

# Classroom Design Tool

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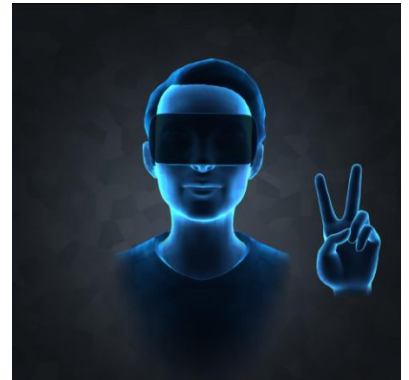
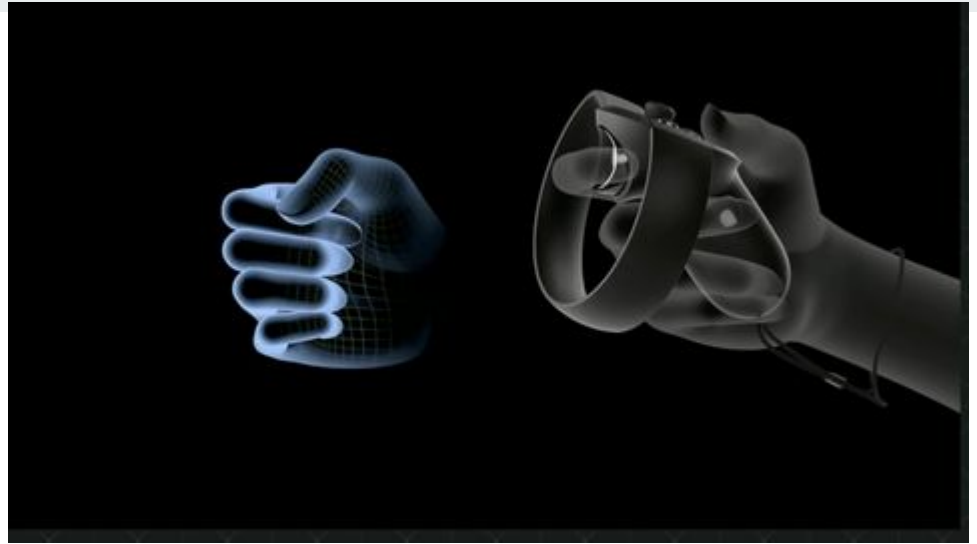
CSE165: 3D User Interaction  
Robin Xu



# Agenda

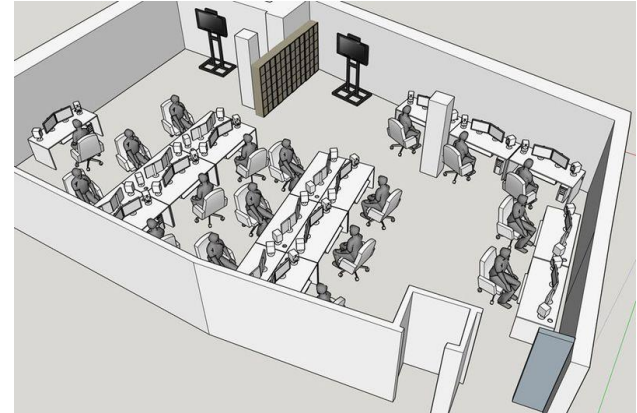
- Intro
- Using Oculus Touch Controllers
- Creating VR Lab
- Instantiating Furniture
- Selecting Furniture
- Manipulating Furniture

And extra credit!

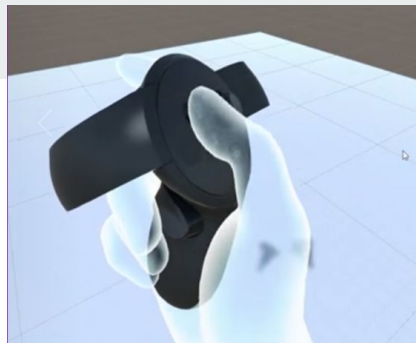


## Project 3: VR Classroom Design Tool

- Provided with fbx files:
  - Including TV, Chairs, Locker, Whiteboard, etc.
  - Download at <http://ivl.calit2.net/wiki/images/1/12/Vrlab-fbx.zip>
- Create an empty classroom!
  - With colliders so that objects won't fall out from the room



# Oculus Touch Controllers

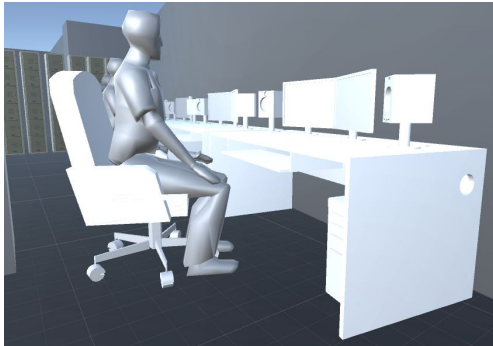


- Oculus Integration SDK:
  - Download: <https://assetstore.unity.com/packages/tools/integration/oculus-integration-82022>
  - OVRPlayerController gives you the prefab for Oculus Camera
  - LocalAvatar gives you the prefab for Oculus Touch Controller
  - Check out sample scripts in the SDK to see how things work!
- FAQs
  - Unity crashes when importing the assets?
    - Find out the script that causes the crash and uncheck it when re-importing.
  - Where do I put localAvatar?
    - One way is to put it under OVRPlayerController/OVRCameraRig/TrackingSpace



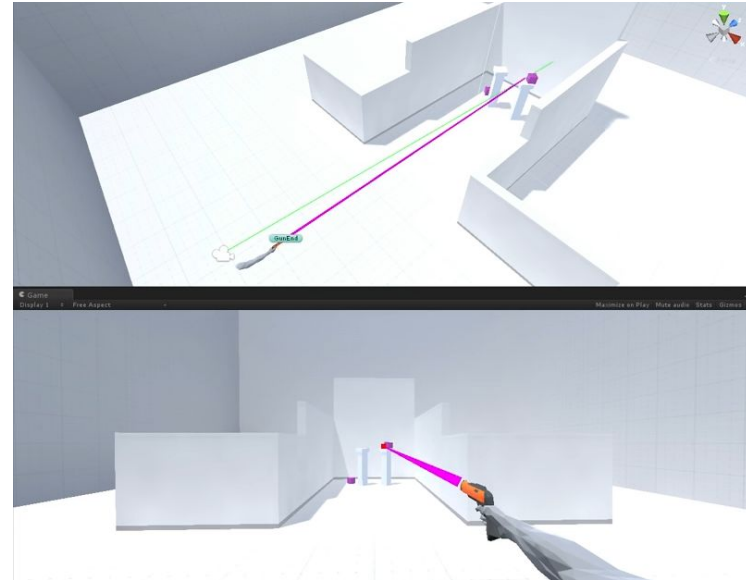
## Downloading and Creating VR Lab

- Extract the folder, and drag it into the Asset window
- The scale of certain objects, like the chair, is way off
  - Select the model, and you should see Import Settings in the Inspector Panel.
  - Change the Scale Factor to realistic values
- You will need to add colliders manually
  - Simply using Mesh Colliders would be too slow
- Once you have set up an object to your liking, make it a Prefab!



## Render a ray casted from your controller

- Just like laser pointer
- The ray should be long enough to reach all of the walls of the lab.





## Instantiating + Placing Furniture

- Be able to place CHAIR and DESK
- When to instantiate?
  - When use press the corresponding buttons
- Where to instantiate?
  - At a fixed distance from the controller along the ray
- How to instantiate
  - `GameObject.Instantiate()` and `Physics.Raycast()` for lots of your interaction
- Key questions:
  - How will the user choose where to place the furniture? No overlap allowed!
  - How can you make sure the furniture is upright when created?

# Selecting & Manipulating Furniture

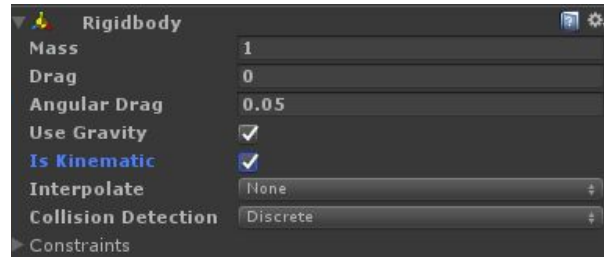
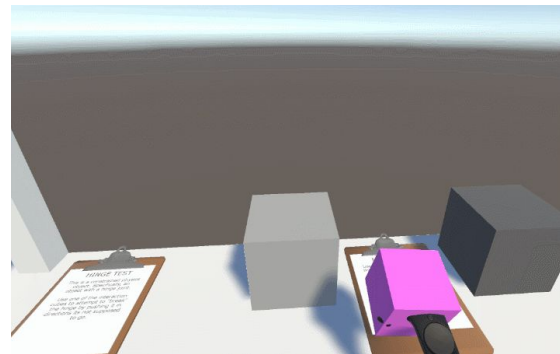
- You need to also implement raycast selection
- When a furniture is being pointed to, it should be highlighted.
- When to enable the selection?
  - When the user pull the trigger
- How to manipulate furniture?
  - The furniture will stay at the fixed distance to your controller
  - Acts like you have skewered the furniture on a stick





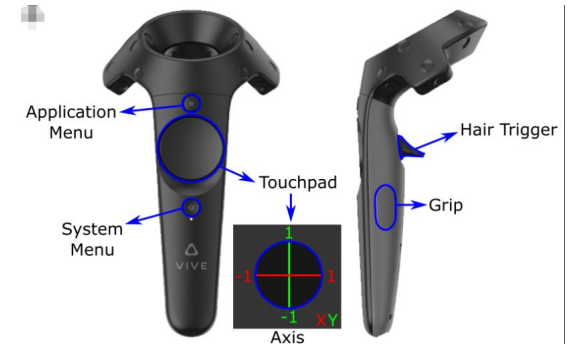
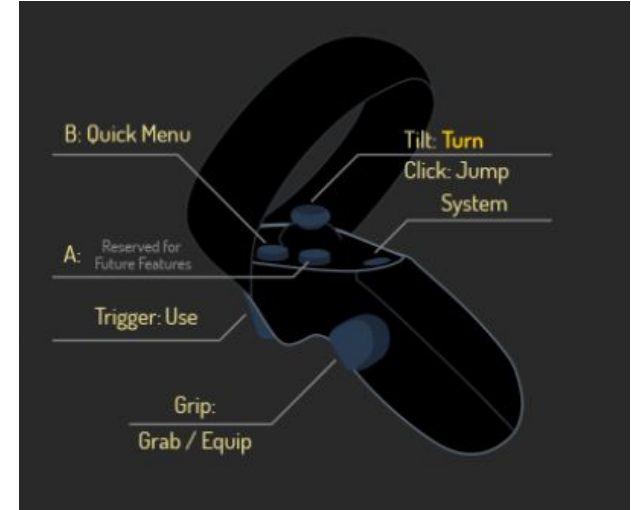
# Manipulating Furniture

- Users should be able to move and rotate furniture objects.
  - Checking `isKinematic` helps you temporarily get rid of gravity.
- Interesting questions to think about
  - How to use this interaction method to
    - Move object?
    - Rotate object around its own center?
  - How will the object you are manipulating interact with other objects?



# Travel

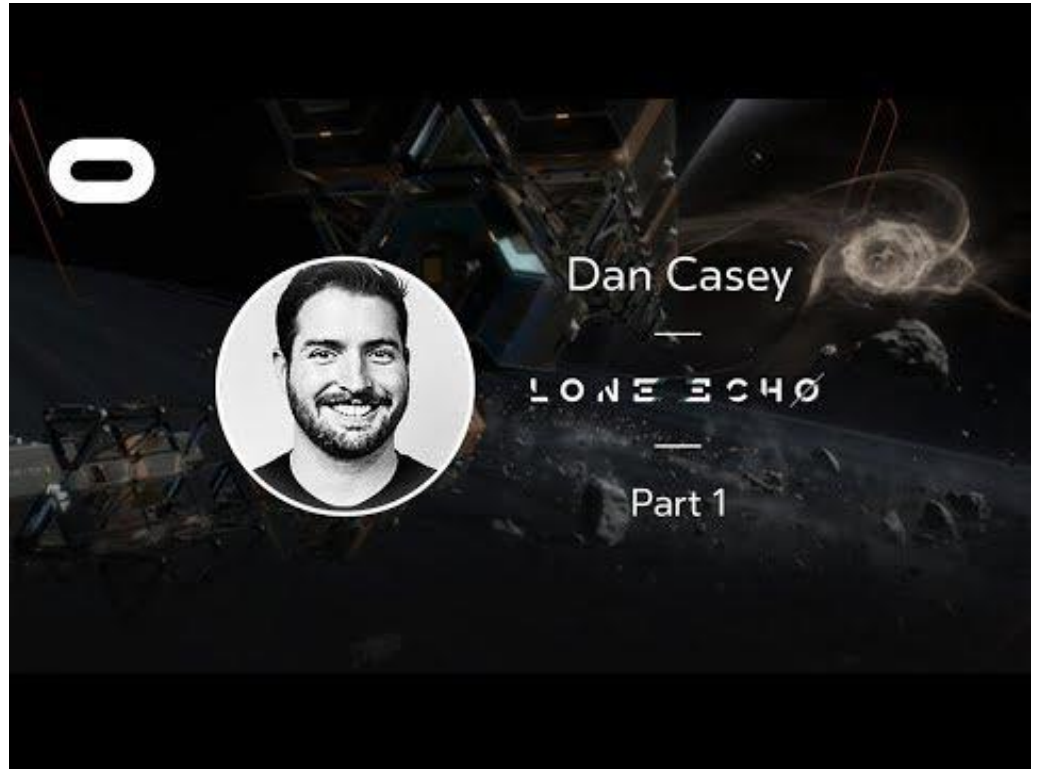
- Grabbing the Air to Move move yourself through the classroom.
- No collision check (user can go through furniture and walls).
- Use the grab buttons for this functionality: on Oculus controllers they are at the middle fingers, on Vive or Microsoft XR controllers they are called grip buttons.





## Travel

- Similar like Long Echo like right
- But not need to check if you grab Objects or not, “Grab the Air”



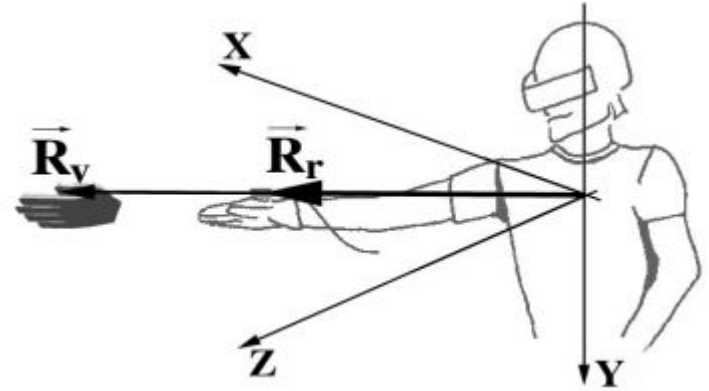
## Extra Credit: Two handed scaling

- Use Grasp Buttons on two controllers to scale the whole world
- Scale factor depends on the delta distance between your two hands
- Ability to reset the scale factor to 1
- Questions:
  - Where are you (as player) after the scaling?
  - How should you spawn/manipulate the existing object after the scaling?



## Extra Credit: Go-Go Hand technique

- Replace the regular virtual hand with Go-Go .
  - No need to show regular virtual hand interaction if you use this



## Extra Credit: saving and loading

- Allow saving and loading of the furniture configuration.
  - You can use keyboard keys (such as 's' for save and 'l' for load).
  - You need to save to a file and be able to load from the file after quitting the app and restarting it.



## Extra Credit: 3D mini map

- Create a 3D mini map of the room to interact with the furniture.
- Add teleporting to wherever the user points in the mini map



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# Questions?

Feel free to ask on Piazza!

*(Making your questions public is helpful to everyone!)*

