The Three Most Important Things

1. Oculus Link application for you PC (to demo VR projects).
2. Meta Quest application for your phone (to enable developer mode).
3. Enabling Enhanced Input plugin for Unreal Engine (so you can program VR input).

Guide for Getting Started in Unreal Engine with Oculus and VR Development

Setting Up Your VR Headset

- Oculus requires a specific piece of software to link to your PC. This software can be found here.
    - Be sure to install the proper software depending on the headset you plan to use/develop for. The list can be found here.
    - Additionally, some things to make note of:
        - Make sure you check your PC specifications match the requirements listed by Meta.
        - On top of the headset, it is recommended to have a Link Cable. This will make connecting to your PC easier.
            - It is a USB-C to USB-C connection, which doesn't help my USB-C-less PC.
        - Many of the embedded links on the Quest Link site led to the same purchase page. Be aware that there are purchase options for headsets, but the option you want is "Download Software."
        - The Equipment Room at Shocker Studios has all the hardware needed to complete a full setup. You can reserve equipment for future use, as well as rent out equipment to take home.
- The instructions for installing Quest Link and first powering on your Quest can be found on here.
- On startup of the Quest Link app, you will be prompted to sign in/set up an account. This can be an Oculus account, Meta account, or a Facebook account.
    - If you are using an Equipment Room headset, be sure to sign out of your account before returning.
- After your account is created, you will be asked which headset you have, and then it will prompt you with a wired or wireless setup.
    a. I followed the wireless setup route.
- Quest Link can now be activated from your settings, and you can choose which display you'd prefer!
    - If you have multiple monitors, you can choose which to display.
- To continue, enable developer mode.

Enabling Developer Mode on Oculus Quest

- Download the Meta Quest application to your phone.
- When you first open the app, it will prompt you to sign into your Meta account. Make sure you use the same account as your headset.

- The app will give you a convenient hub to control the settings of your headset, view battery status, as well as allow you to download updates and view notifications, just like the Oculus App on your PC.
- After you've signed in, it may prompt you to add a device if it hasn't already. Follow the steps to add your device.
    - If this option does not appear, go to Menu -> Devices -> Connect New Device
    - This step gave me a lot of trouble. If your phone does not connect to your headset and enables you to adjust settings, see the Troubleshooting section below.
- To enable Developer Mode for your connected headset, go to Menu -> Devices -> Headset Settings ->Developer Mode. Turn it on.
- This will enable you to demo VR projects in your game engine of choice.
- Article detailing the steps to enable developer mode: https://aixr.org/insights/how-to-enable-developer-mode-on-oculus-quest-2/
- You may be prompted to create a Developer Account by Meta.
    - Here's the signup link: https://developer.oculus.com/sign-up/
    - The School of Digital Arts has already created a developer account. The name is Shocker Studios.
        - *I do not know who has the password to it. I had to create my own for this report.*
        - *Apparently, Meta allows developers to create multiple temporary accounts as needed for testing projects. That could be neat.*

Starting A New Unreal Engine Project in VR

- Now that Quest Link is set up and developer mode is enabled, let's open Unreal Engine through the Epic Games Store.
- This guide will primarily be focused on UE 5.
- You'll get the option to choose between templates between several categories. The ones you've used before are probably in the "Games" section. The VR templates, however, are in the "Simulation" section.
    - You'll have three different template options:
        - Simulation Blank – blank canvas development using C++ or blueprints.
        - Handheld AR – Augmented reality development specifically for Android and iOS devices.
        - Virtual Reality – Blueprint-based VR development for all platforms, including mobile. There's also the option to include Unreal Engine starter content.
    - Since the most customization can be found in the third, that will be the one I select.
- To preview projects, select the Play Mode Options and Settings.
    - Instead of playing from the selected viewport (which is the default option), choose "VR Preview."
    - If this option is grayed out/inaccessible, be sure that your headset is in developer mode. The easiest way I found out how to enable this is through the settings on the mobile application.
- Some Additional notes:

    - This template uses Enhanced Input Systems Plugin for most actions the player can take. Make sure it is enabled.
    - The VR Pawn blueprint included in the Starter Content is the basic player controller.
    - The process for Unreal Engine 4 has a few key differences:
        - VR is more flexible outright than UE5.
        - The VR templates are not in their own category. Instead, they've all been grouped in with the "Games" category.
        - There is no blank VR template. Instead, there is a Vehicle Advanced template for developing driving games from multiple perspectives. All other templates are in UE5.

Demoing and Playing a Game Build Using Meta Quest

Tidbits I need to revisit

https://www.youtube.com/watch?v=nixc8NF_97s

Troubleshooting

- My framerate is dropping.
    - This could be the cause of several processes not being enabled or corrected. Let's go through them.
    - First, let's check the settings in our Oculus Link PC application.
        - Go to Settings -> General
        - Adjust the Bandwidth Limit to more accurately suit the capabilities of your network.
        - Disable App Downloads While Using VR.
        - Disable Automatic App Updates.
        - Adjust the Bandwidth Limit While Using VR to reflect the capabilities of your network more accurately. This solution only applies to Air Link.
    - If none of the above steps work, check the battery level of your headset. Like many hardware, performance drops when the battery gets too low and is forced to optimize processes.
- Nanite and Lumen are displaying errors/not enabled.
    - Nanite and Lumen are currently not supported for VR development.
- Oculus cannot recognize the application you are trying to demo.
    - This only happens if you are trying to simulate your project demo in VR from the Unreal Editor.
    - To fix this, in the Oculus Link application on your PC, go to Settings -> General -> Unknown Sources -> Enable.

    - Now you will be able to play your VR games!
- VR projects cannot be edited.
    - Ensure the Enhanced Input plugin is enabled. This plugin is essential for all VR development in Unreal Engine, as it allows the developer to program and implement VR inputs for a variety of headset hardwares.
    - In the Unreal Editor, with the desired project open, go to Edit -> Plugins -> Search -> Enhanced Input -> Enable
    - Restart the Unreal Editor for the changes to take effect.
- Your phone cannot connect to the Quest VR headset to enable developer mode.
    - Article discussing the problem: https://stealthoptional.com/how-to/how-to-fix-oculus-quest-2-not-pairing-to-phone/
    - Possible solution steps:
        - *These steps will assume you have already installed the necessary Meta Quest application for your mobile device.*
        - Ensure your phone and your headset are connected to the same network.
        - Check your headset and your Meta Quest app for updates.
        - Uninstall, then reinstall the Meta Quest application on your mobile device. Retry the connection process.
        - Repair your headset to your phone from the Meta Quest app.
            - In your headset, open the Settings application. Go to System -> About -> Pairing Code.
            - In the Meta Quest app, go to Menu -> Devices -> Elipses menu -> Connect new device -> Quest 2
            - It may take a few minutes, but a screen asking for a pairing code should appear.
            - Input the pairing code found from the Meta Quest headset settings into your Meta Quest mobile application.
        - Factory Reset your headset.
            - Hold down the power button and the volume down button until the blue Meta logo appears. Release the buttons as soon as possible.
            - Using the volume buttons as instructed in the boot menu, navigate to Factory Reset.
            - Click yes. This will completely wipe the headset of all data, prompting you to restart the setup of the headset.
            - As soon as the system has successfully rebooted, you will be able to connect your mobile device to the headset using the Meta Quest application, and it will assist you in the setup of your rebooted headset.
                - The pairing code from earlier steps will appear on the startup screen.
            - *This is the solution that worked for me, but it is likely because my profile was not the administrator profile. If you borrowed a headset from the Shocker Studios equipment room like I did, it is very likely to have a previous user's profile still on it. Go ahead and factory reset the headset.*