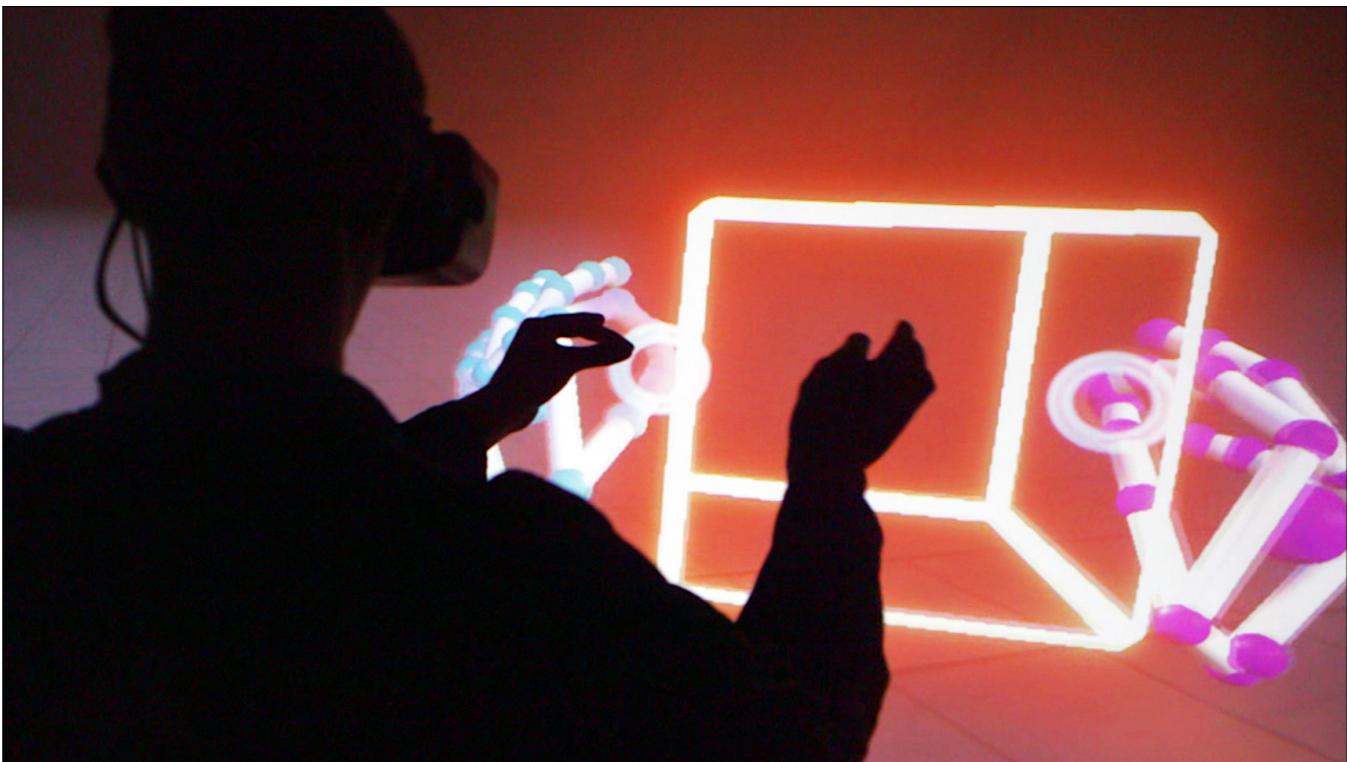
Technology is finally catching up.

LEAP almost failed because nobody wanted to interact with their email by waving their arms around: too much cardio!

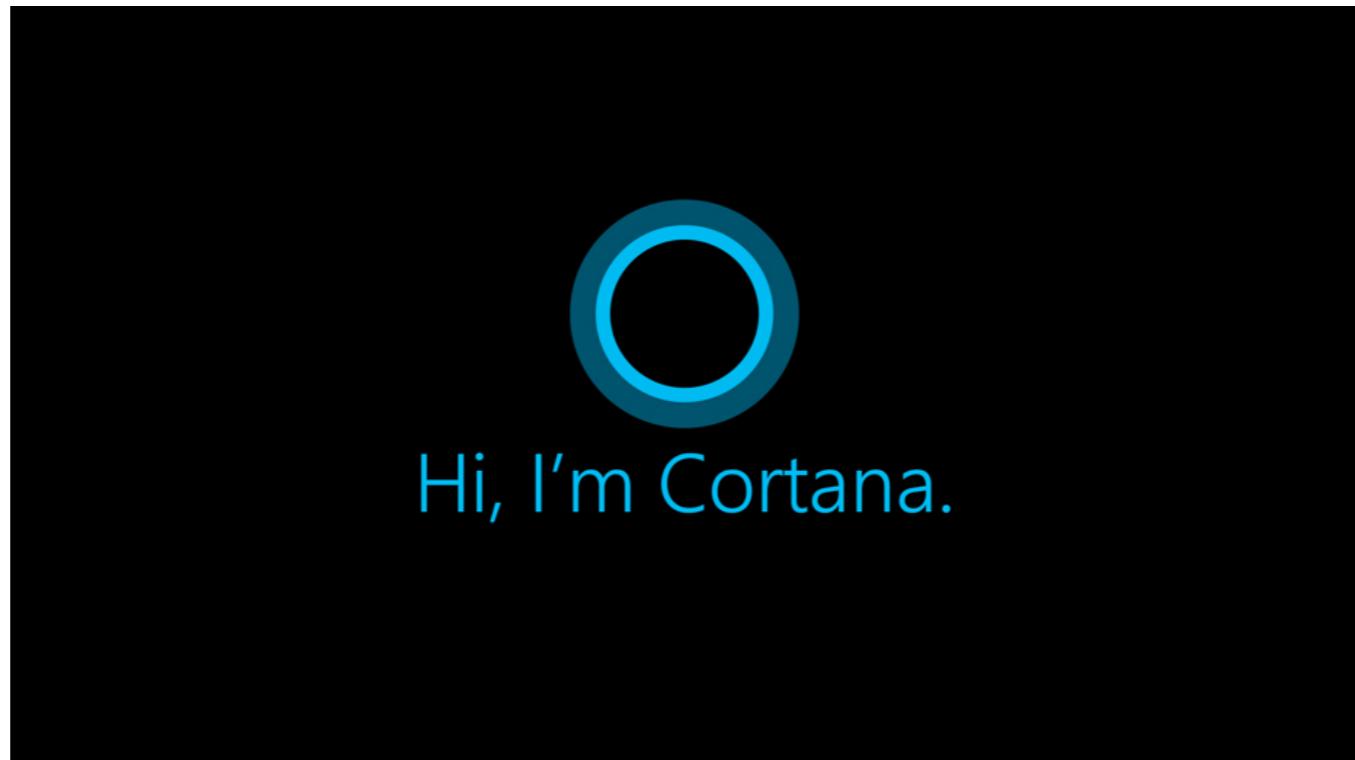
Needed new kinds of interaction.



Flip the sensor, put it on a headset, and now it is used to bring hands into VR experiences without remotes



Gestures can be used to manipulate

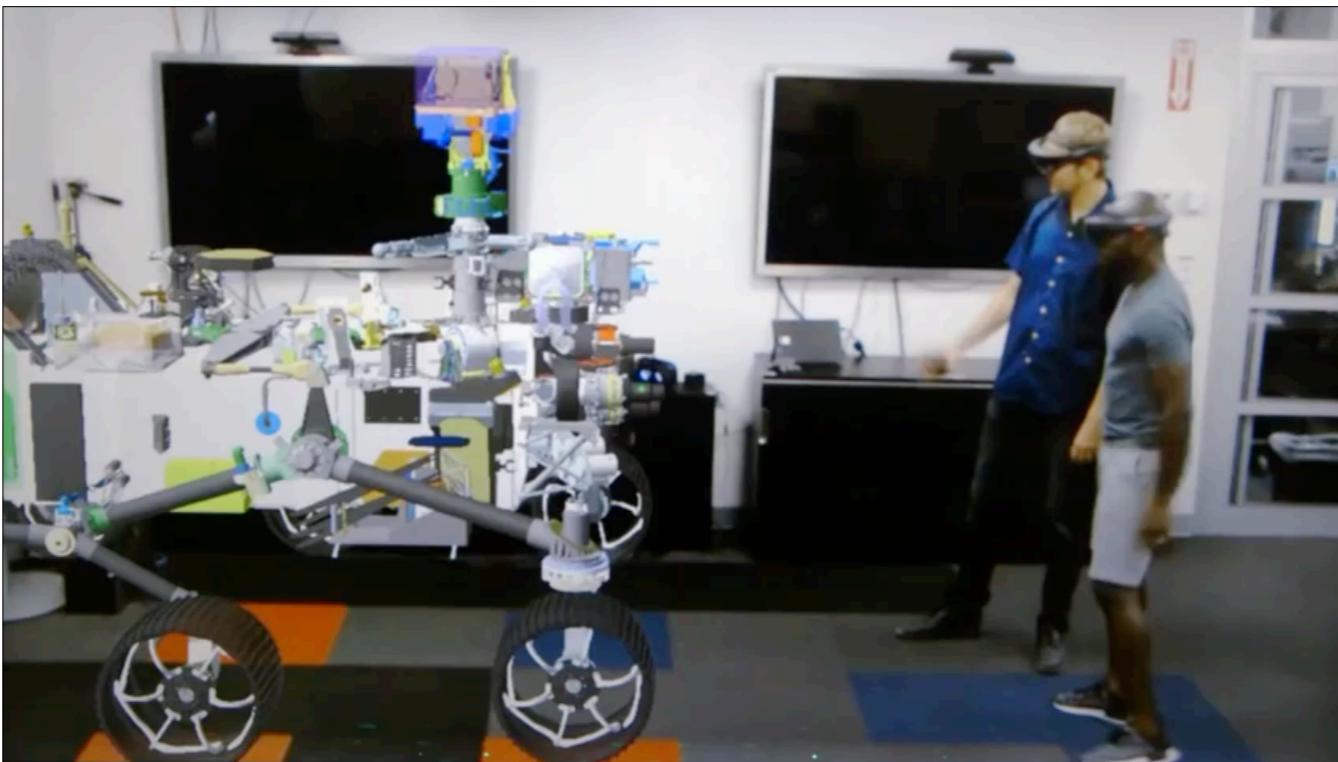


Voice recognition is a very powerful (if socially awkward) way to interact with interface-less experiences.





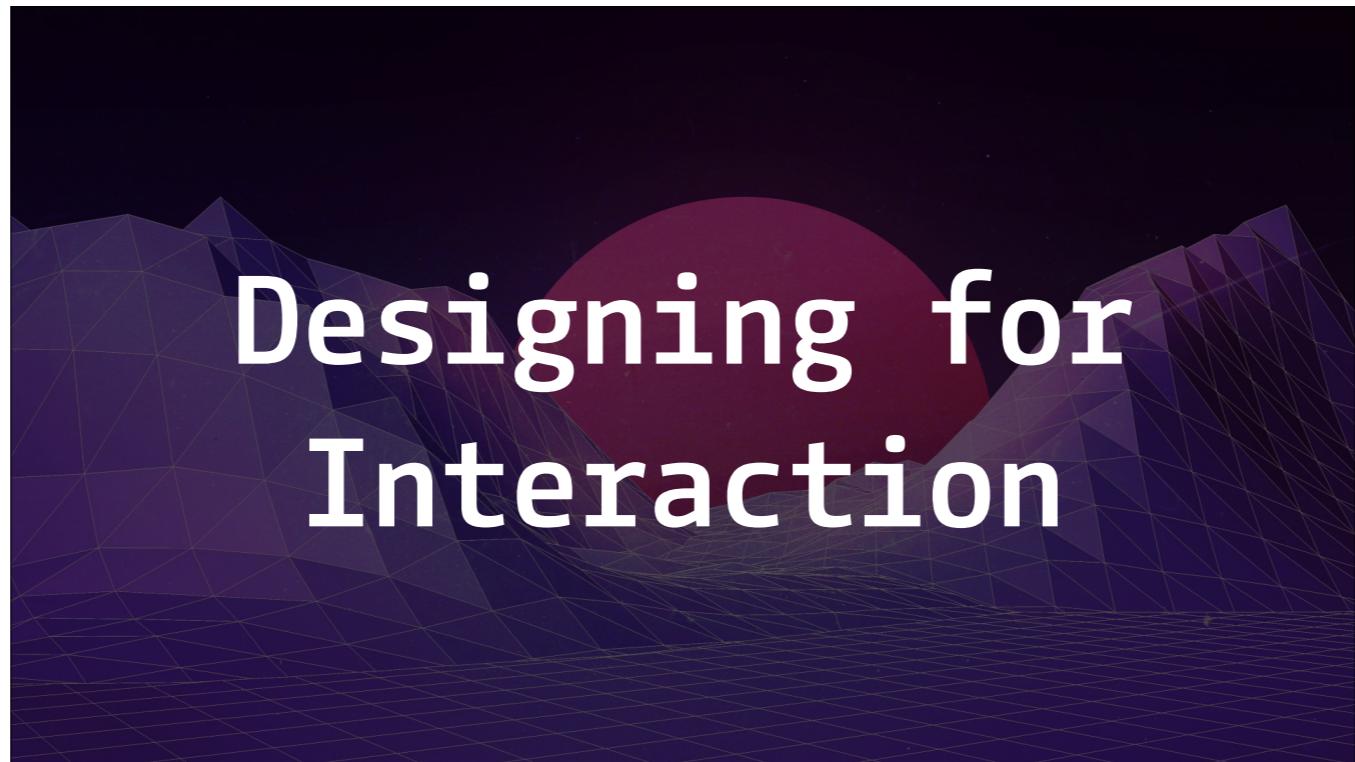
Moving through an environment to discover content - no direct manipulation.



JPL uses Hololens to visualize 1:1 models of rovers, allowing designers to discover relationships and problems before anything is actually built.



Exploration can still be a manipulation - content can react to viewers position



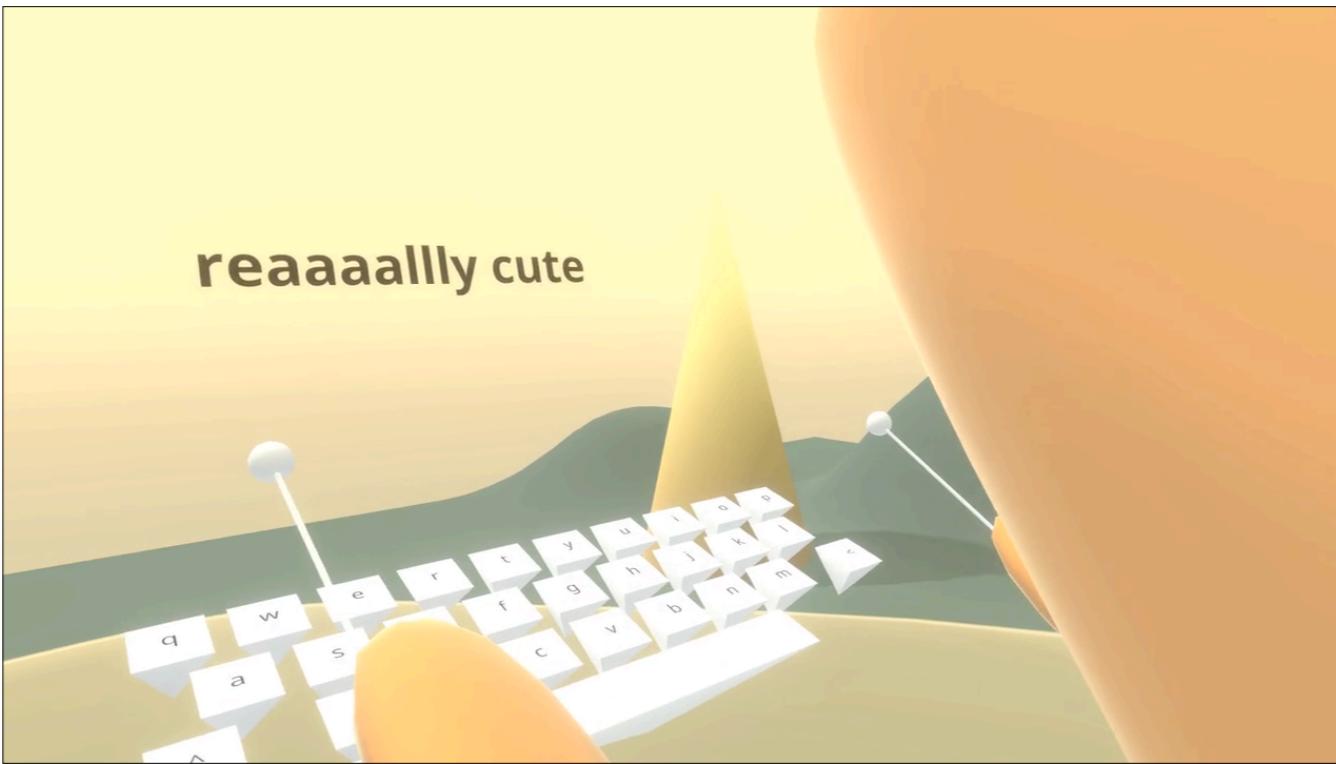
Designing for Interaction

Why

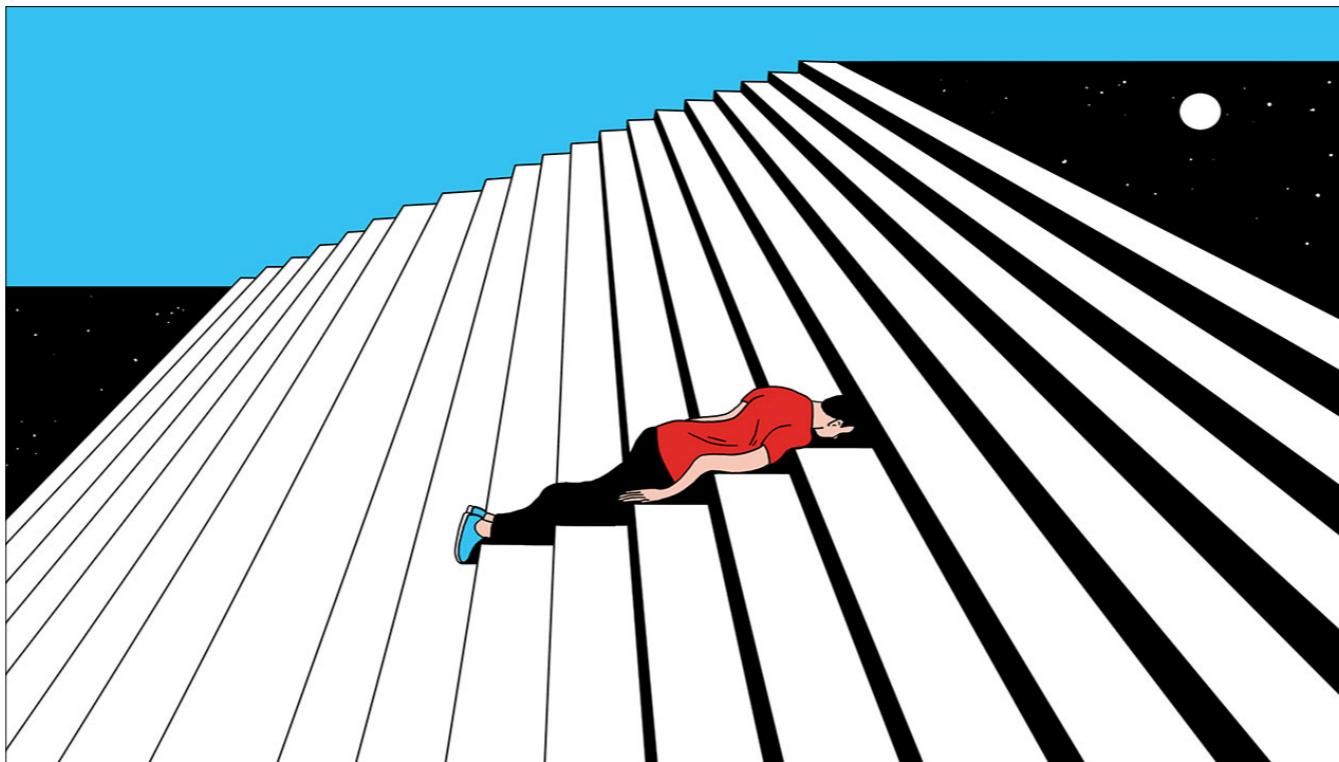
To Reveal
To Change
To Visualize



Bad/frustrating example of bringing keyboard into space: using gaze direction + time.



Good example: uses space and natural interaction for the tools you have available (handheld remotes)

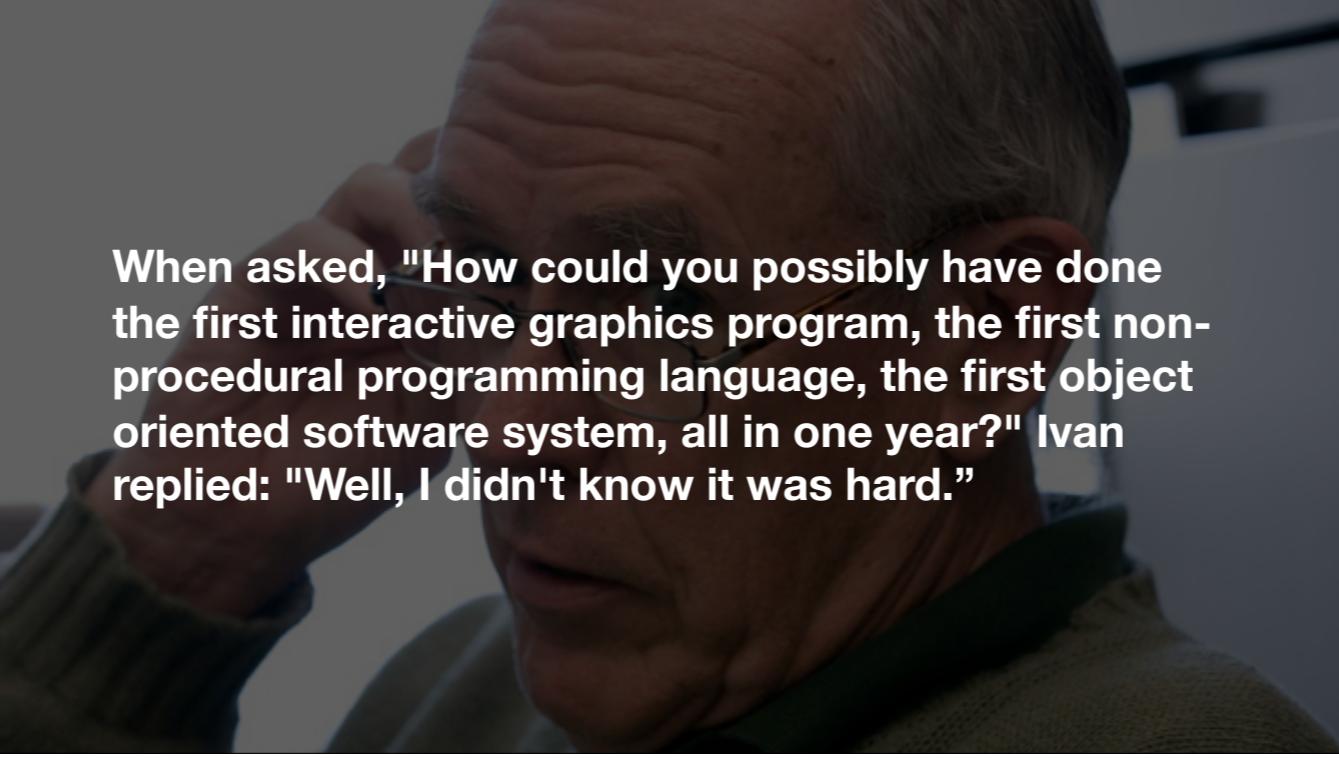


Ok ok...break time so we can switch gears.





Ok! Let's break up in to groups....



When asked, "How could you possibly have done the first interactive graphics program, the first non-procedural programming language, the first object oriented software system, all in one year?" Ivan replied: "Well, I didn't know it was hard."

There are often advantages to starting a design process without knowing the technical hurdles ahead of time...

Something Digital you Wish you could touch?

Something big you wish you could see small?

Something small you wish you could see big?

Something invisible you wish you could see?

We're going to start writing ideas on post-its

Very high-level. Just a few words will fit (write big so we can see it from far away)

Tool?

Format?

No bad ideas!

It can be a tool, or a ***way of doing/seeing something***.

**Specifically think about
places where technology is a
barrier.**

The exercise isn't how do we make **email** better, it's how do we **replace** email.

Something Digital you Wish you could touch?

Something big you wish you could see small?

Something small you wish you could see big?

Something invisible you wish you could see?

10 mins.

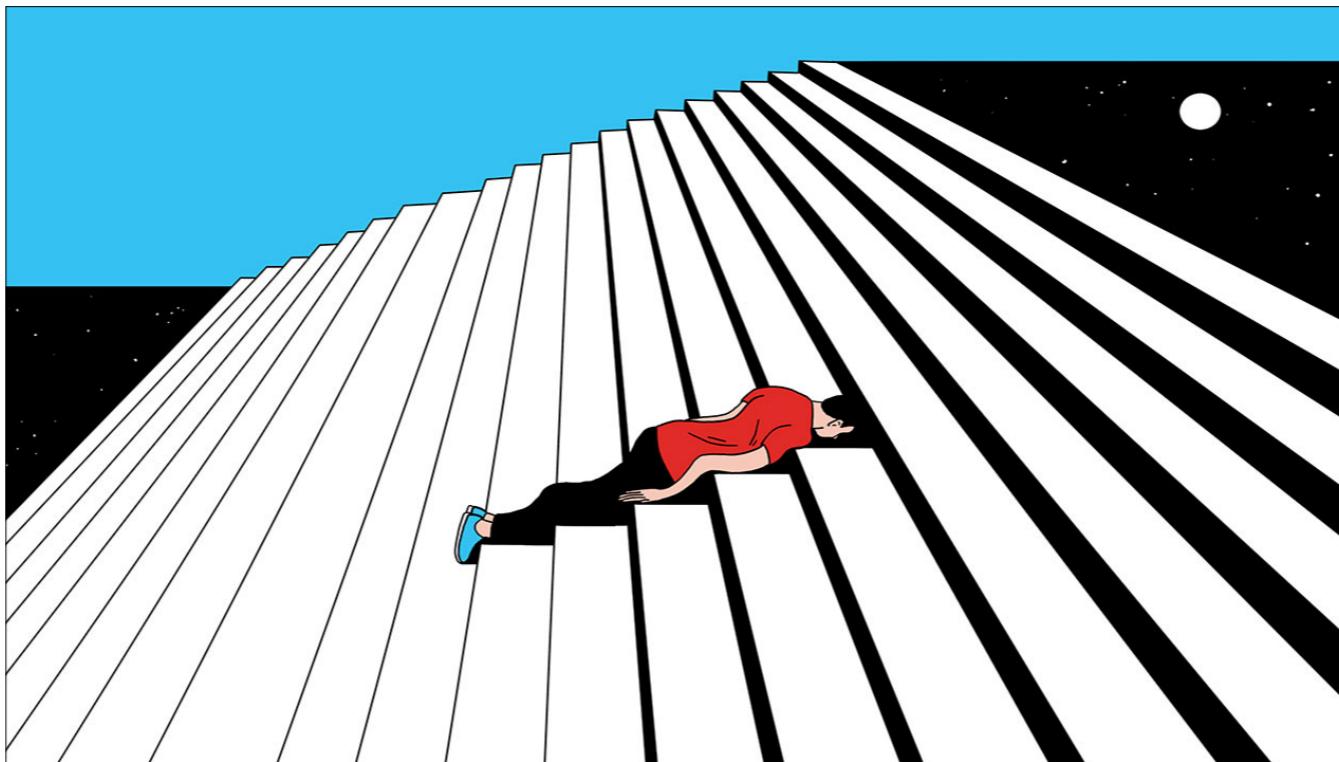
Awkward silence is OK!

Combine Similar Ideas

Separate Complex Ideas

Find Relationships

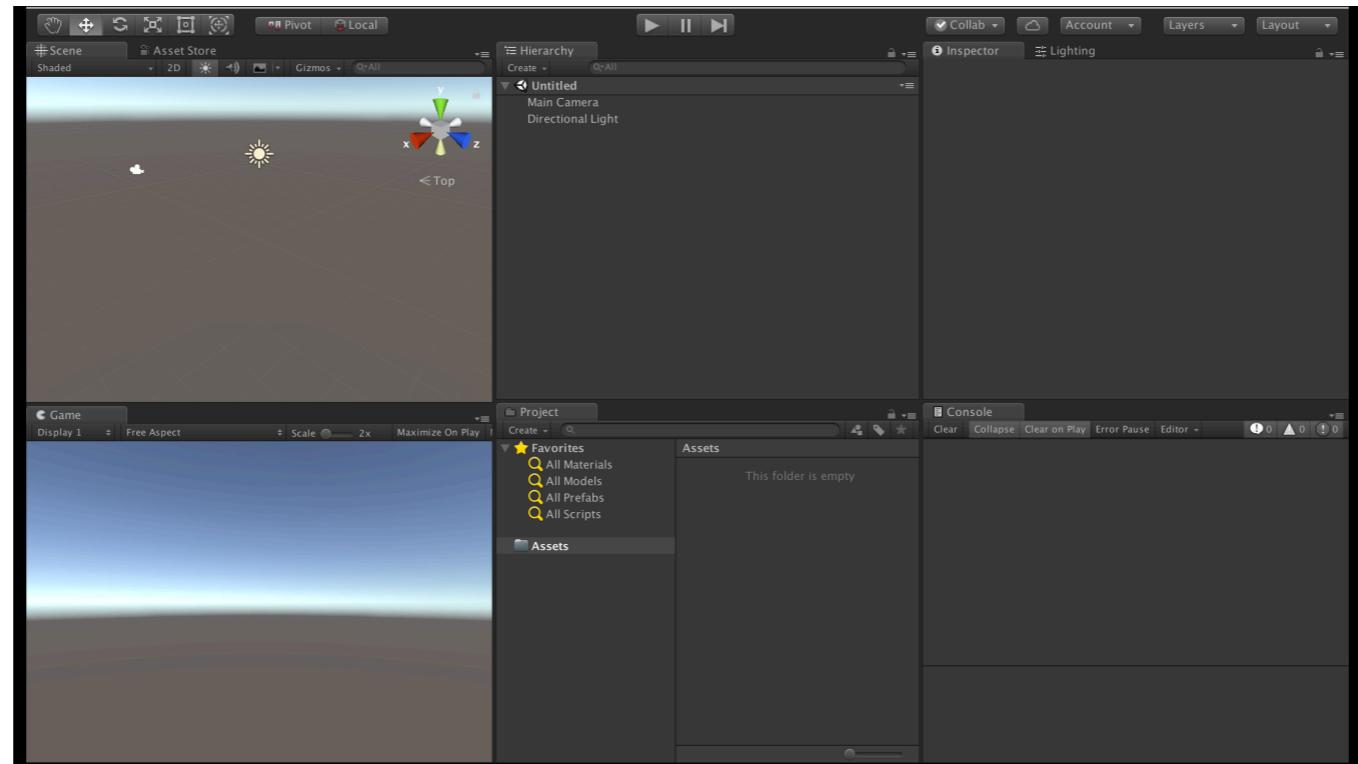
10 Mins

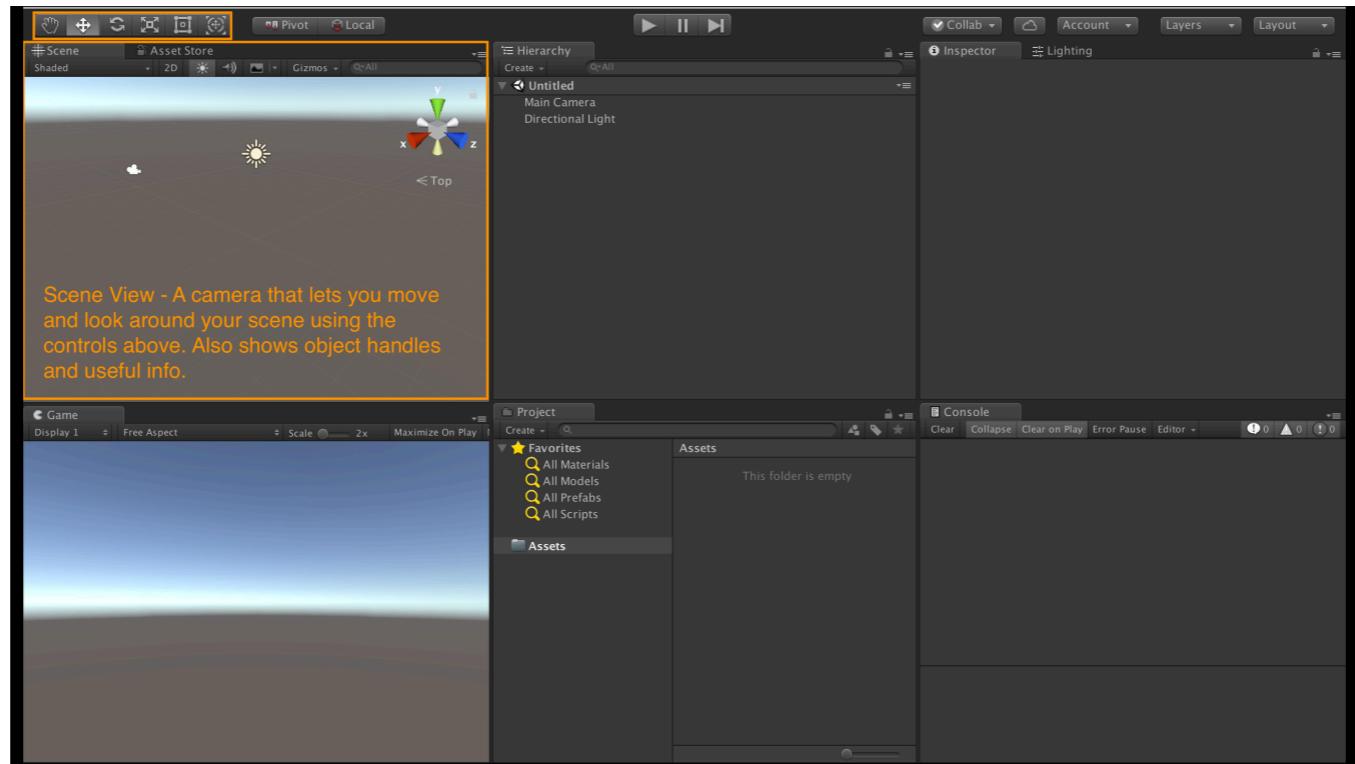


Ok ok...break time so we can switch gears.

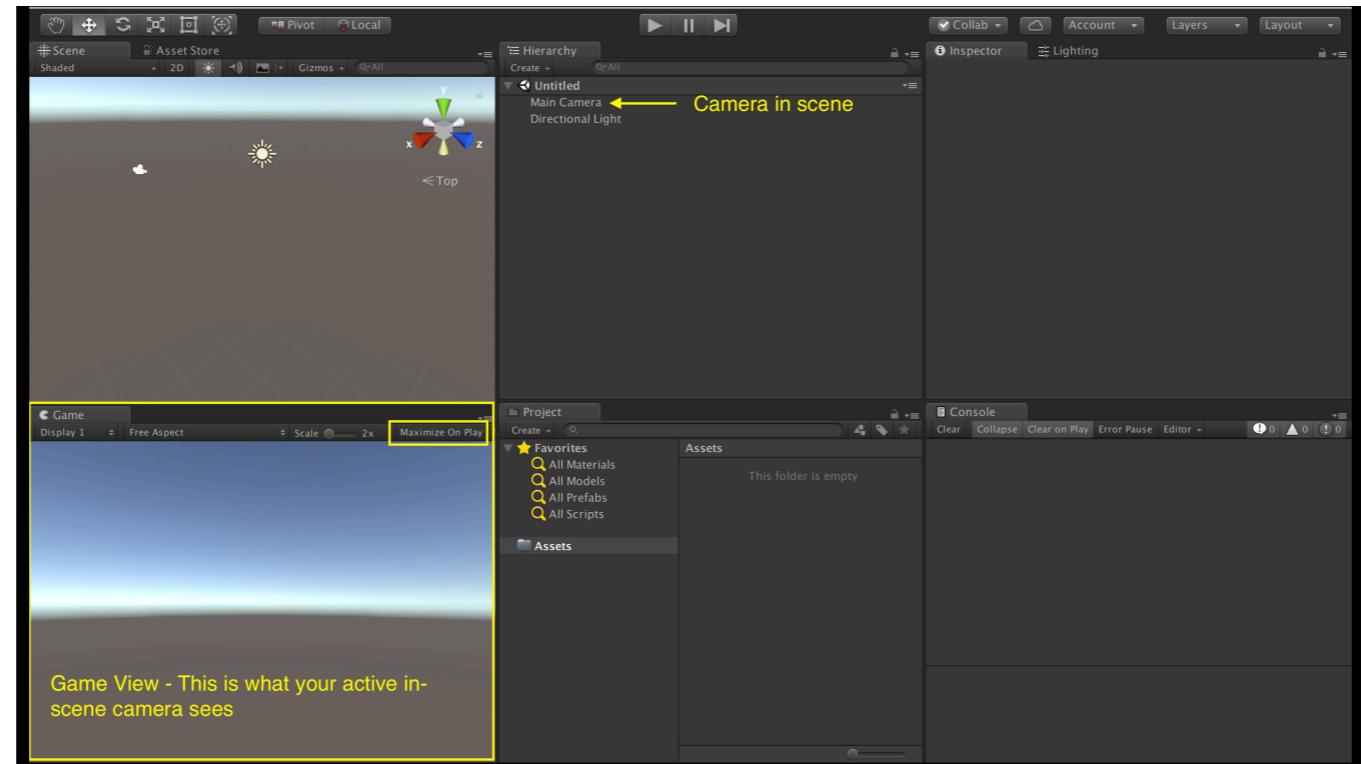


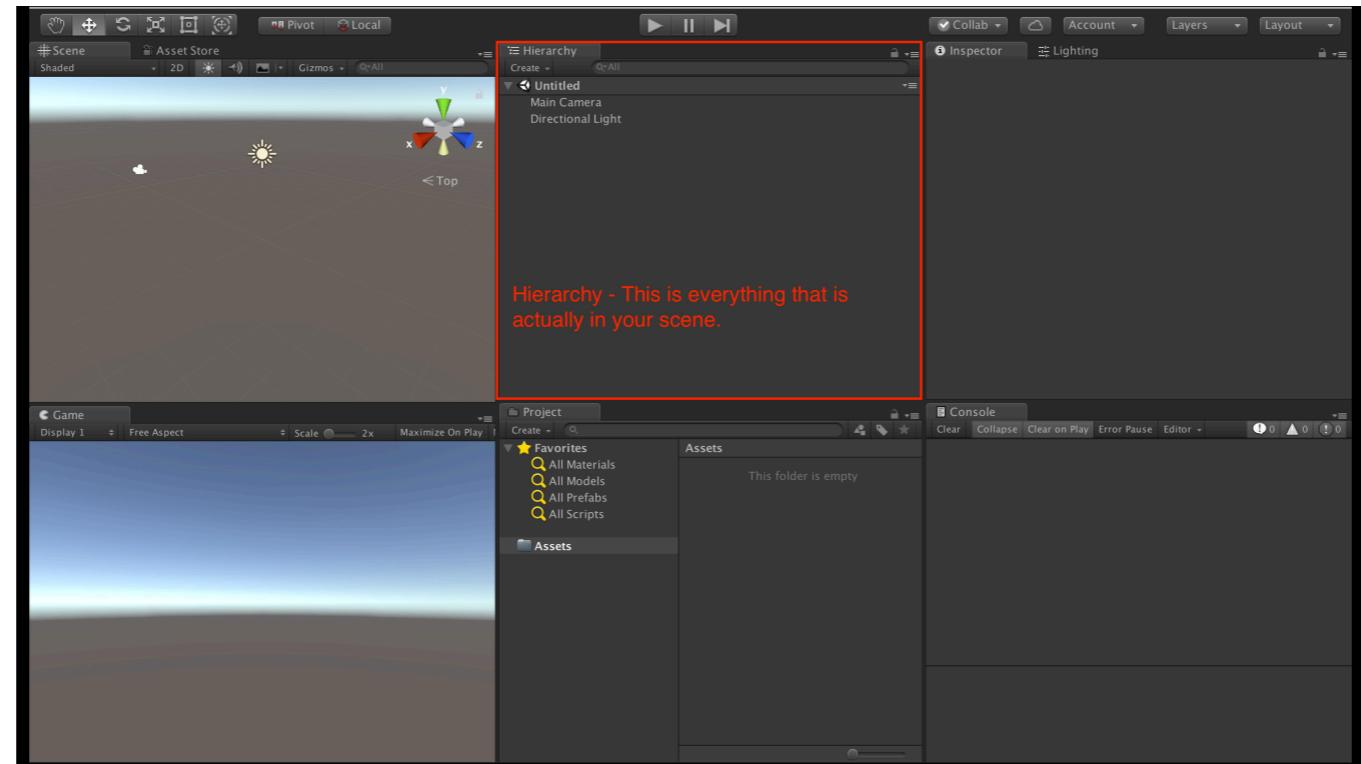
Let's get in to Unity!

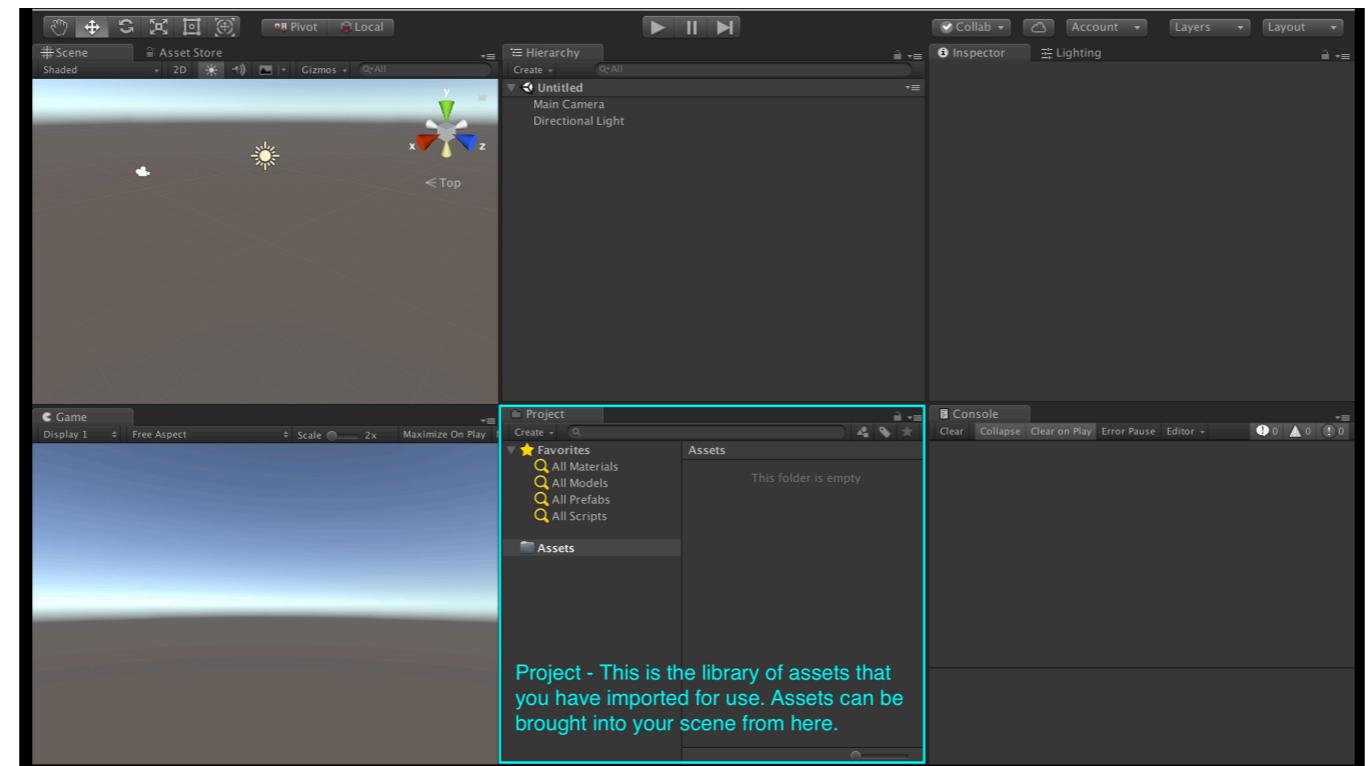


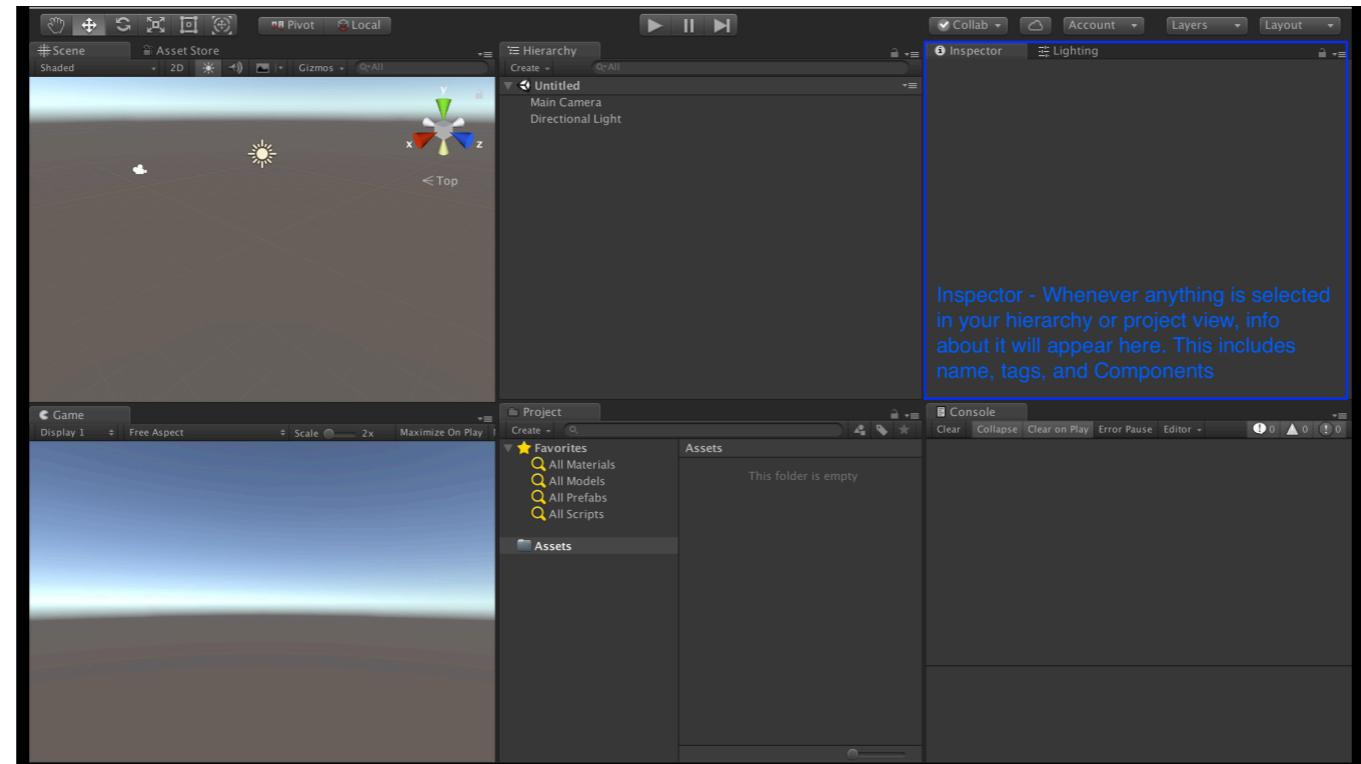


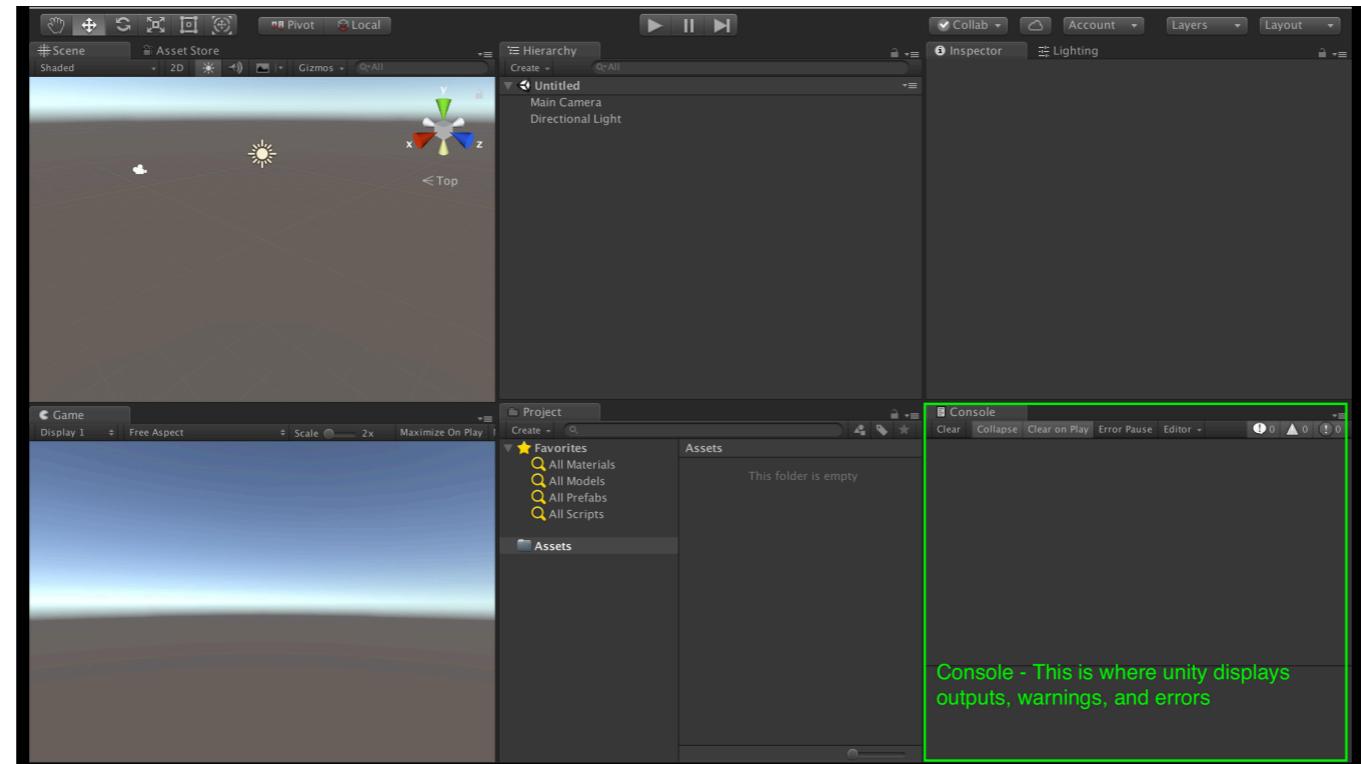
When holding down **Right-Click** inside the scene view, moving mouse along with **W-A-S-D-Q-E** keys will move our point of view.

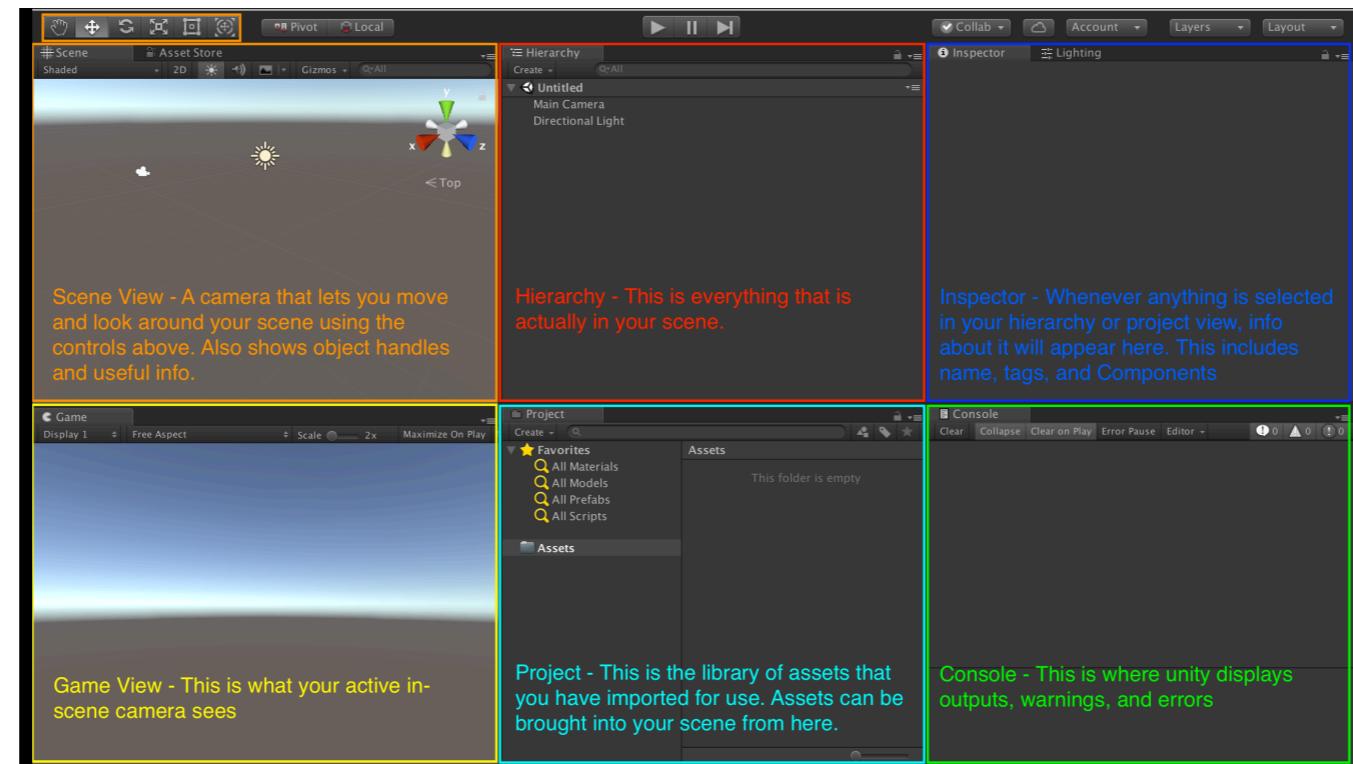


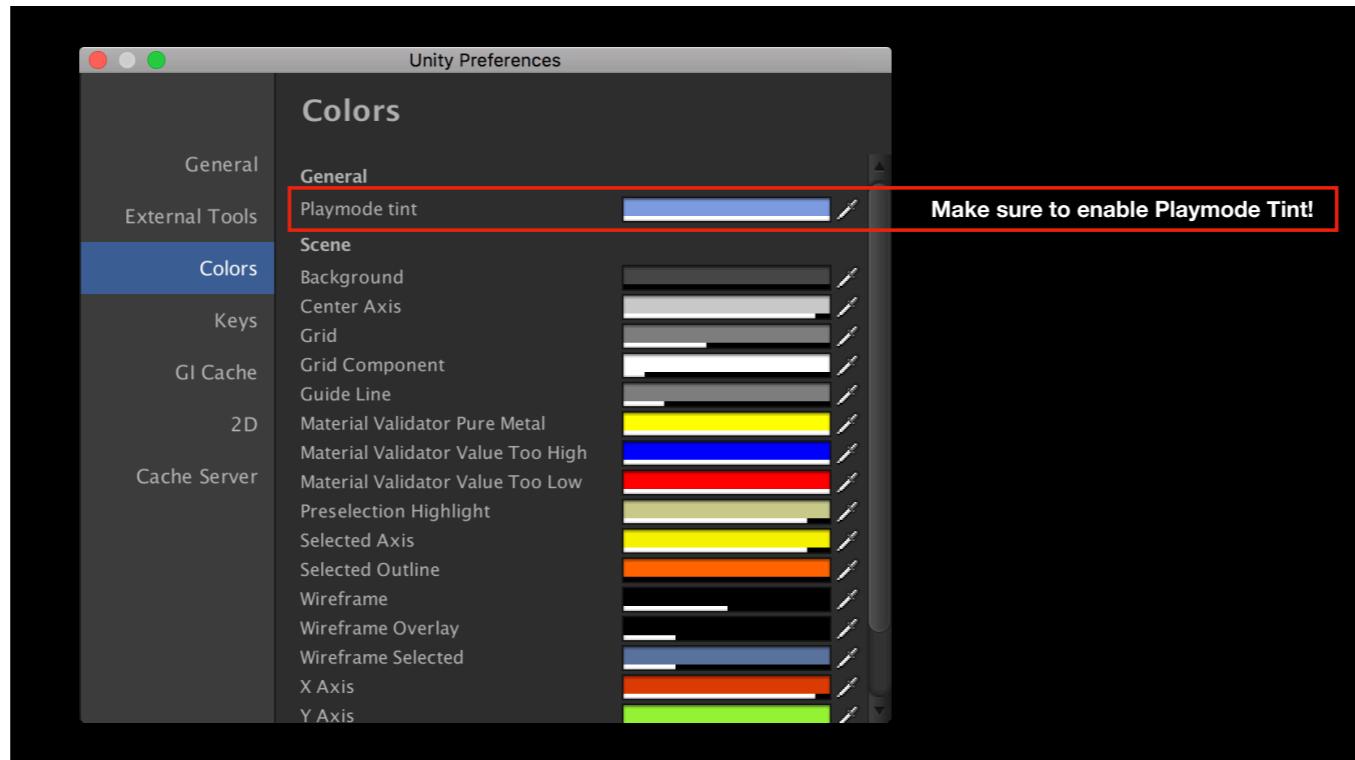






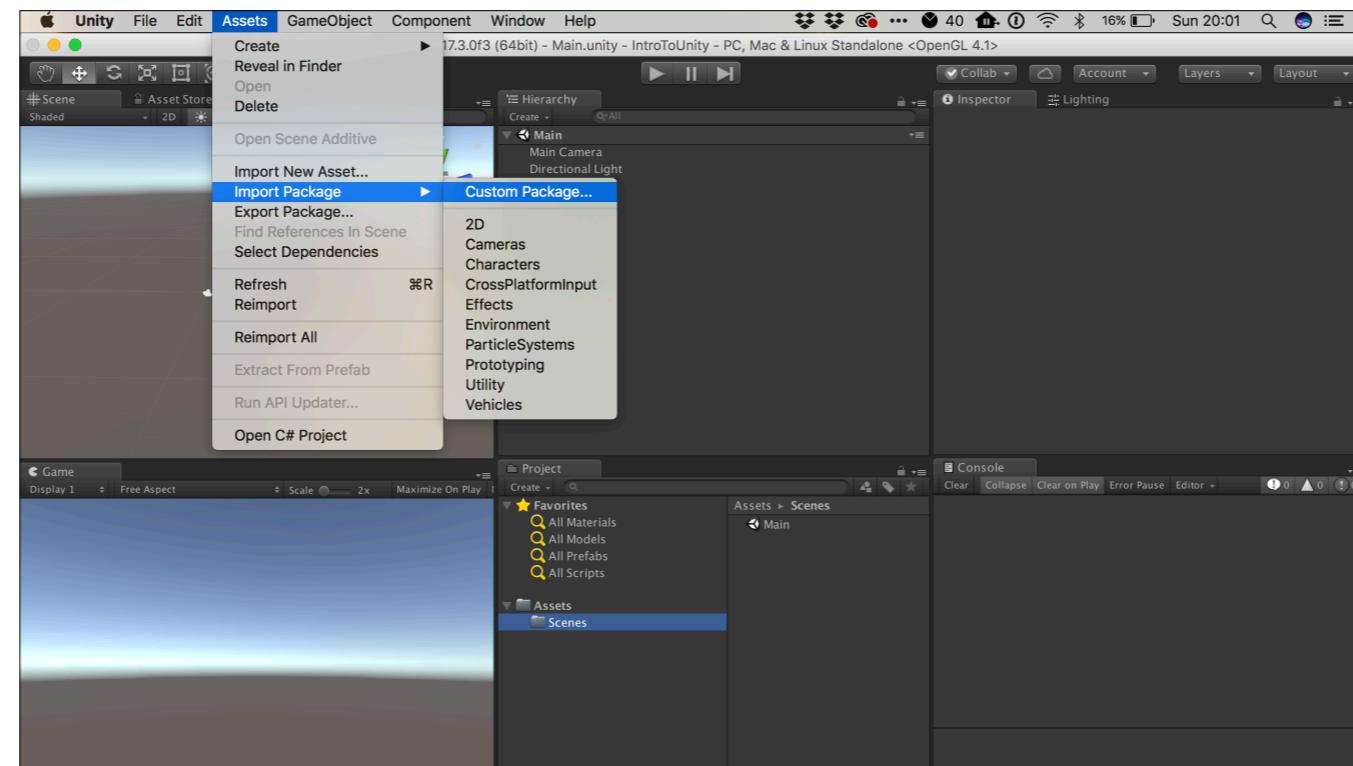




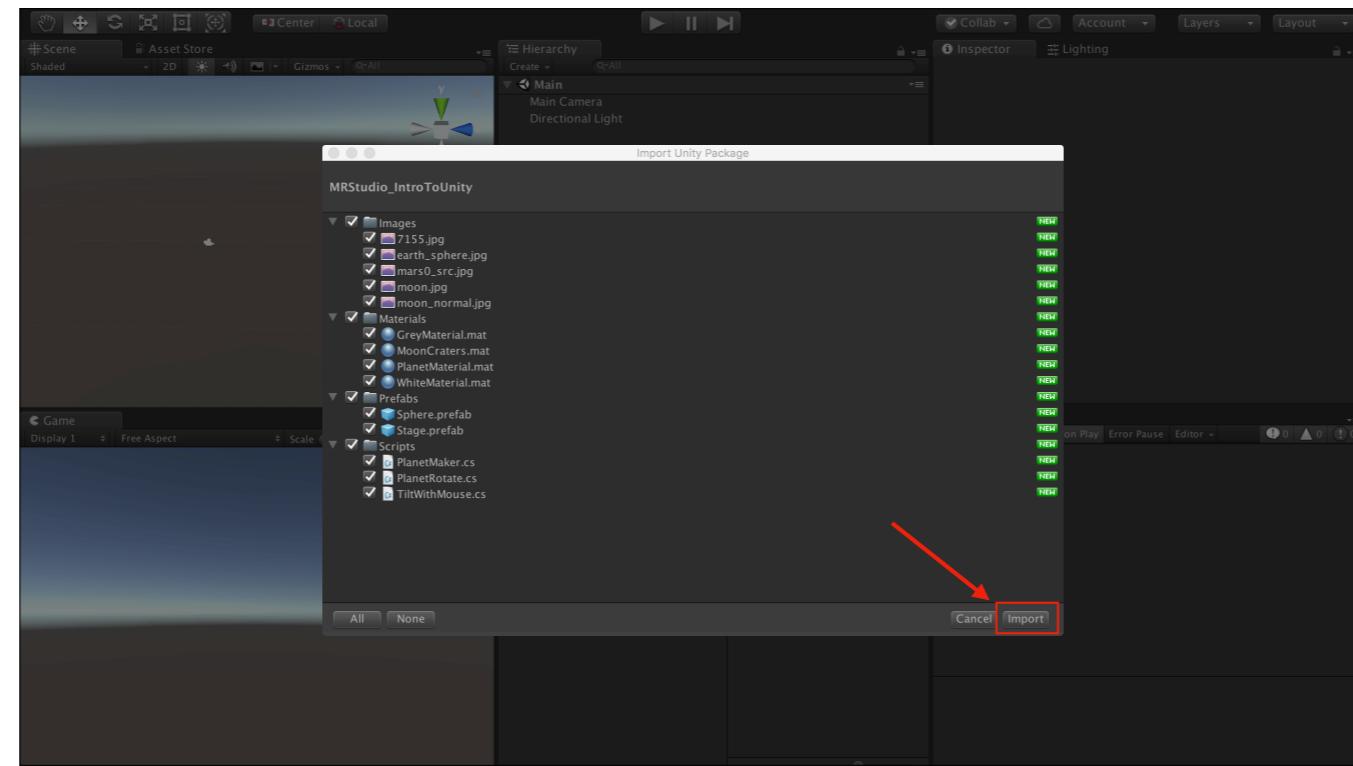


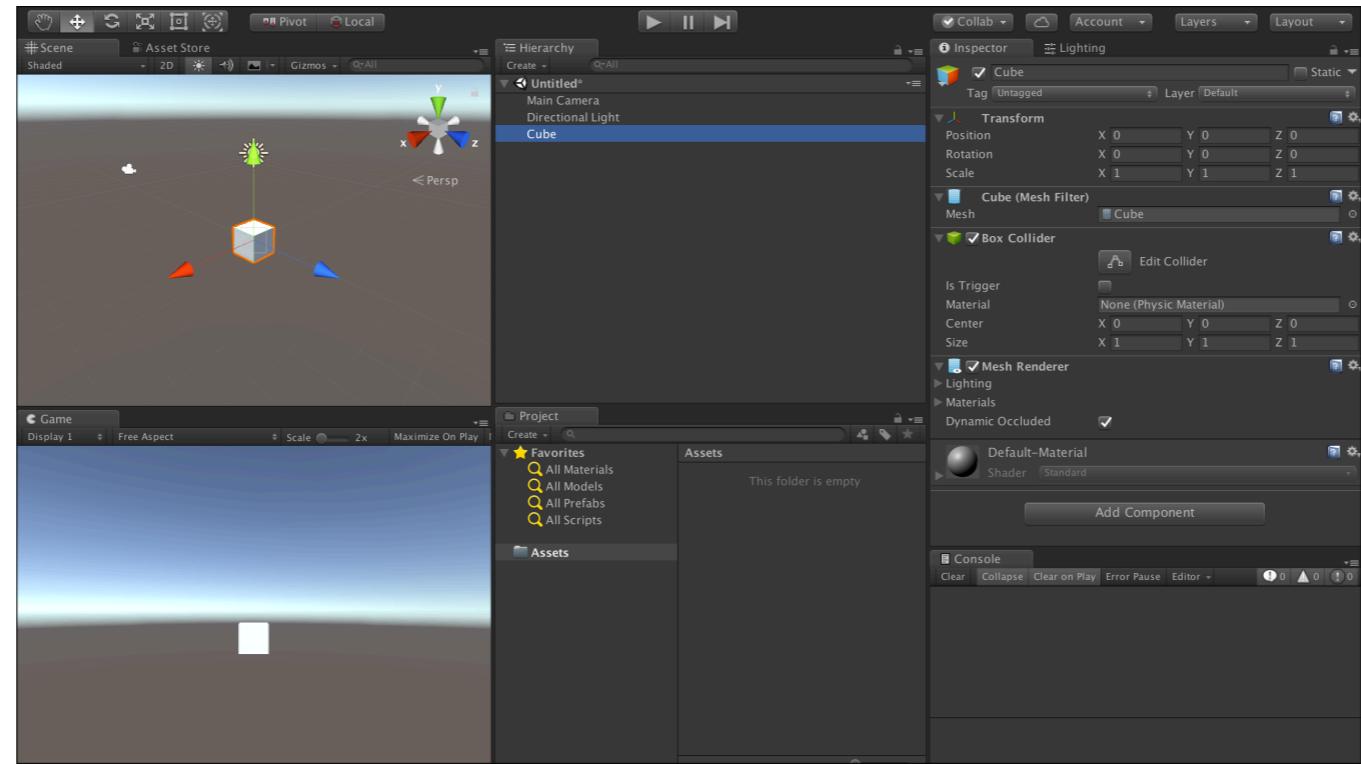
This will save you so much heartache.

(So so much)

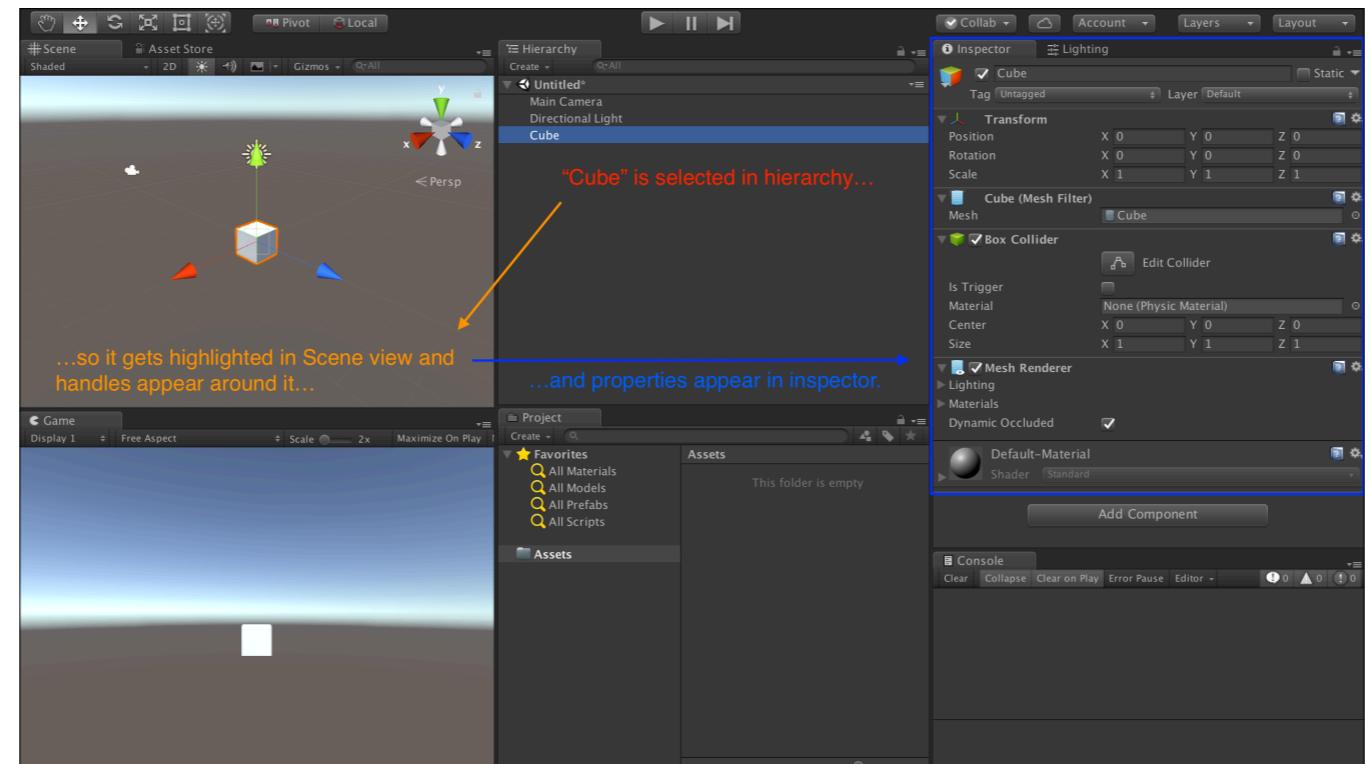


Assets > Import Package > Custom Package...

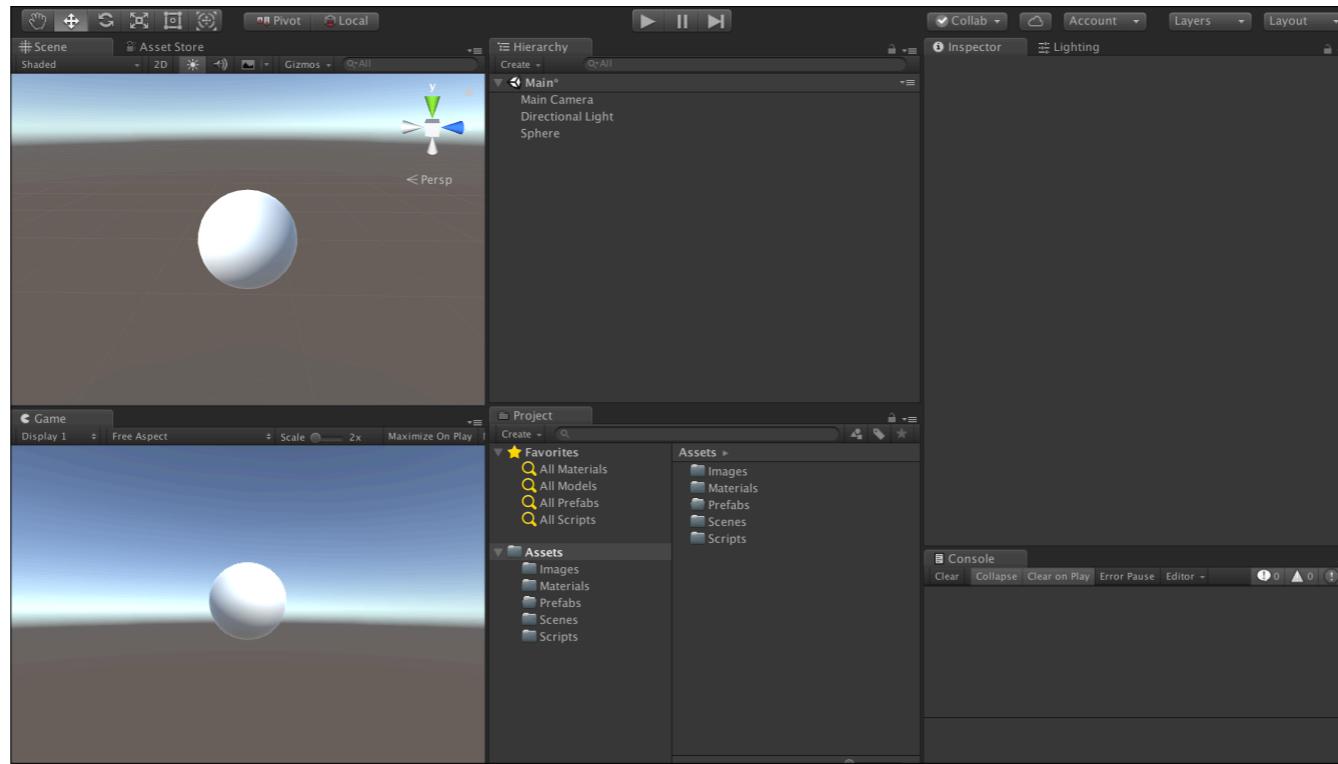




Inspector and **Scene View** change based on what's selected in **Hierarchy**

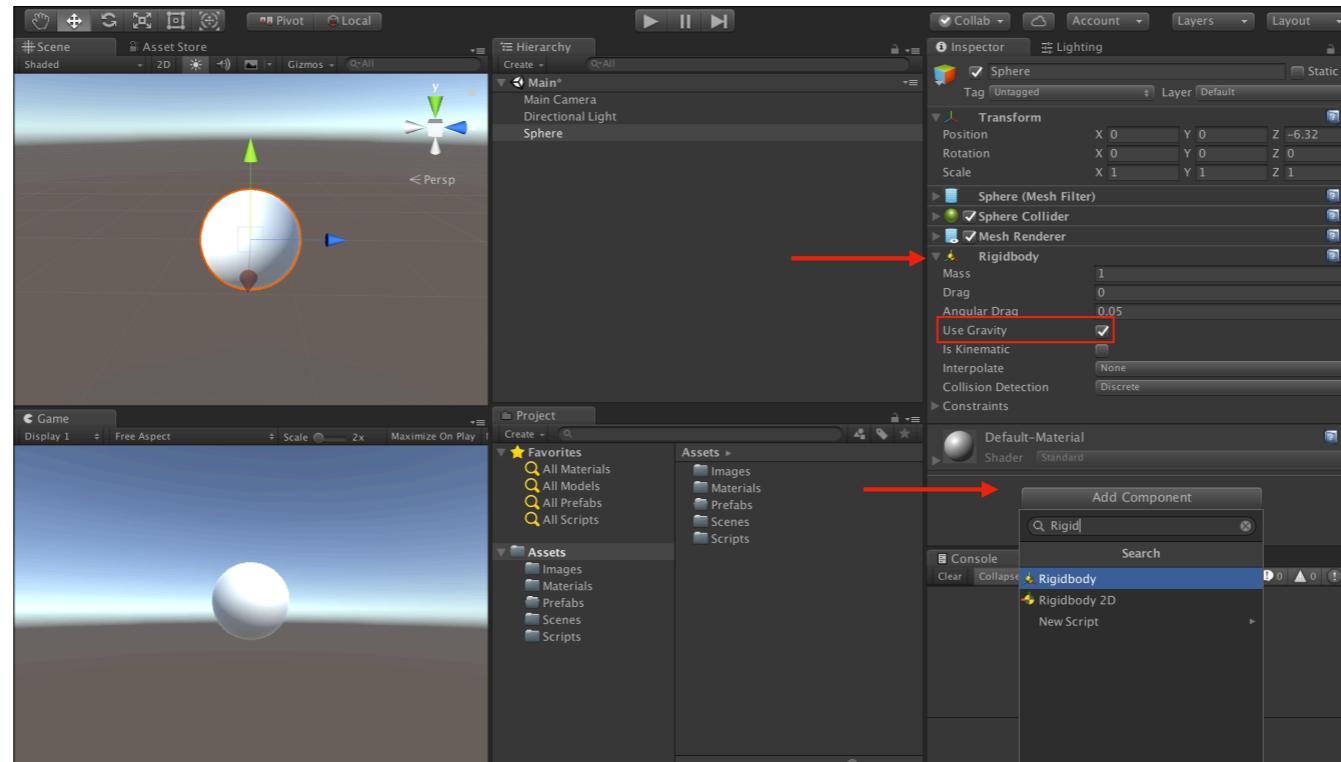


Inspector and **Scene View** change based on what's selected in **Hierarchy**



Working with GameObjects, Components, and Prefabs.

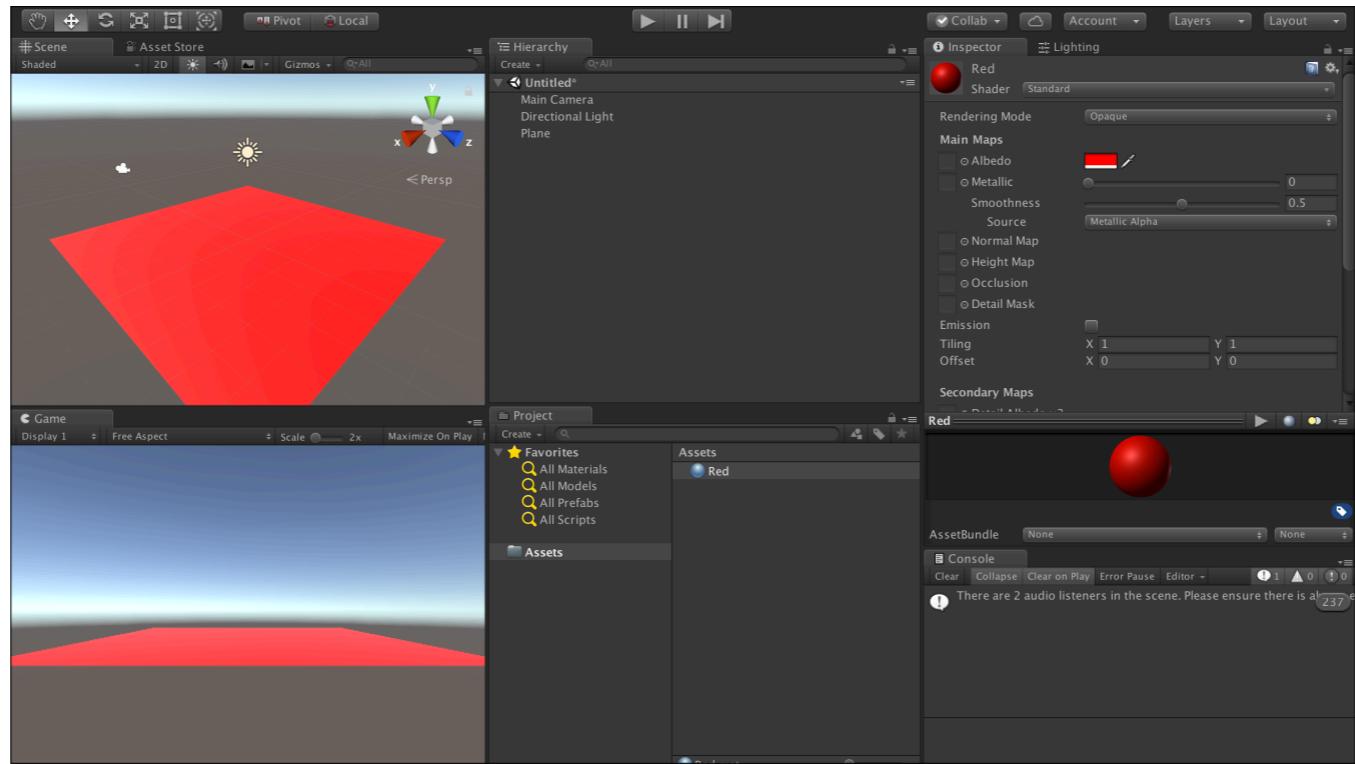
Create a new **Sphere** inside your scene (i.e. create it in the **Hierarchy**)



Back to our **sphere**.

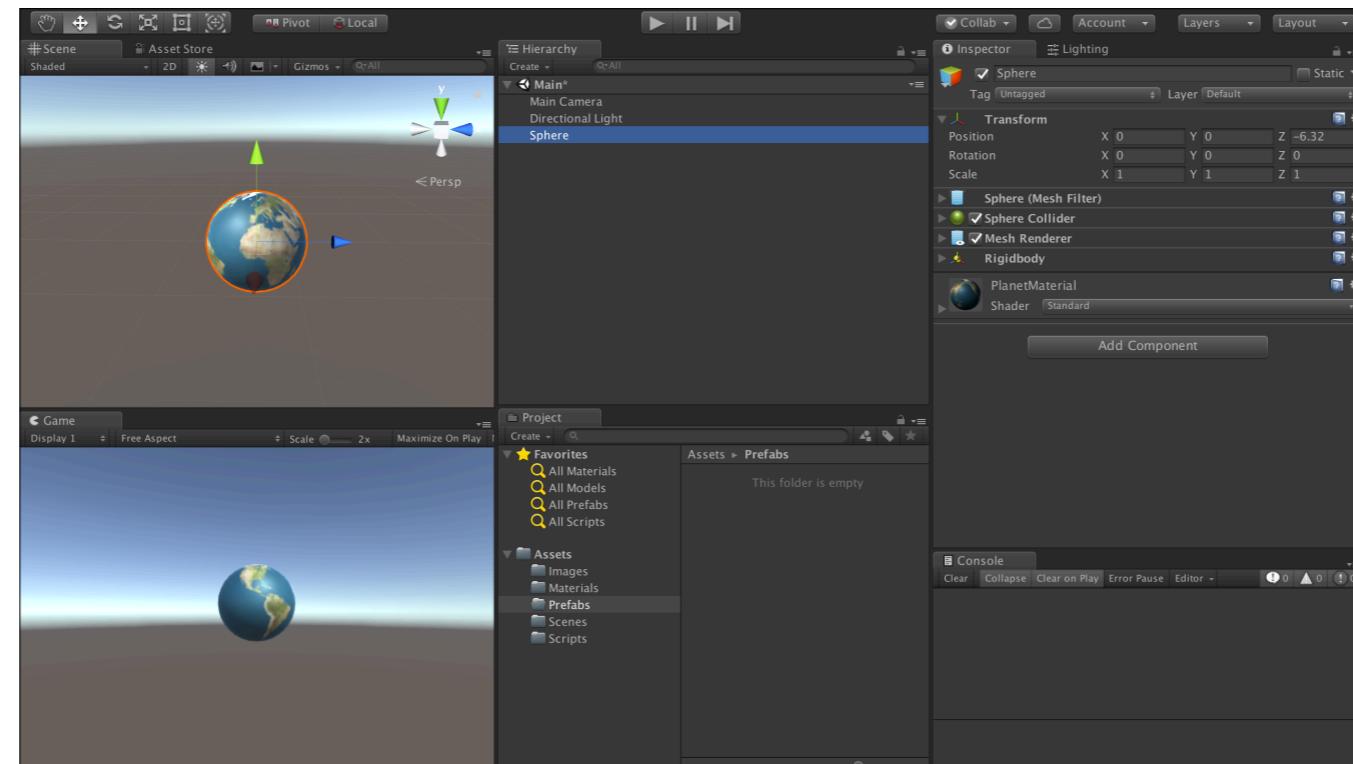
Make sure it is selected and use the “Add Component” button in the inspector to add a **Rigid Body**.

Now you have physics! Yay, thanks Unity!

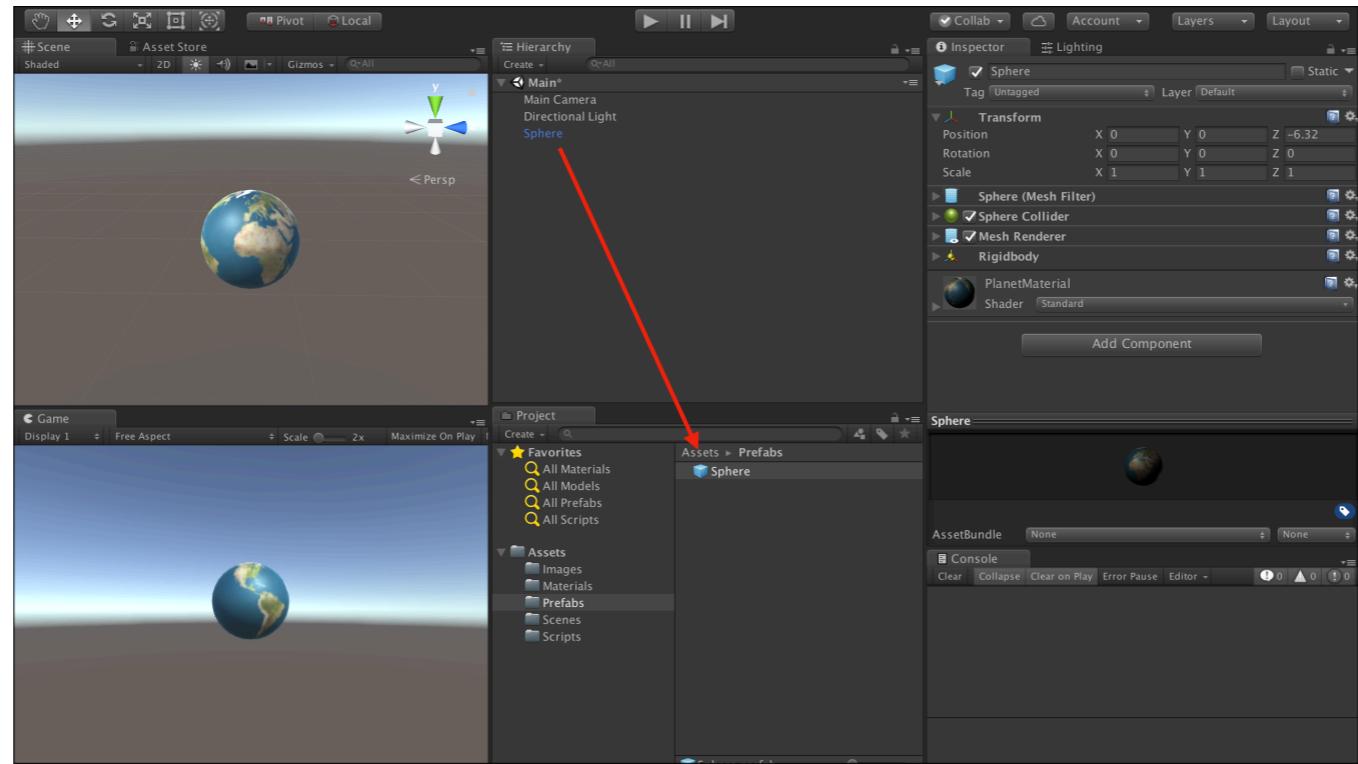


Materials are a bit weird - they're kind of like a *Component* of a Component

Lots of ways to add them but easiest is by dragging. (This actually works for a lot of components, but materials are clearer: easy to see what you're adding to, everything else I prefer adding via the inspector, like we did with Rigidbody)

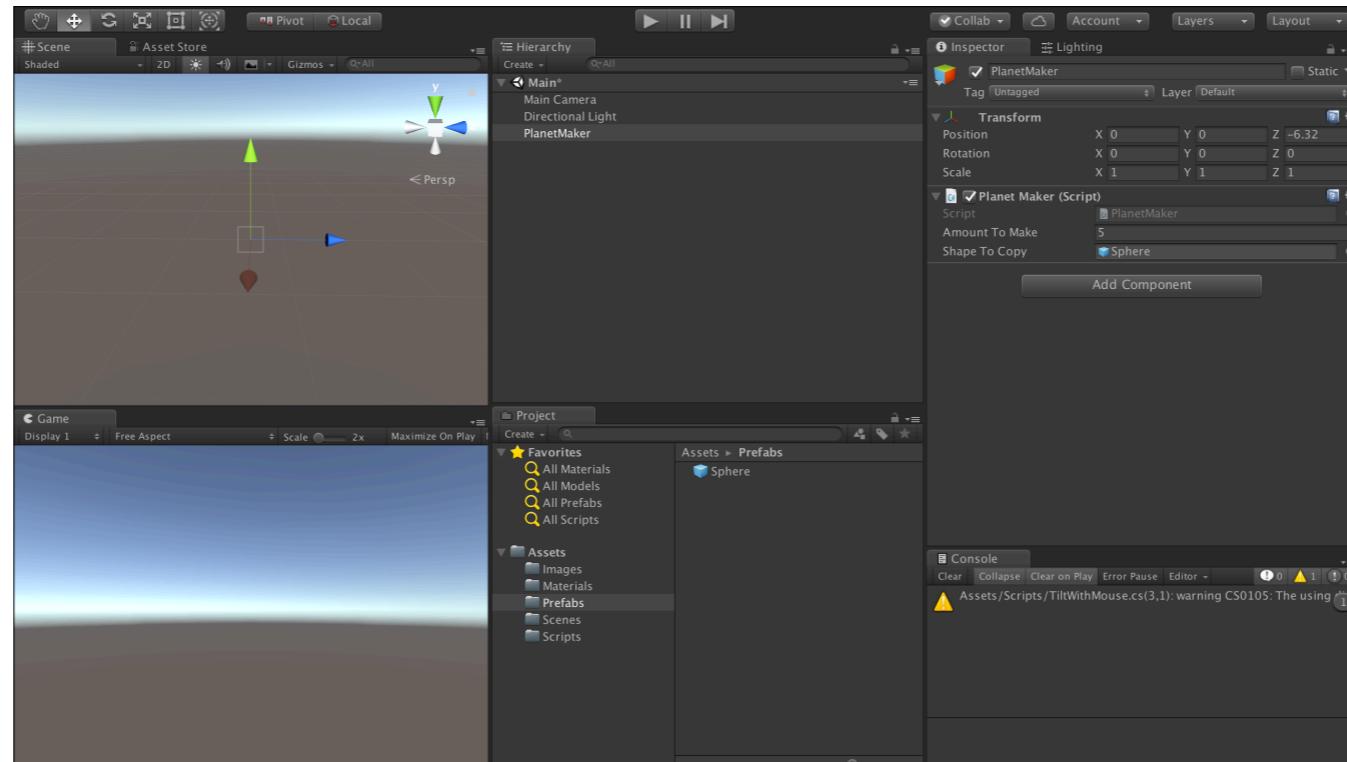


Prefabs! So, we've started with a simple shape, but now we've added stuff to it. Cool textures, useful components.



We can drag things from the hierarchy **back** into the assets in the project view!

This creates a reusable object called a **Prefab**.



Adding **Scripts** to GameObjects is the same as anything else (We'll cover making our own scripts next time)

Scripts have to live somewhere in your Hierarchy (just because they are in the assets does not mean they are active yet).

Create a new **Empty** game object (Just like you created a Sphere) and add the *PlanetMaker* script to it (Just like you added a RigidBody)

Notice that this particular script has an empty slot in it called “Shape to Copy” and in parenthesis it’s saying that this slot takes a **GameObject**. Drag the **Prefab** we made earlier into this slot.

Also notice the “Amount to Make” slot - this is a **public script variable** (more on that later).

John Underkoffler - TED Talk and Article

<http://bit.ly/2vmZLrp>

Design For Humanity - Parts 1, 2, 3

<http://bit.ly/1T0gJ6E>

Reading/watching assignment:

<https://thenextweb.com/media/2015/08/31/a-stark-future/>

<https://medium.com/swlh/the-future-of-design-is-emotional-5789ccde17aa>



Thank you!