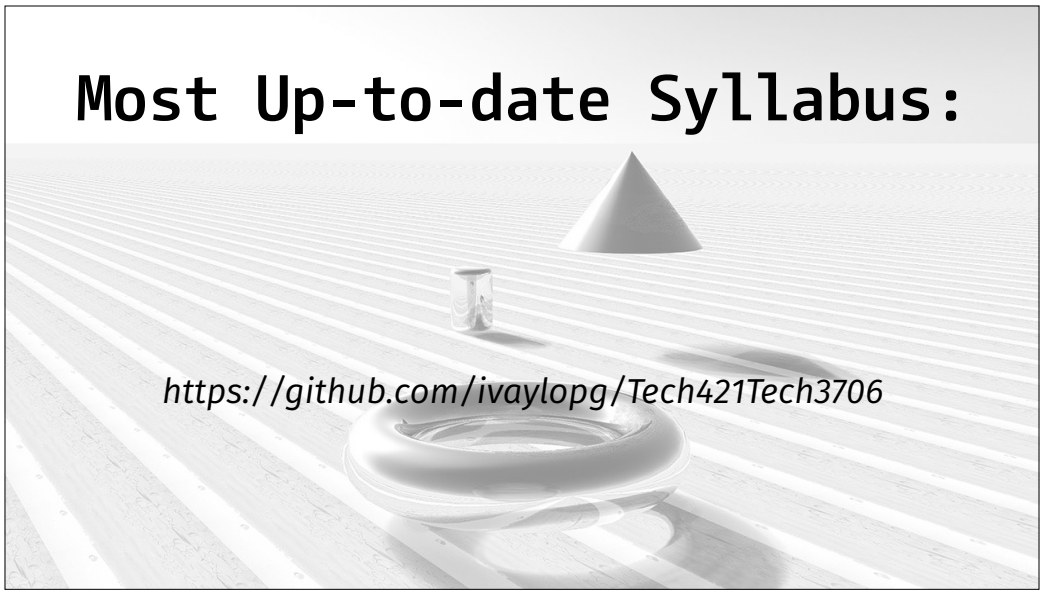
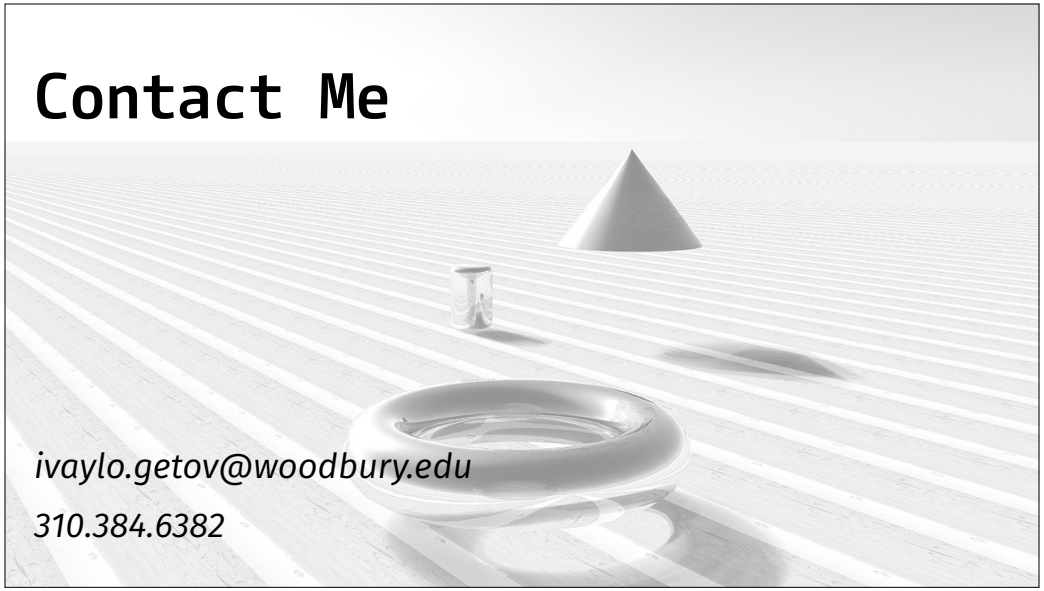

TECH 421 - Future of Digital Media
TECH 3706 - AR/VR in Architectural Environments



I will do my best to keep the various Moodle pages updated, but I can promise that most up-to-date class materials will be here:
https://github.com/ivaylopg/Tech421Tech3706

Contact Me



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What is AR/VR/MR?

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

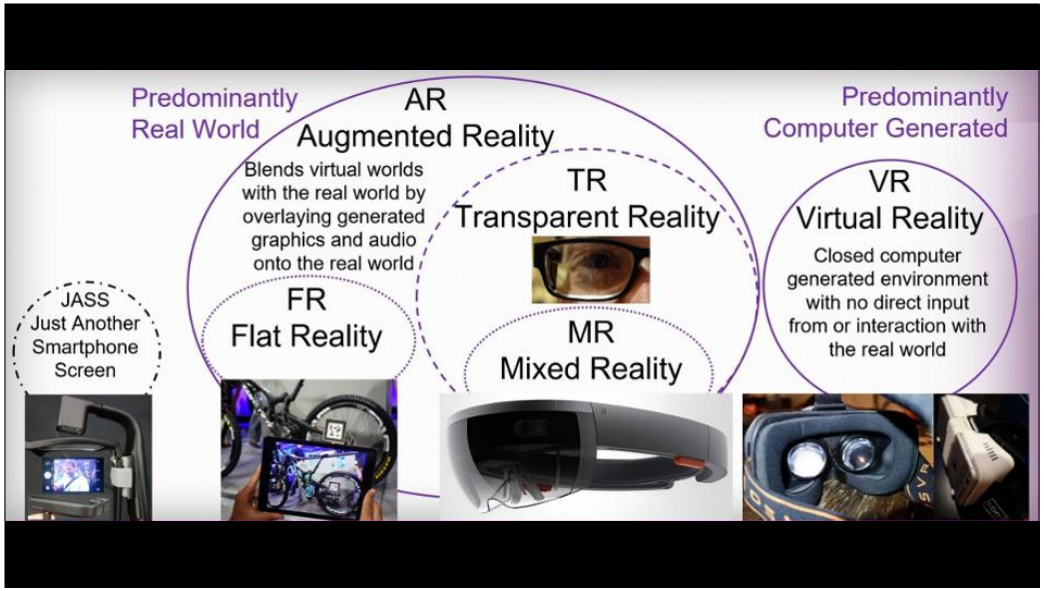
Inducing targeted behavior in an organism by using artificial sensory stimulation, while the organism has little or no awareness of the interference.

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

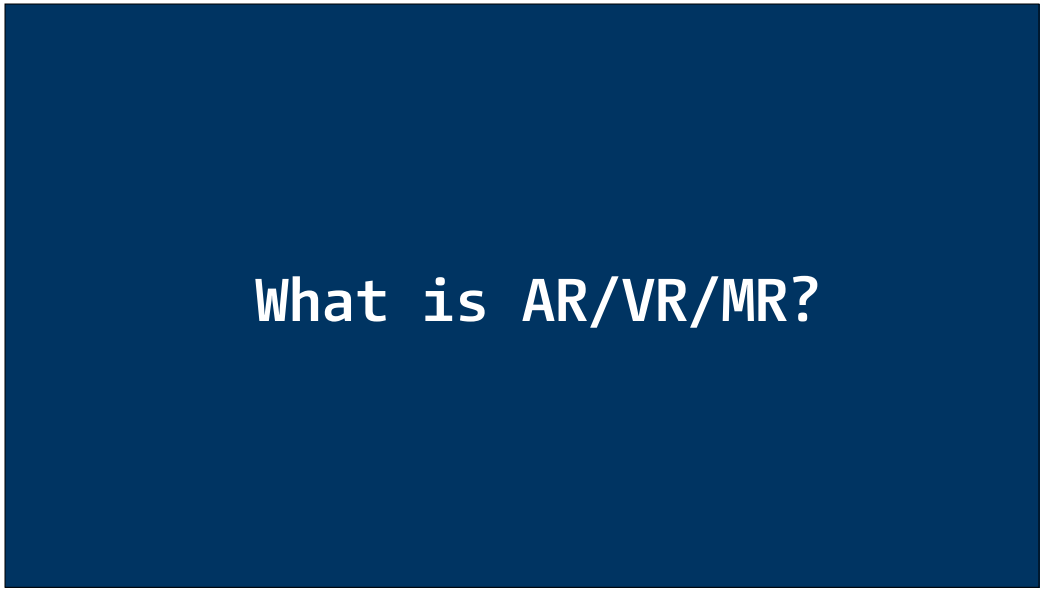
Intentionally Broad

Immanuel Kant - 1781 - Critique of Pure Reason

Stated that there are two parallel worlds: the **nouminal** and the **phenomenal**. **The nouminal world is the objective external world**, which is the source of the light that stimulates the retina. This is the world studied by science, and is populated by invisible entities such as atoms, electrons, and invisible forms of radiation. **The phenomenal world is the internal perceptual world of conscious experience**, which is a copy of the external world of objective reality **constructed in our brain on the basis of the image received from the retina.** The **only way we can perceive the nouminal world is by its effects on the phenomenal world**. Therefore the world we experience as external to our bodies is not actually the world itself, but only an internal virtual **reality replica** of that world generated by perceptual processes within our head.



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



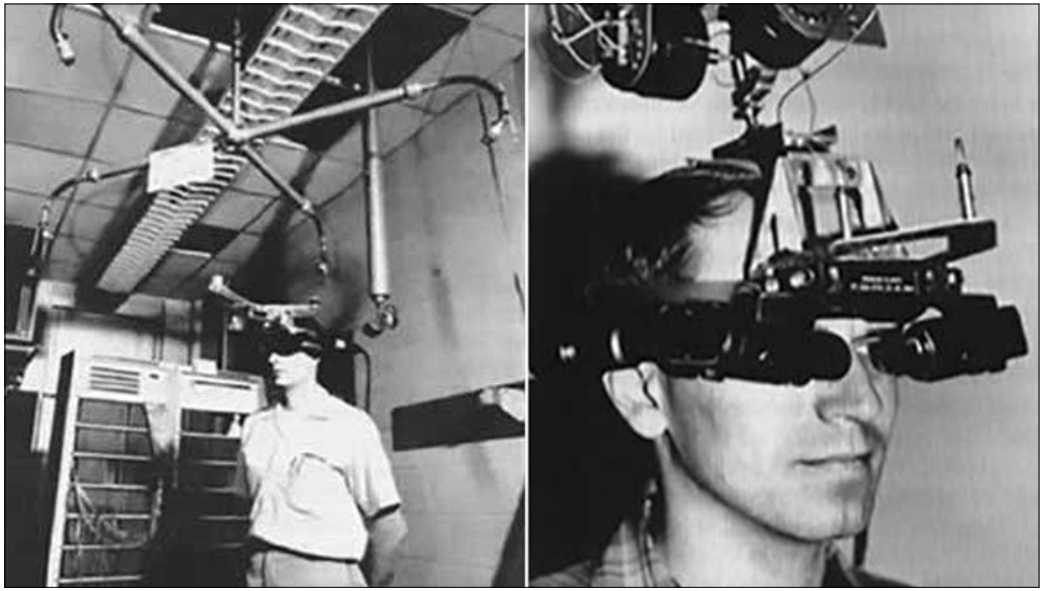
As far as this class is concerned, we're drawing the line here:

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.

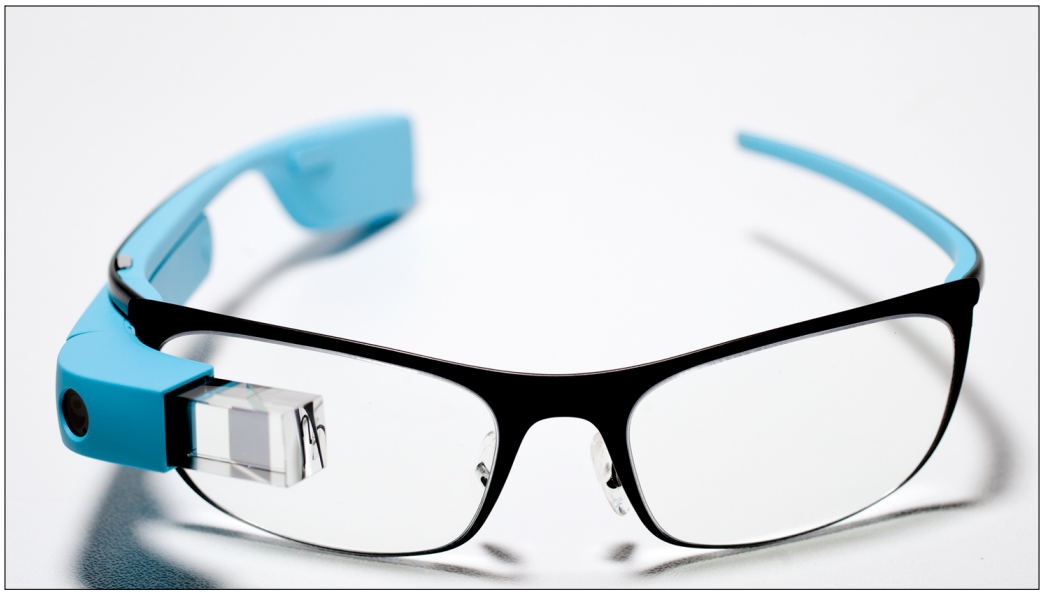
AR = you are *adding* things to the real world. The rules/expectations of the real world still apply, and you can leverage that to your advantage.

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.

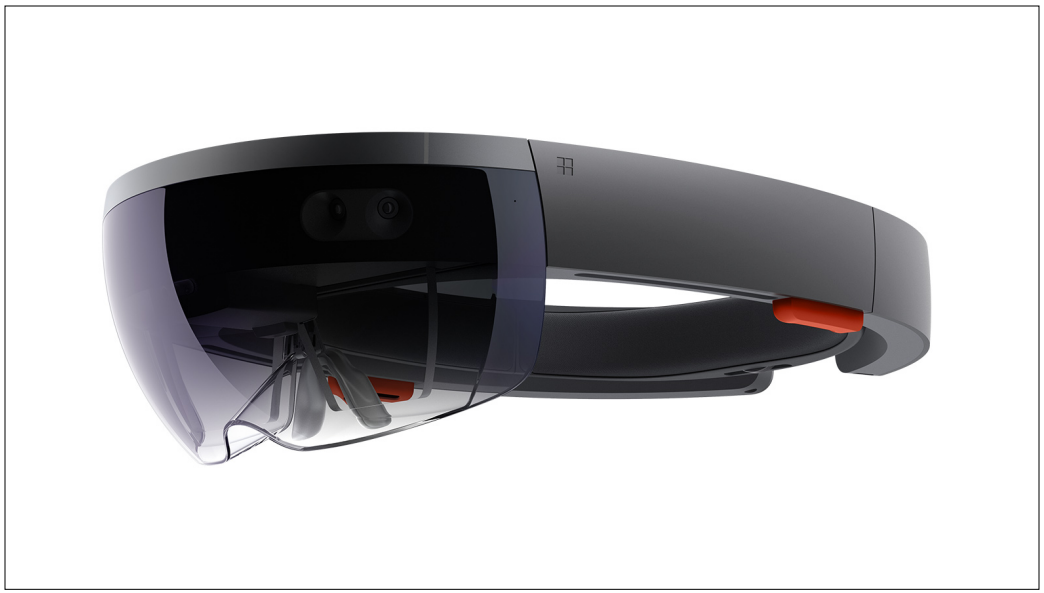


We’ll be dealing mostly with AR for a while

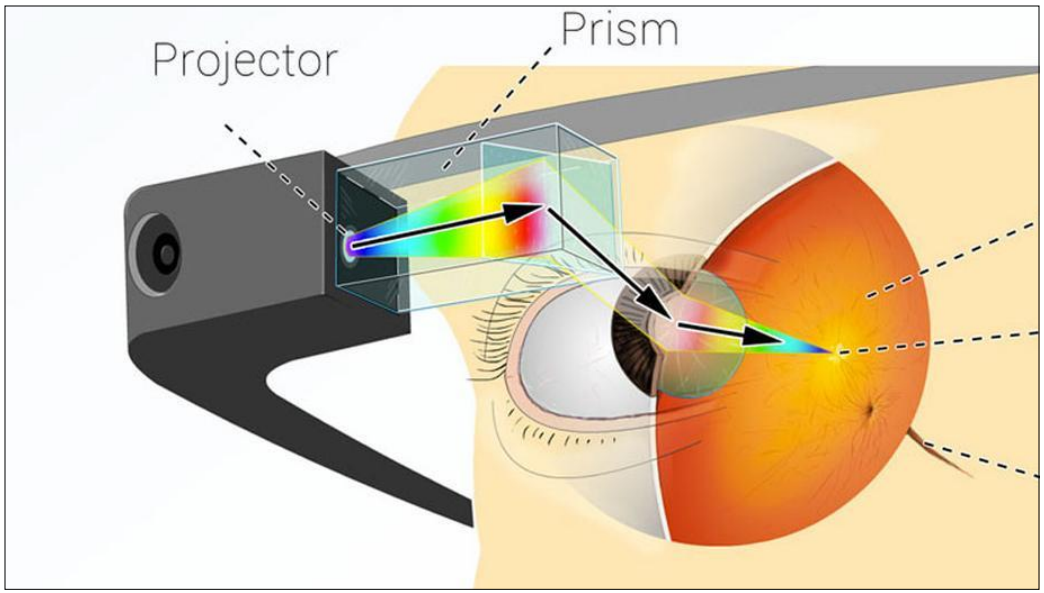


April 15, 2013 Google glass comes out. This is, for many people, the first “mainstream” Head-mounted display. This is **NOT AR**. It is just a screen that floats in your field of vision.

It does not have any relationship to 3D space that you are in …. just provides some contextual information.



Microsoft Hololens

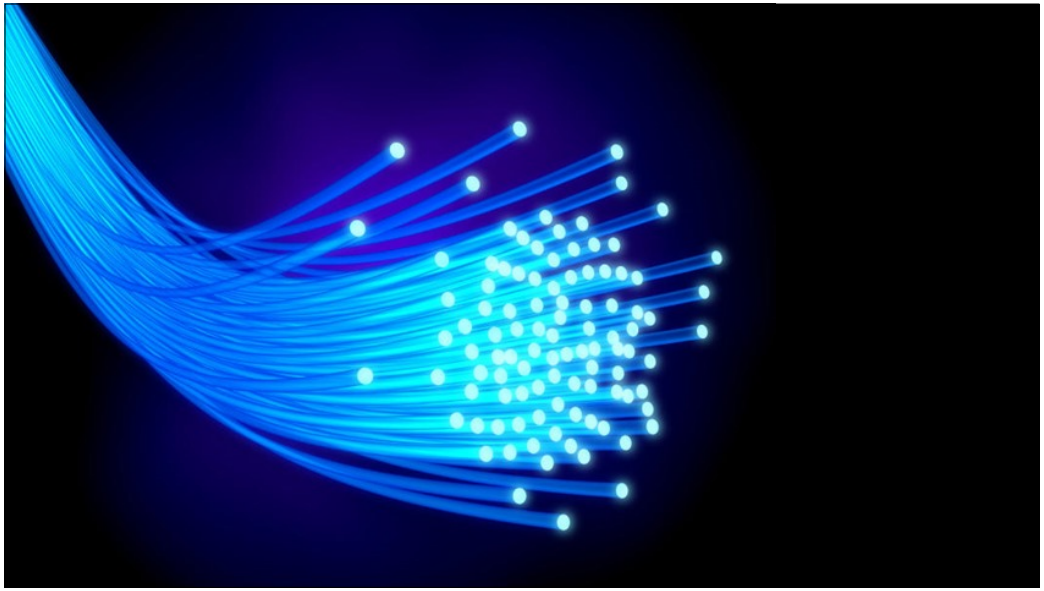


Google Glass used a translucent mirror to reflect a projected image onto the back of your eye.

Projected image was about the size of the projector itself, so it was very small (floated in the corner of your vision).

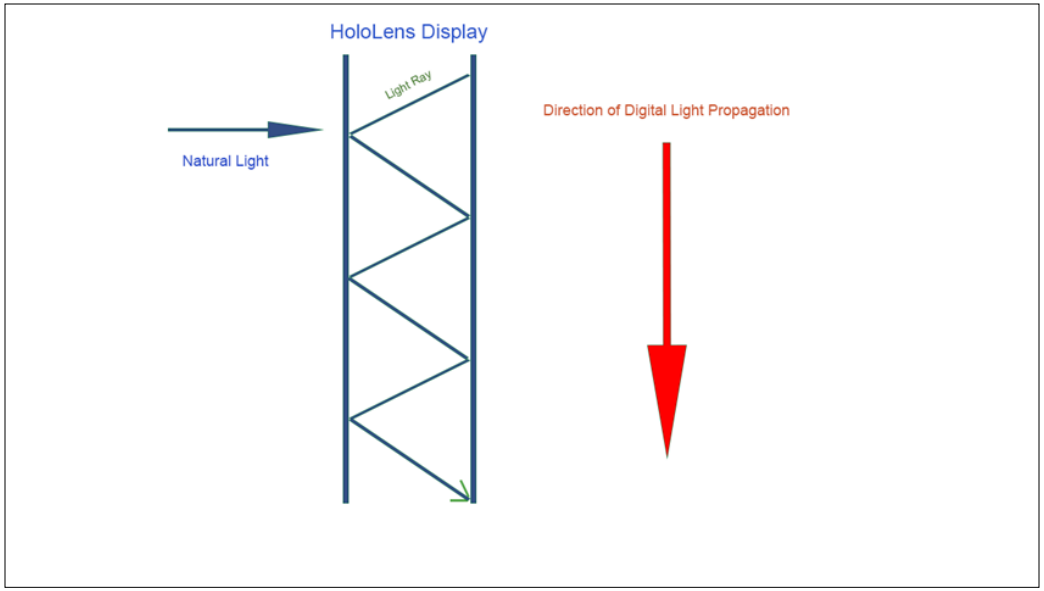
Hololens uses a wave-guide based screen. Projected image can be much bigger than the projector.

Still very limited in size, but (barely) able to cover your field of view instead of just a corner of your vision.



Optical fiber is an instance of a waveguide we are all familiar with.

Hololens screen works in similar way



The two HoloLens eye screens are basically flat optical fibers or planar waveguides. Some sort of image source at one end of these screens sends out RGB data along the length of the transparent displays. We'll call this the image former. This light bounces around the internal front and back of each display and in this manner traverses down its length. These light rays eventually get extracted from the displays and make their way to your pupils

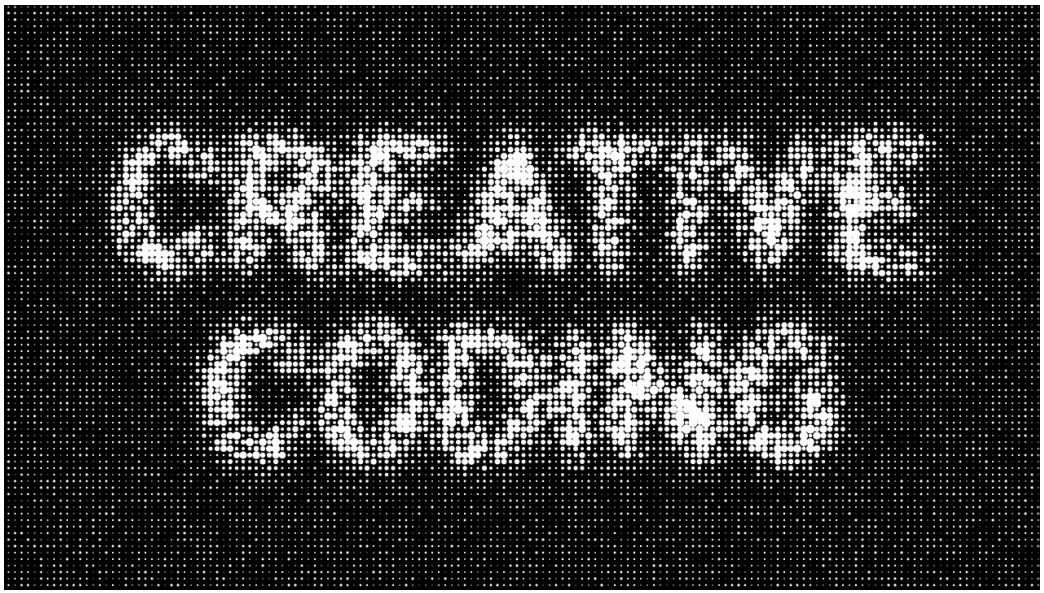
Sensors!

The Hololens is made by the same company as the Kinect - uses similar technology to constantly map its surroundings and feed that data back into the experiences that it is running.

Why Hololens for this class?

Even though it is not widely available, expensive, and technically only for “developers,” it is really good at what it can do.

It is currently the only wearable device that comes close to “ideal” AR, so we will use it as our ideal test lab.



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.

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


http://www.creativeapplications.net
http://prosthetickknowledge.tumblr.com/

Recap:

Last time we covered

- the UI
- Play/Scene views, editor tint
- Hierarchy view
- Inspector
- Adding and moving objects to our scene
- adding components and physics

Project

Virtual Reality (LaValle) - Chapter 1

http://vr.cs.uiuc.edu/

Set up Unity!

Find examples of AR/VR that interest you on the creative coding websites linked earier

Finish reading for next time:
http://vr.cs.uiuc.edu/

Have a good weekend!