Building Blocks

CSE165: 3D User Interaction

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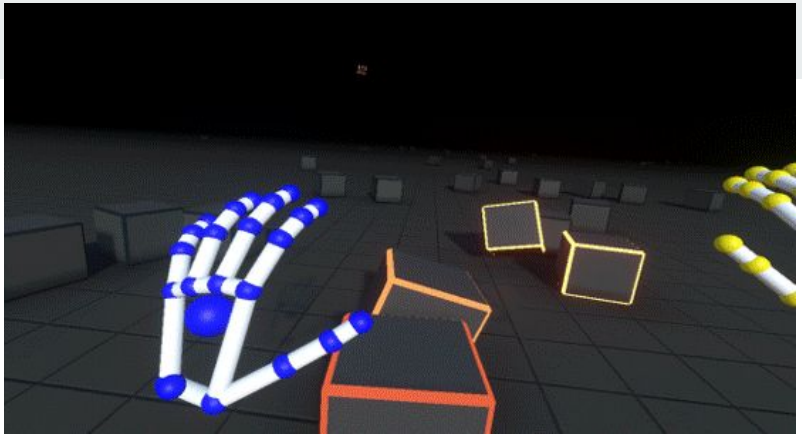
Agenda

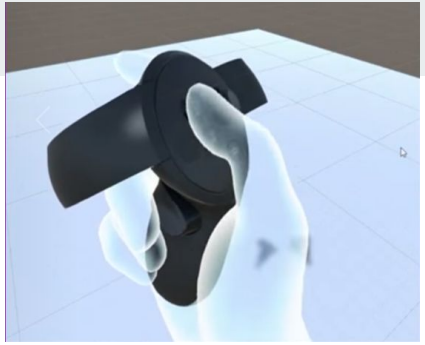
- Intro
- Using Oculus Touch Controllers
- Setup your environment
- Create multiple types of Menu
- Instantiate Blocks based on Menu
- Blocks Manipulation

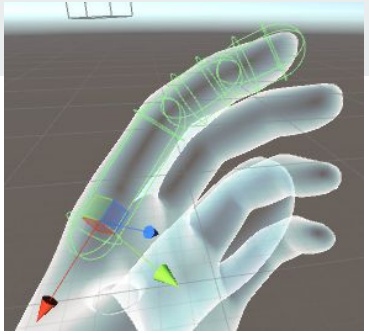
And extra credit!



Project 4: Building Blocks

- Go beyond your project 3!
- The project is to create a 3D application to create building blocks of different shapes and colors and allow the user to play with them.
- Similar to a Wood Blocks childrens' toy
- All interaction has to be done with the VR system (headset and controllers)





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

Create a scene like project 3

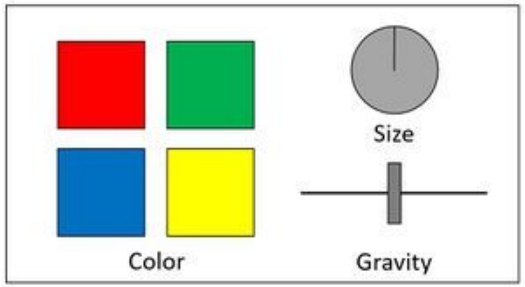
- Create a large rectangle to serve as a table surface to put the building blocks on. (fix position)
- Place it at the height of a typical desk and right in front of the user in the VR space.
- Use the Virtual Hand interaction method for all interactions with the application. You can re-use the one from project 3.

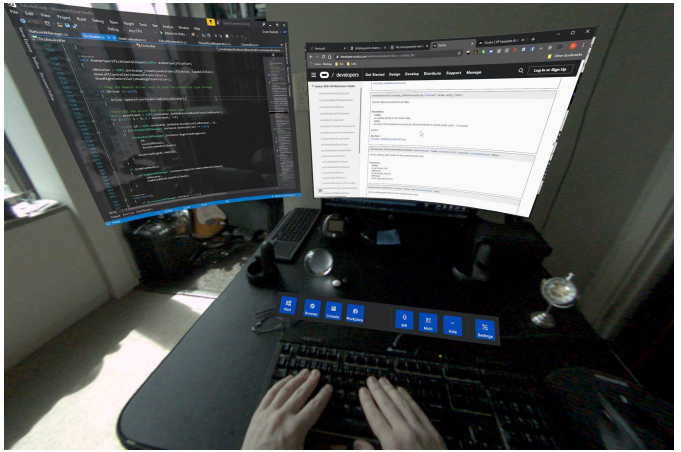
- Once you have set up an object to your liking, make it a Prefab!

Stationary Menu

The menu feature should included at least:

- Change color of the specific object you are creating
- Change size of the specific object you are creating
- Control gravity, so global objects can be float or even reverse gravity
- etc..

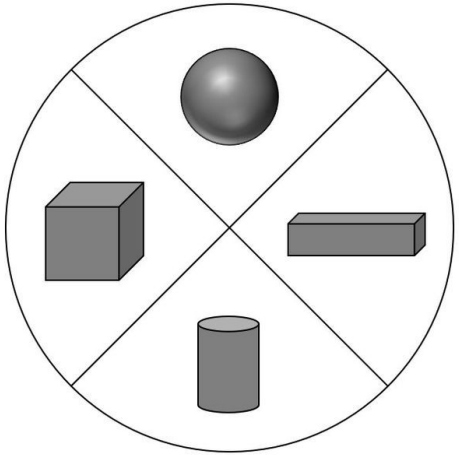


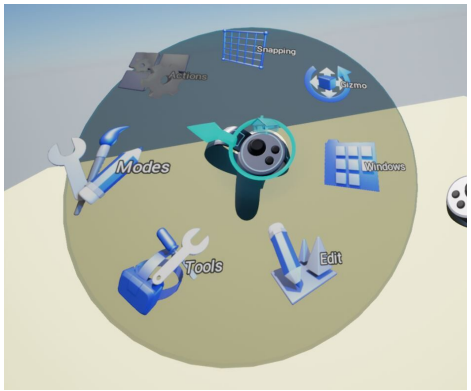


Stationary Menu Button

Radial Menu

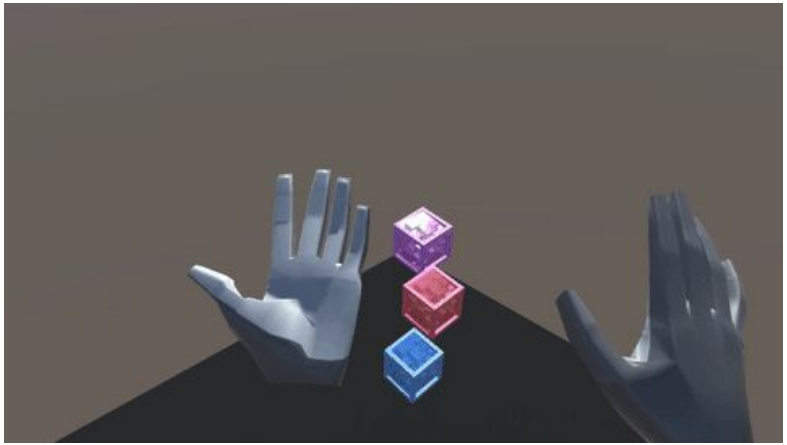
- This menu should be about ~20cm wide.
- When menu visible, user can pinch on item with dominant controller.
- The radial menu should have entries for the four different shapes the user can create:
  - cubes
  - cuboids
  - spheres
  - cylinders (All are part of Unity's built-in 3D object types or can be derived from them.)
- Create icons for the four different shape types. You can copy images from the internet, or take screenshots of the objects you're creating. Show the icons in the four quadrants of the radial menu.

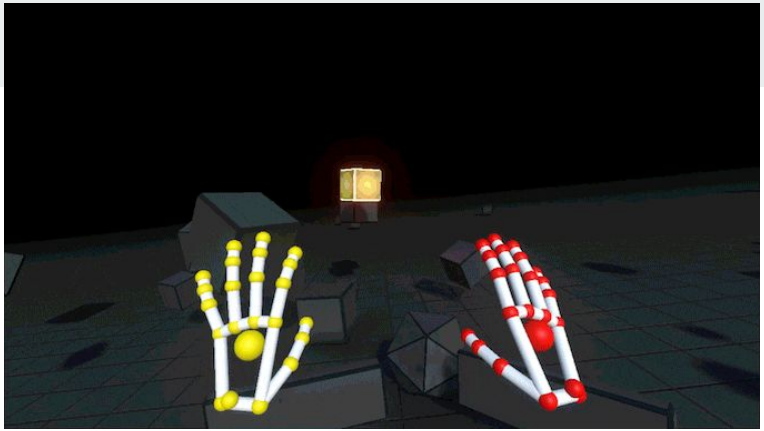




Radial Menu

- When the user hovers over one of the four items it should be highlighted before the user clicks on it.
- When the user creates a new shape with the radial menu, a new block of this shape should show up in the user's hand and it should be colored white or grey. By default the objects should be about 10cm wide (or whatever size works best for your VR setup).

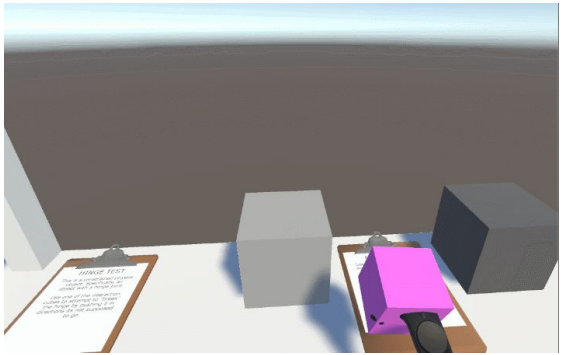




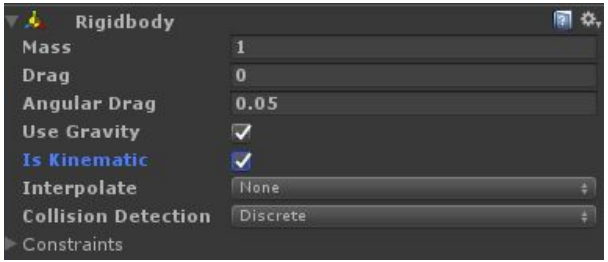
Instantiating + Placing Blocks

- Be able to place different sizes, colors, shapes of blocks
- When to instantiate?
  - When user pinch one of block type buttons in the radial menu
- Where to instantiate?
  - At the place where user release their trigger button
- How to instantiate
  - GameObject.Instantiate() and Vector3 position() or OVRInput.GetLocalControllerPosition() for lots of your interaction
- Key questions:
  - How will the user drag and drop the blocks? No overlap allowed!
  - How can you make sure the blocks has different property when created? (Color, Scale, Width, Gravity)

Manipulating Blocks



- Users should be able to move and rotate Blocks.
  - Checking UseGravity 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?



Extra Credits: Color selector

- Create a **Color selector** for proper RGB color selection with sliders or dials.
- But notices it should be on the desk like other stationary menu button

Extra Credits: sound effects

- Add **sound effects** to your application for any clicks in menus.
  - Use different **click** sounds for the radial menu and the stationary menu.
  - Adjust the **pitch** of for the dial and the slider.

Questions?

Feel free to ask on Piazza!

(Making your questions public is helpful to everyone!)