Downloads

Time to complete
30-45 minutes

Requirements
Computer running either MacOS or Windows
iPhone/iPad running iOS 12.0 or later

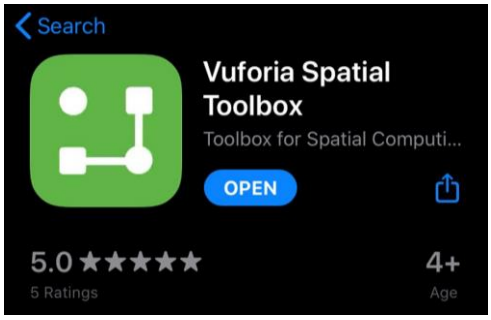
Font Notes:

- All code to be typed in Terminal/Command Prompt is designated by `text following this convention`
- All important notes are in ***bold italics***
- All folder names are in *italics*
- All file names are underlined
- All buttons that need to be clicked are in "quotations"
- All section headers are **bold**
- All references to other portions of the project are **bold and underlined**
- Hyperlinks are blue and underlined

Getting Started
This page will give detailed instructions about downloading the software necessary to complete this project. Each software download is linked directly to where the download can be found.

Vuforia Spatial Toolbox
Vuforia Spatial Toolbox has two components to it: the Vuforia Spatial Edge Server and the Vuforia Spatial Toolbox application. View "Differentiating between the Vuforia Spatial Toolbox app and Vuforia Spatial Edge Server" video for further explanation between the two parts of the Vuforia Spatial Toolbox.

> **Vuforia Spatial Toolbox App**
> Download the Vuforia Spatial Toolbox App through the App Store. Visit the Download section of the Vuforia Spatial Toolbox website to see a list of compatible devices. This app interacts with the spatial environment of Vuforia Spatial Toolbox via an iPhone/iPad.

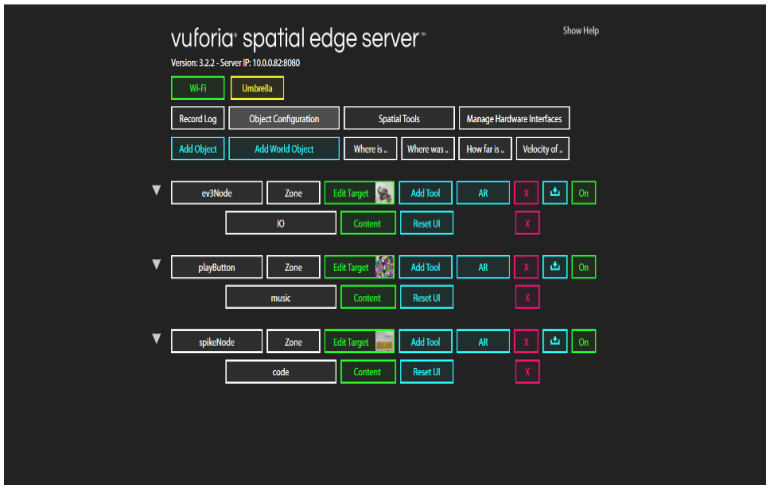


Troubleshooting note: iOS 14.0 may sometimes cause issues with connecting using the Vuforia Spatial Toolbox app. To fix this issue, follow these steps:

1. Go into the iPhone/iPad Settings
2. Scroll down and click on "Toolbox"
3. Toggle the switches for local network and cellular data on and off

Vuforia Spatial Edge Server

The Vuforia Spatial Edge Server provides a web interface for connecting and configuring the environment that is viewed in the Vuforia Spatial Toolbox app. This server can edit image targets and spatial tools, as well as manage the hardware interfaces that can be interacted with. The server needs to be running on a computer to connect the LEGO SPIKE Prime to the Vuforia Spatial Toolbox App. Mac and PC instructions for downloading the server from GitHub are listed below, as they have slightly different download methods.



Git (Optional)

Git is a distributed version control system which allows users to make changes to code before actually implementing them. In this case, it provides a shortcut for downloading the Vuforia Spatial Toolbox from GitHub. This download is not required, as a zip file of the documents can be downloaded from GitHub, but it will speed up the download process.

4. Use the link in the header of this section to go to the Getting Started page for Git. Scroll through this page and find the instructions for downloading Git.
5. Download Git with all default settings
6. Type `where git` if using Windows Command Prompt or `whereis git` if using Mac Terminal. ***If an error is received saying that "git is not recognized as an internal or external command, operable program or batch file" refer to the instructions below***
    - To make sure Git is downloaded, follow these steps from Stack Overflow:

    Modifying PATH on Windows 10:
        - In the Start Menu or taskbar search, search for "environment variable".
        - Select "Edit the system environment variables".
        - Click the "Environment Variables" button at the bottom.
        - Double-click the "Path" entry under "System variables".
        - With the "New" button in the PATH editor, add `C:\Program Files\Git\bin\` and `C:\Program Files\Git\cmd\` to the end of the list.
        - Close and re-open the console.

    Modifying PATH on Windows 7:
        - Right-click "Computer" on the Desktop or Start Menu.
        - Select "Properties".
        - On the very far left, click the "Advanced system settings" link.
        - Click the "Environment Variables" button at the bottom.
        - Double-click the "Path" entry under "System variables".
        - At the end of "Variable value", insert a `;` if there is not already one, and then `C:\Program Files\Git\bin\;C:\Program Files\Git\cmd\`. Do not put a space between ; and the entry.
        - Close and re-open the console.

GitHub Desktop (Optional)
Desktop interface for storing any files downloaded from GitHub. Suggested for users who are not yet familiar with Git.

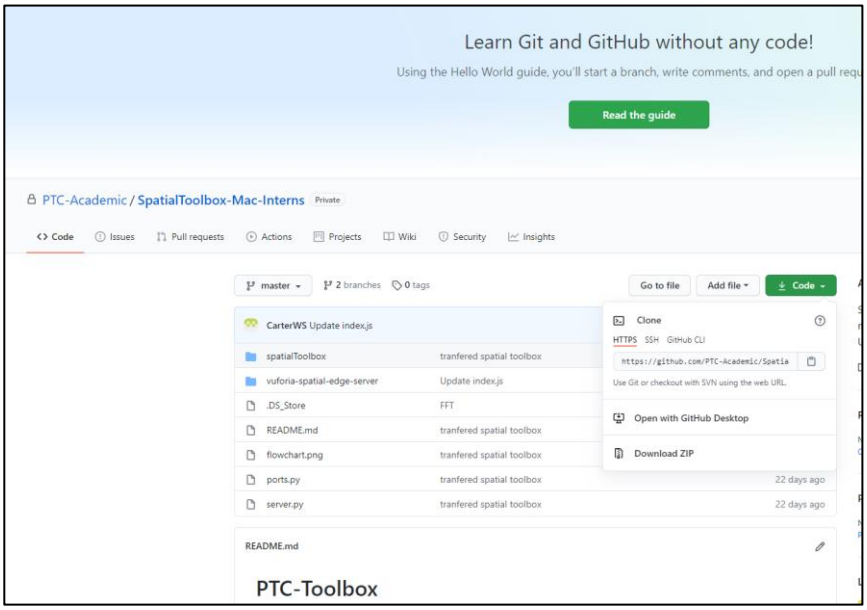
1. Download GitHub Desktop from the link in the section title
2. Open the install file that has been downloaded and start the install process
3. Sign in with GitHub account information or create an account

Downloading the Vuforia Spatial Edge Server from GitHub
GitHub is a website that provides hosting for code management and this is where all the necessary files for using Vuforia Spatial Toolbox are stored. In order to do this

project, users will need to download the *SpatialToolbox-Mac-Interns* or *SpatialToolbox-Windows-Interns* folder from the LEGO-Spatial-Computing-Project repository in the PTC Academic GitHub, as explained in the bullets below, which includes all the necessary files for running the Vuforia Spatial Edge Server. Check out ***Appendix A*** in **Appendices and Additional Resources** for a folder hierarchy explanation.

For Mac Users

1. In a web browser, go to the GitHub repository where the Vuforia Spatial Edge Server download is located: https://github.com/PTC-Academic/SpatialToolbox-Mac-Interns
2. Using Git in Terminal ***(for users experienced with Git)***
    - Use `git clone` to download the GitHub repository. This is the fastest download method, but ***Git needs to be installed*** to complete it.
        - Open Terminal. For instructions how to do this, follow the information on Apple's website.
        - Navigate to the *Documents* folder in Terminal using the command `cd Documents`
            - Information on how to navigate through folders in Terminal
        - Type in `git clone https://github.com/PTC-Academic/Spatial-Toolbox-Mac-Interns.git`
            - This step clones the GitHub repository into the *Documents* folder

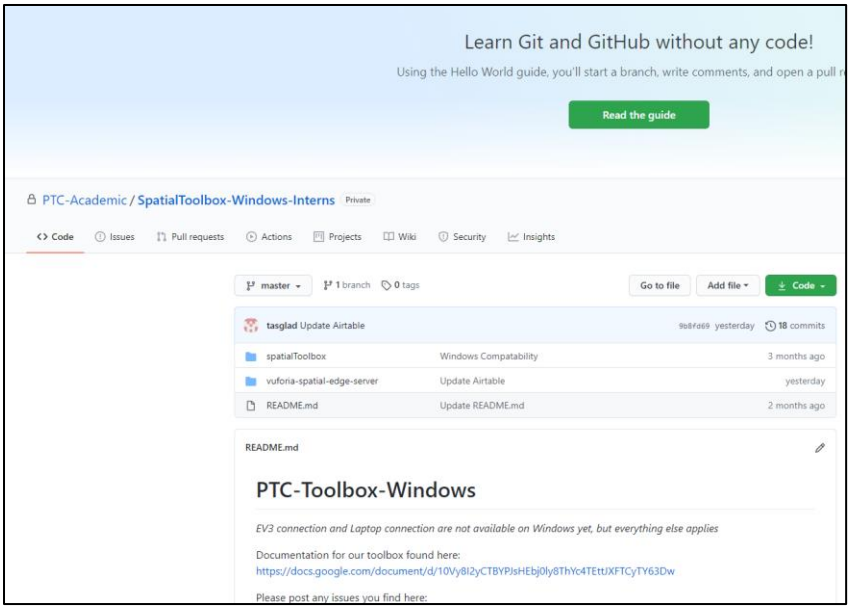


3. Using GitHub desktop
    - The "Open with GitHub Desktop" option allows a manual import of the Vuforia Spatial Edge Server folder into GitHub Desktop, ***if GitHub Desktop has already been downloaded***.

        - Selecting the "Open with GitHub Desktop" option will prompt GitHub Desktop to open
        - When GitHub Desktop opens, there is a pop-up window that prompts users to choose a location for the repository to be downloaded.
            - For consistency purposes throughout the project, choose the *Documents* folder of the computer as the location to clone the repository.
        - Once a location has been chosen, the repository will clone itself to the given location.
        - Navigate to the *Documents* folder in Finder. If there is a folder named *SpatialToolbox-Mac-Interns*, then the cloning was completed successfully.
4. Downloading ZIP File
    - For an option that does not require any additional software downloads, select the "Download ZIP" option. This will download a zipped version of the Vuforia Spatial Edge Server folder, most likely to the *Downloads* folder of the computer.
        - When the download completes, locate the file in Finder and move it into the *Documents* folder. Unzip the file if it did not unzip automatically.
5. ***The** SpatialToolbox **folder inside of the** SpatialToolbox-Mac-Interns **folder will need to be moved to sit directly in the** Documents **folder, regardless of download method. If this folder is not in the correct spot, the connection will not be properly established.***

<u>For PC Users</u>

1. In a web browser, go to the GitHub repository where the Vuforia Spatial Edge Server download is located https://github.com/PTC-Academic/SpatialToolbox-Windows-Interns
2. Using Git in Command Prompt
    - Use `git clone` to download the GitHub repository. This is the fastest download method, but ***Git needs to be installed*** to complete it.
        - Open the Command Prompt
        - Navigate to the *Documents* folder in the Command Prompt using the command `cd Documents`
            - Information about common Command Prompt commands
        - Type in `git clone https://github.com/PTC-Academic/SpatialToolbox-Windows-Interns.git`
            - This step clones the GitHub repository into the *Documents* folder

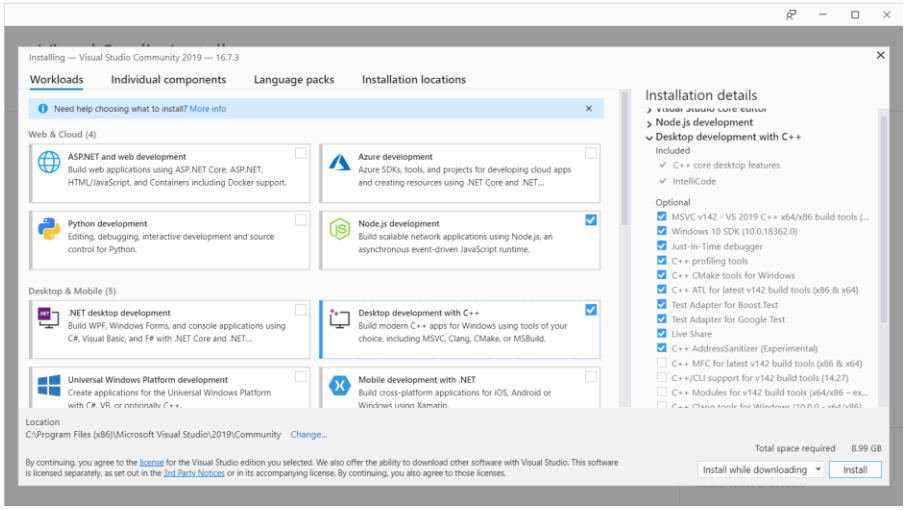


3. Using GitHub Desktop
    - The "Open with GitHub Desktop" option allows a manual import of the Vuforia Spatial Edge Server folder into GitHub desktop, if GitHub Desktop has already been downloaded.
        - Selecting the "Open with GitHub Desktop" option will prompt GitHub Desktop to open
        - When GitHub Desktop opens, there is a pop-up window that prompts users to choose a location for the repository to be downloaded.
            - For consistency purposes throughout the project, choose the *Documents* folder of the computer as the location to clone the repository.
        - Once a location has been chosen, the repository will clone itself to the given location.
        - Navigate to the *Documents* folder in Finder. If there is a folder named *SpatialToolbox-Windows-Interns*, then the cloning was completed successfully.
4. Downloading ZIP
    - For an option that does not require any additional software downloads, select the "Download Zip" option. This will download a zipped version of the Vuforia Spatial Edge Server folder most likely to the *Downloads* folder of the computer.
        - When the download completes, locate the file in File Explorer. Unzip the file and move it into the *Documents* folder
5. ***The** SpatialToolbox **folder inside of the** SpatialToolbox-Windows-Interns **folder will need to be moved to sit directly in the** Documents **folder**. **If this folder is not in the correct spot, the connection will not be properly established.***

Visual Studio 2019 (Community Edition – free)

Visual Studio is an integrated development environment for editing code

1. Download Visual Studio from the link in the section title
2. In the Visual Studio Installer, select the "Community Edition"
3. ***Make sure to check the boxes for the*** "Desktop development with C++" ***and*** "Node.js development" ***workloads when installing, as seen in the image below***



4. In the pulldown bar at the bottom right-hand corner, select either "Install while downloading" or "Download all, then install" and then click "Install". Download all, then install should be used if the internet connection that is being used is slow.
5. ***Troubleshooting note:*** The install can take a few minutes sometimes, depending on internet speed, so do not be alarmed if it does not complete the install immediately
6. The computer will need to restart after the install. Save all current work and restart the computer

Node.js

Node.js is an open source JavaScript environment that executes JavaScript code in Terminal or Command Prompt. This in necessary in order to start the Vuforia Spatial Edge Server.

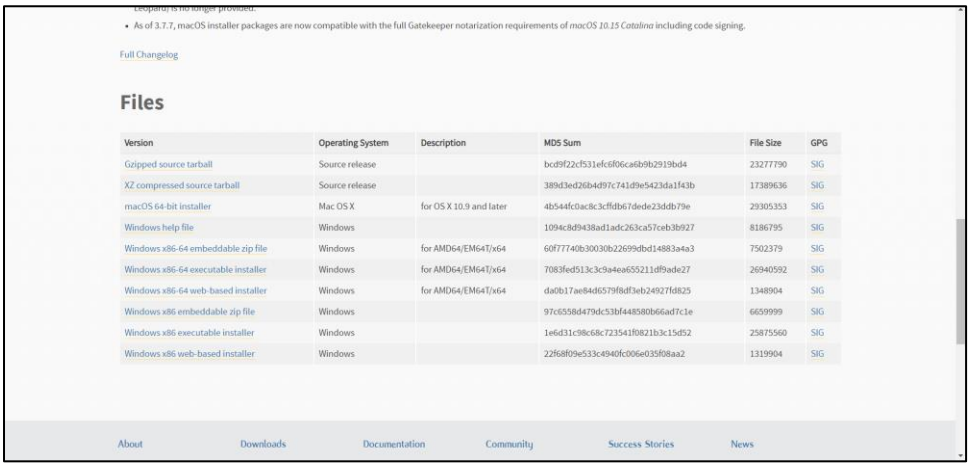
1. Download Node.js for either MacOS or Windows from the link in the section title
    - For Windows, check the box that says "Automatically install the necessary tools. Note that this will also install Chocolatey. The script will pop-up in a new window after the new installation completes."

Python 3.7

Python is an object-oriented programming language. It is used when connecting Vuforia Spatial Toolbox to the SPIKE Prime Hub. No changes will need to be made in

Python, but the software needs to be downloaded in order to run the initialize.py file in the *vuforia-spatial-edge-server* folder.

1. Follow the link in this section title to go to the download page for Python 3.7
2. Read the instructions on the page and scroll down to the different downloads at the bottom.



- As of 3.7.7, macOS installer packages are now compatible with the full Gatekeeper notarization requirements of *macOS 10.15 Catalina* including code signing.

Full Changelog

Files

Version	Operating System	Description	MD5 Sum	File Size	GPG
Gzipped source tarball	Source release		bcd9f22cf531efc6f06ca6b9b2919bd4	23277790	SIG
XZ compressed source tarball	Source release		389d3ed26b4d97c741d9e5423da1f43b	17389636	SIG
macOS 64-bit installer	Mac OS X	for OS X 10.9 and later	4b544fc0ac8c3cffdb67dede23ddb79e	29305353	SIG
Windows help file	Windows		1094c8d9438ad1adc263ca57ceb3b927	8186795	SIG
Windows x86-64 embeddable zip file	Windows	for AMD64/EM64T/x64	60f77740b30030b22699dbd14883a4a3	7502379	SIG
Windows x86-64 executable installer	Windows	for AMD64/EM64T/x64	7083fed513c3c9a4ea655211df9ade27	26940592	SIG
Windows x86-64 web-based installer	Windows	for AMD64/EM64T/x64	da0b17ae84d6579f8df3eb24927fd825	1348904	SIG
Windows x86 embeddable zip file	Windows		97c6558d479dc53bf448580b66ad7c1e	6659999	SIG
Windows x86 executable installer	Windows		1e6d31c98c68c723541f0821b3c15d52	25875560	SIG
Windows x86 web-based installer	Windows		22f68f09e533c4940fc006e035f08aa2	1319904	SIG

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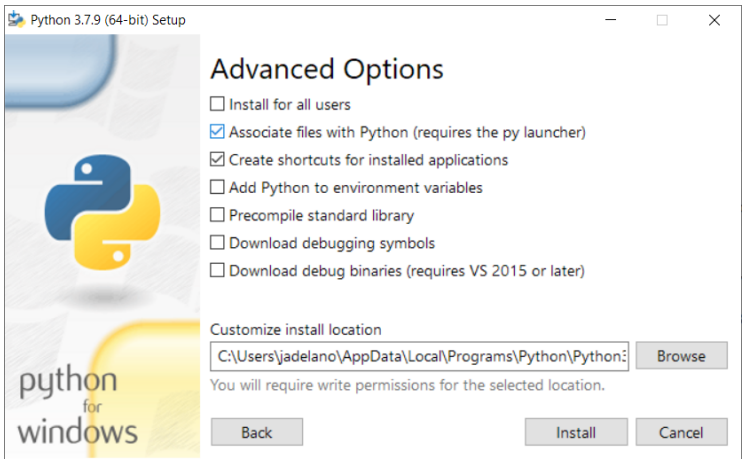
   - For computers running macOS, choose the “macOS 64-bit installer”
   - For Windows computers, choose the “Windows x86 executable installer” or “Windows x86-64 executable installer” for 64-bit machines (Support for figuring out if a computer is 32 or 64 bits)
      - Open the installer and choose the “Customize installation” option

      - In the Optional Features page, leave all default options checked off and click “Next”
      - In the Advanced Options page, set the file path for the download to be C:/Users/[Your User Name]/AppData/Local/Programs/Python/Python37 and click “Install”



LEGO Education SPIKE app

The SPIKE app can be downloaded for free and is traditionally used as the controlling interface for the SPIKE Prime. In this project, it is used only for connecting the computer to the SPIKE Prime Hub since the Prime will be controlled with Vuforia Spatial Toolbox.

1. Download the LEGO Education SPIKE app on a computer or tablet. This app will be used for connecting the SPIKE Prime to the Vuforia Spatial Edge Server in the **Connecting LEGO SPIKE Prime to Vuforia Spatial Toolbox** section of this project.