

# GrabCAD & Inventor Projects

Team 1732 uses GrabCAD, a free, cloud-based collaboration system made specifically for engineers, to share and store our CAD files. This guide will give you a simple introduction to GrabCAD and instructions on how to set up your own GrabCAD account and workspace to work with the rest of the design subteam.



Figure 1: GrabCAD's logo  
(image from SeekVectorLogo.com)

## 1 - Introduction to GrabCAD

GrabCAD allows a simple and easy-to-use cloud storage platform, with specific advantages for CAD files. The team has its own Workbench on GrabCAD, a sort of hub in the cloud which contains all of the team's files. Within the workbench, there are several projects, most for different competition seasons. Administrators, typically the subteam leads and mentors, can add individual users to projects. Then all members of a project have access to its files, allowing them to download files, make edits, and upload new files.

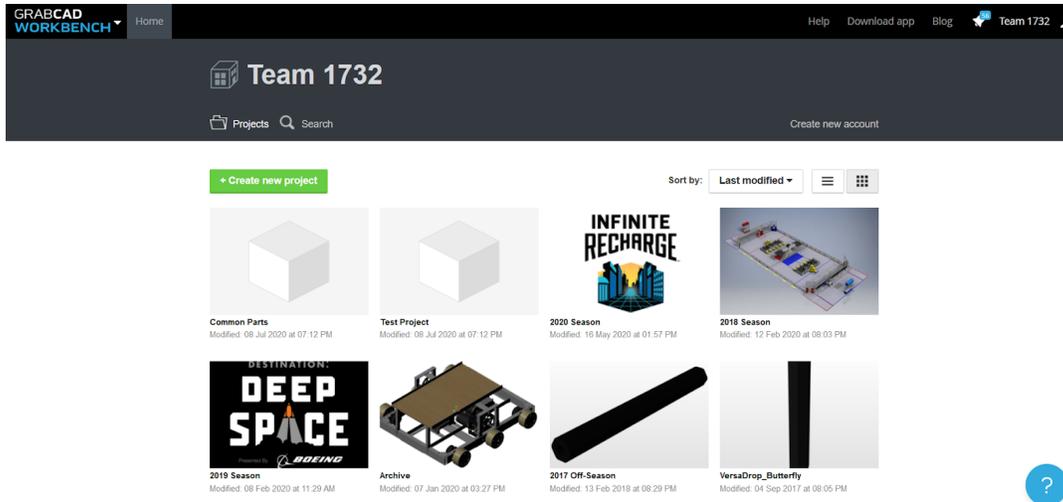


Figure 2: The Team 1732 Workbench in a web browser, showing several projects

There are two main ways to access GrabCAD: at [GrabCAD.com](https://www.grabcad.com) in a web browser and through the GrabCAD desktop app. The web browser provides the best functionality for many administrative functions: creating new projects, adding users to projects, managing file history, etc. The desktop app, on the other hand, is better for syncing local files with the cloud.

The primary way you will use GrabCAD is to sync files with the cloud every time you work. Every user has a local GrabCAD directory on their personal computer, and within it are individual directories for each project to which the user is connected. GrabCAD synchronizes files between the user's local directory and the team's Workbench, making it so that all users have exactly the same files on their own computers.

## 2 - Tutorial: Setting up GrabCAD for the First Time

If you're new to the team, you'll need to set up a new GrabCAD account and configure the necessary directories on your computer. Follow these steps to do that.

In a web browser, navigate to [GrabCAD.com](http://GrabCAD.com) (Or follow this link.)

In the top, right corner of the page, select "Log in".

This takes you to the login page. There, select the bottom option, "Create Account".

**Sign In or Create Account**

Enter email

Enter password

Sign In

f in G

or

Create Account

On the next page, enter the requested information.

Please use the email that you use for other team accounts (Slack, Google Drive, etc.) If you are a student, this is likely your school email.

Note that you will need to select a "Job Level" at the end of the page. For students, there is a "student" option. This does not affect your use of GrabCAD, but is likely for the site's internal statistics.

Finally, read the Terms of Service, Software Terms, and Privacy Policy, and click "Sign Up."

**First name**

First

First name can't be blank

**Last name**

Last

**Email**

Enter email

**Password**

Minimum 6 characters

Enter password

Password can't be blank

**Location**

Select your country

**Phone number**

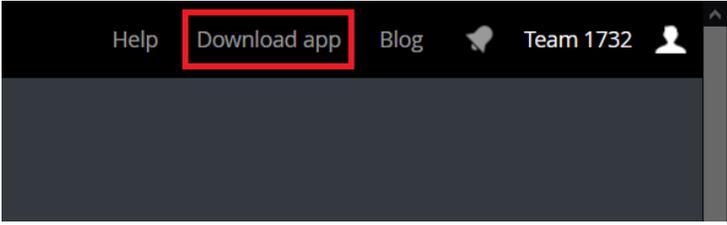
Enter phone number

**Job Level**

Select response

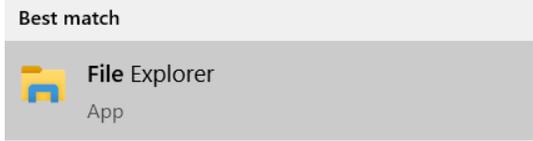
At this point, one of the GrabCAD admins will invite you to join the team's projects. Make sure your subteam leads know which email you used to create your account so that they can do this. You will receive an email with instructions to join the project. Once you have logged in and entered the project, you will be able to download the desktop app. From this point forward, you will likely use the desktop app for most things.

From the Workbench page, select "Download app" in the top, right corner. Then install the application like you would any other. Once it is installed, you will be prompted to sign in to your GrabCAD account.



Now, you will need to configure some directories on your computer to make a place to store your GrabCAD files.

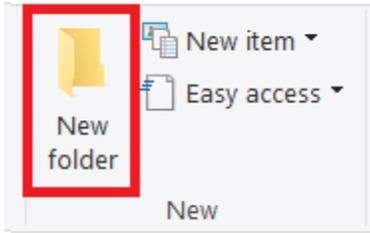
Launch File Explorer on your computer. If you don't have it on your Start menu or Desktop, you can always find it (or any program, for that matter) by pressing the Windows key and beginning to type the program's name. Select it to launch it.



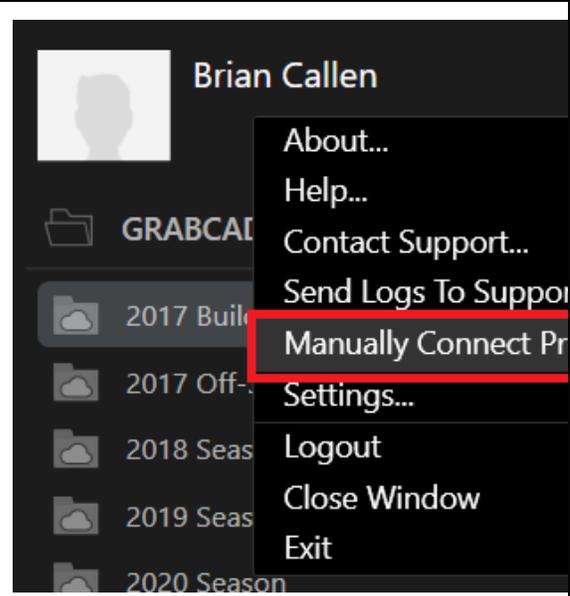
Navigate to wherever you save your personal files, specifically your robotics folder if you have one. If you don't, it is highly recommended that you create a dedicated "Robotics" folder on your computer.

Then, in that folder, create a folder called "GrabCAD". This will serve as the hub for all your GrabCAD files. You can create folders by selecting "New folder" from the Toolbar.

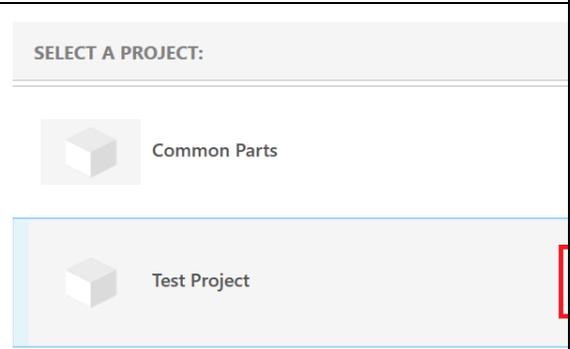
Finally, create a folder named for the project you are joining.



Then, return to the GrabCAD desktop app. Select the options menu by clicking on the gear beside your name, and then choose "Manually Connect Project..."

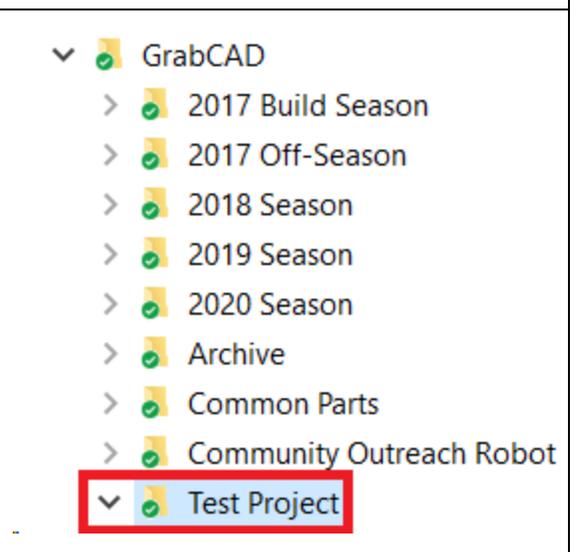


This opens a list of all the projects to which your account is connected. Choose the project you wish to add, and select "Link to Folder".

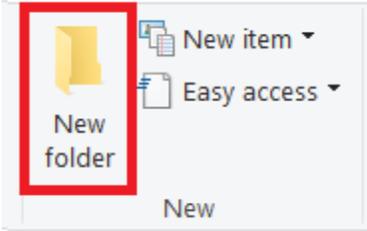
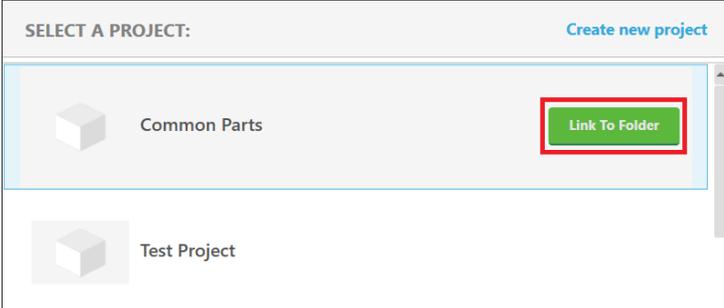


Then, in the file tree that appears, find the directory that you just made for this project. You will likely have to expand the drop-downs. Select that folder, and then click "OK" in the bottom corner.

Note that in the example image, there are many folders listed because the author of this guide is connected to all those projects. If this is your first time using GrabCAD, you should have just the one folder.



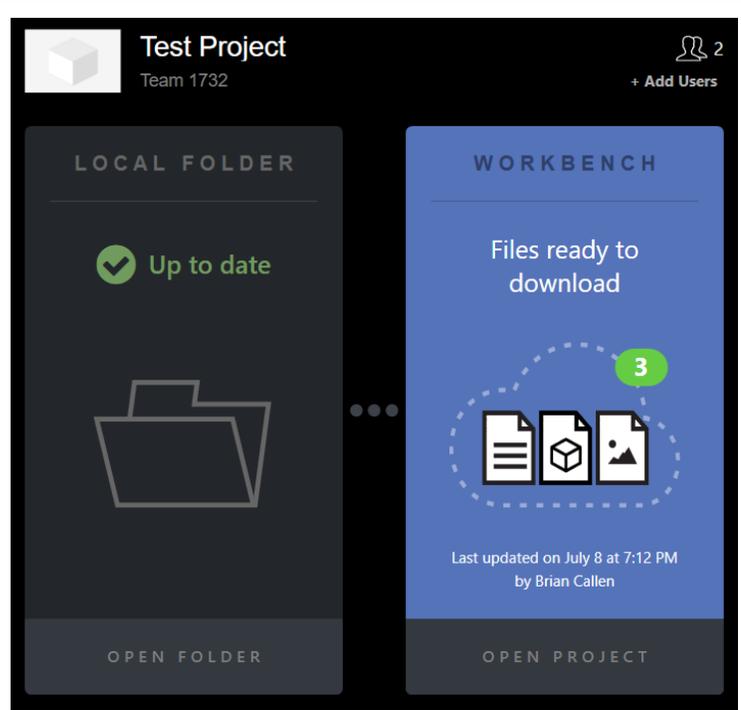
Congratulations! You now have your first GrabCAD project connected. Next, we'll connect another project, Common Parts, which serves as a library of COTS parts and other common files that the team uses.

<p>Return to File Explorer, and create a new folder called "Common Parts".</p>	 A screenshot of the Windows File Explorer 'New' context menu. The 'New folder' option is highlighted with a red rectangular box. Other options visible include 'New item' and 'Easy access'.
<p>In the GrabCAD desktop app, select "Manually Connect Project..." from the options menu again, and choose "Link to Folder" beside the Common Parts project.</p> <p>Then, select your new "Common Parts" folder from the files tree, and choose "OK" to complete the action.</p>	 A screenshot of the GrabCAD desktop application's 'SELECT A PROJECT:' dialog. The dialog shows two project entries: 'Common Parts' and 'Test Project'. The 'Common Parts' entry is selected, and a green 'Link To Folder' button is highlighted with a red rectangular box. A 'Create new project' link is visible in the top right corner.

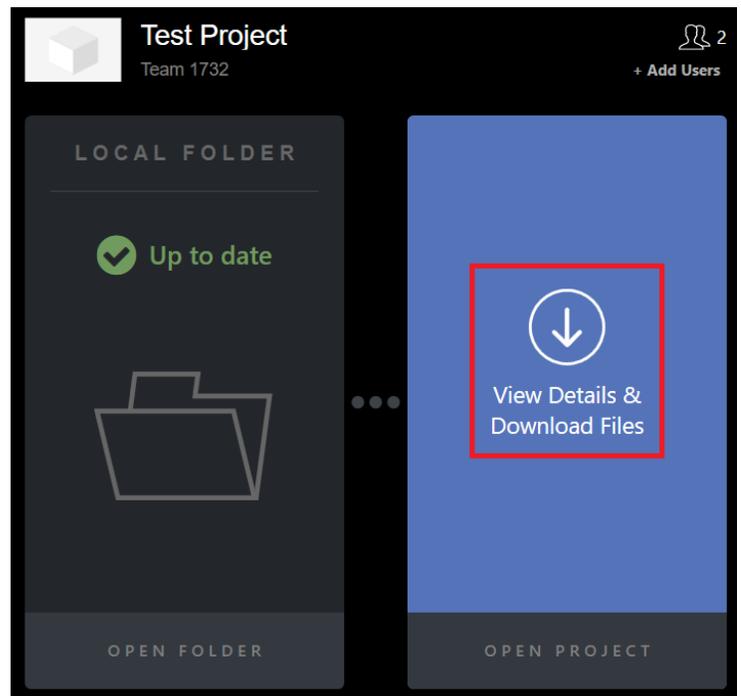
Next, you will need to synchronize your new project folders with the Workbench.

In the desktop app, select the project you want to synchronize from the list of projects on the side of the screen.

Then, in the center of the screen you will see two columns, one labelled "Local Folder" and the other "Workbench". Whenever your files are out of sync, one of these columns will appear blue. Right now, you have no local files, so only the Workbench column is blue.

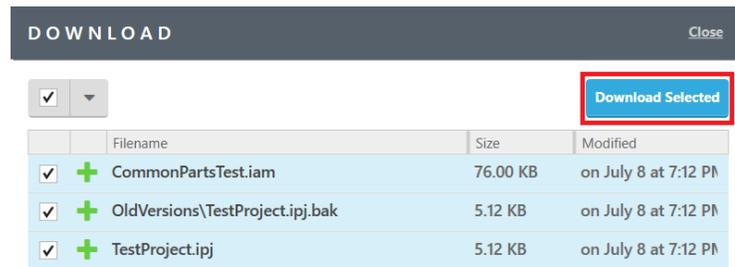


Hover over the Workbench column and its display will change to read "View Details & Download Files". Select that option.



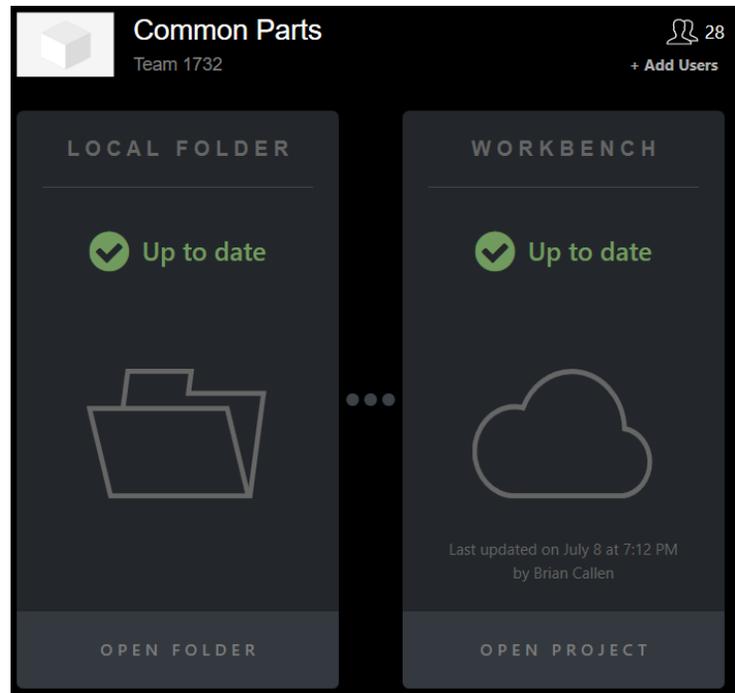
This opens a list of the files on the Workbench that are not in your local folder. By default, all of the files are selected, but you can deselect them by clicking on the checkmark.

With all the files selected, click "Download Selected" in the corner. This will initiate a download of all the files in that project.



Repeat the process for the Common Parts project. Because it contains so many files (over 1 GB,) it will likely take some time.

When you are done, both columns will show "Up to date".



At this point, GrabCAD is fully synchronized. Going forward, you will sync your files every time you start and finish working. After you work in Inventor, you will have made changes to your local files. Simply select the Local Folder column, and it will open a list of files similar to the one you used to download. Just select "Upload Selected" to upload your changes to the Workbench, where your teammates can access them. Remember, **always download all the files from the Workbench before you start working, and upload all your files to the Workbench when you finish working.**

However, you are not quite ready to work. You still need to configure the team's Inventor project that allows easy access to the Common Parts folder within Inventor.

### 3 - Inventor Projects

Although they share the same name, projects in Autodesk Inventor are different from projects in GrabCAD. In Inventor, a project is a file that designates file search paths, so that when you open an assembly, for instance, Inventor knows where to search for the part and subassembly files. To use projects in Inventor, you create an Inventor Project (.ipj) file. Then, the folder in which the .ipj file is stored, as well as all its subfolders, are the search paths for that project.

This is where we have a slight problem with our Common Parts library: if we were to make an Inventor project to go with each GrabCAD project, then none of those Inventor projects would have Common Parts within their search paths. In fact, this is what we did from 2017 through 2020, and it required us to have a copy of Common Parts within each project. But, this presented another problem: Common Parts contains over a gigabyte of files, but it doesn't change year-to-year, so having it in each year's project folder is a waste of storage space and download time. To fix this, we now use only one Inventor project for all of the team's GrabCAD work. Below is a diagram of the file structure.

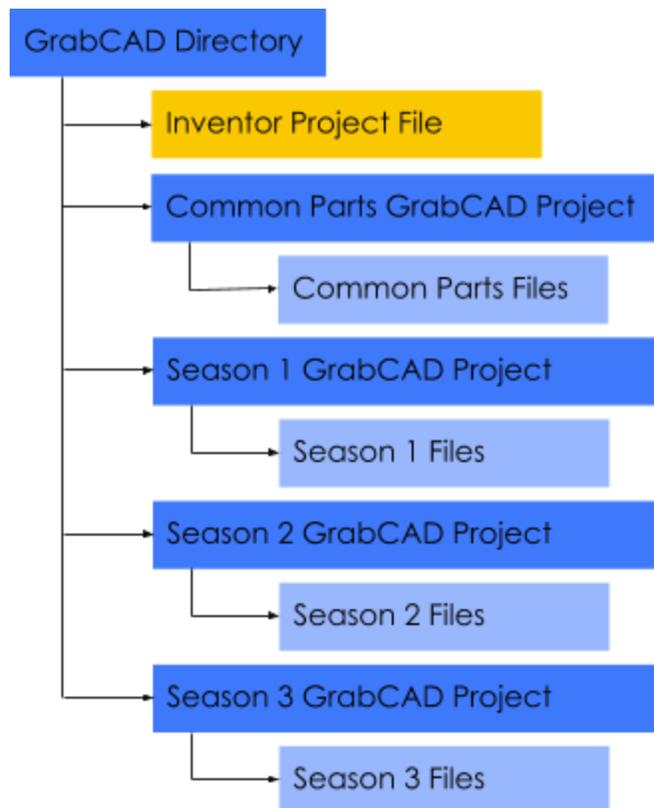
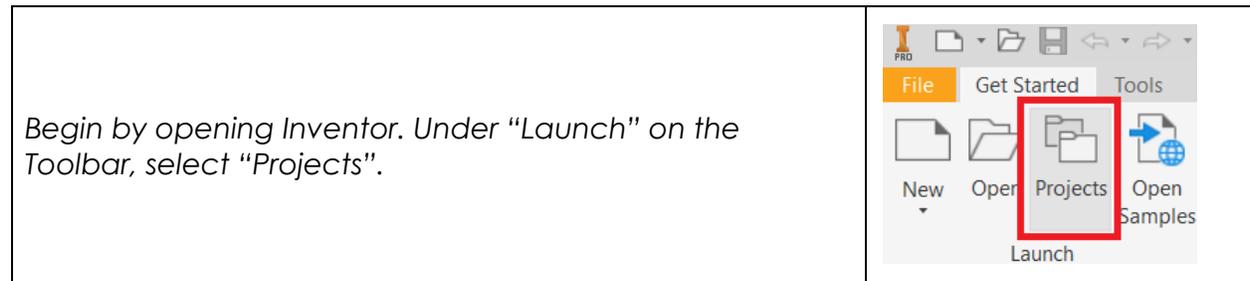


Figure 3: An example of the file tree for each user's GrabCAD directory

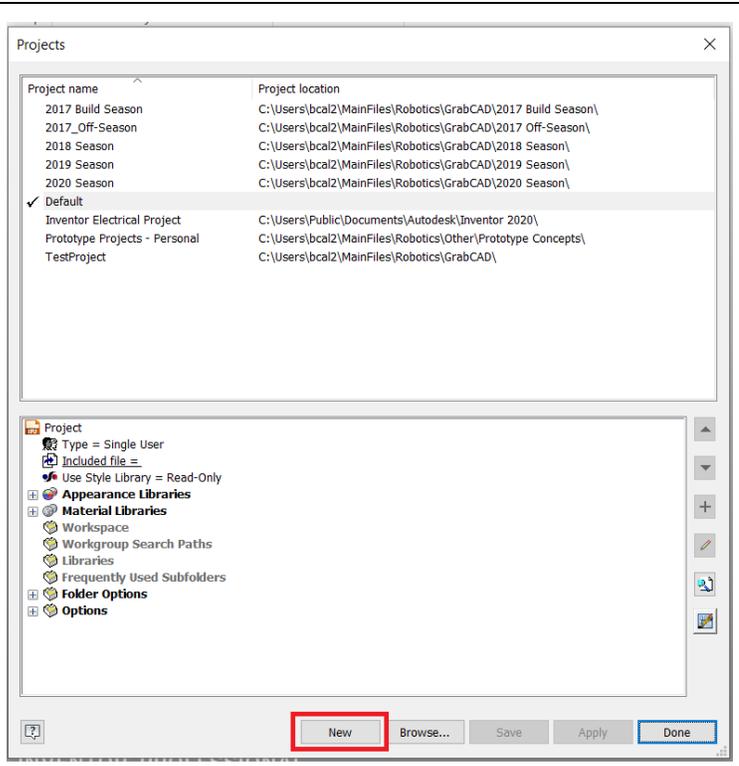
## 4 - Tutorial: Creating your Inventor Project

This tutorial will show you how to create an Inventor project to organize your CAD workspace.



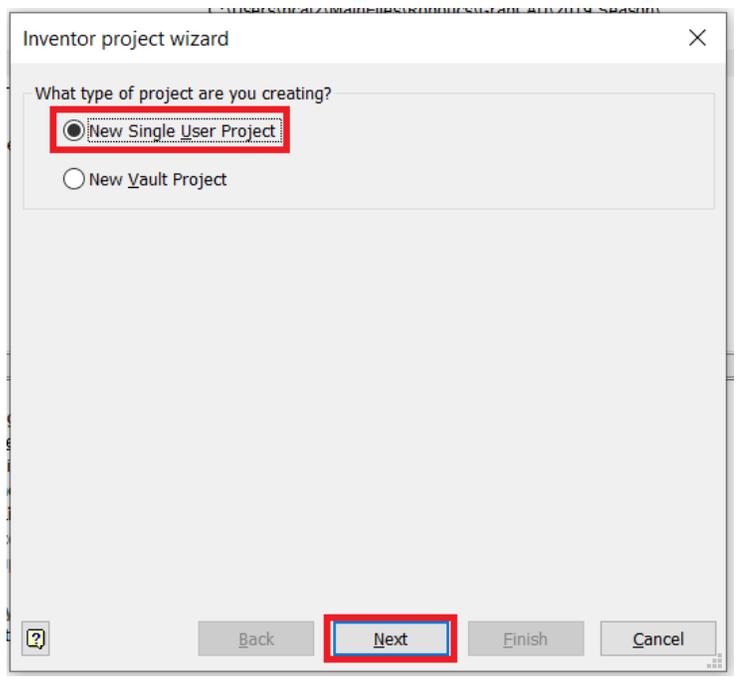
This opens the Projects dialogue box, which allows you to create and edit project files. The list in the top half of the box shows all the projects which have been connected on your computer. If you are just starting out, this is likely a short list of a few default projects. To change the active project, just double-click on one of them in the list. The bottom half has a tree that allows you to change options such as search paths and libraries. We will not need to use these options.

At the bottom of the dialogue box, select "New".



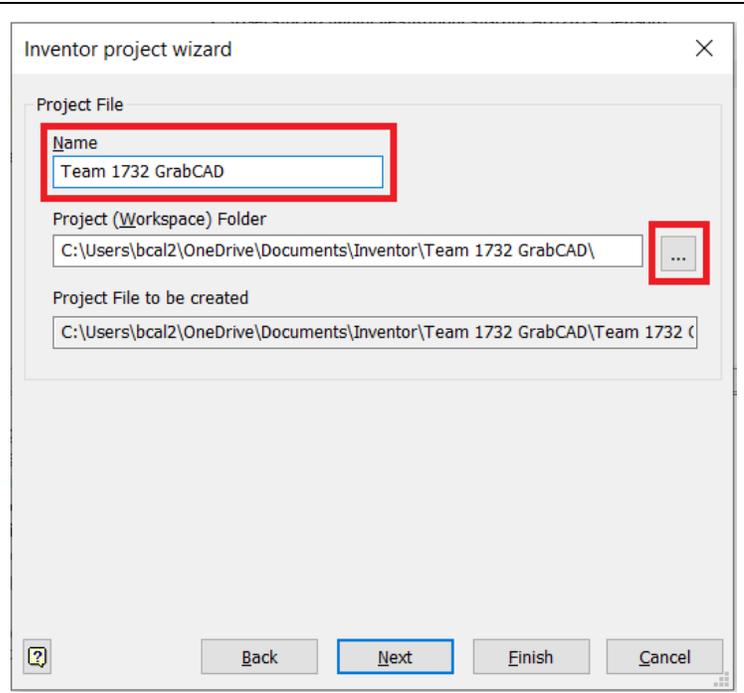
This opens the Inventor Project Wizard, which allows you to create new project files.

On the first page, make sure that "New Single User Project" is selected (it is by default,) and select "Next".

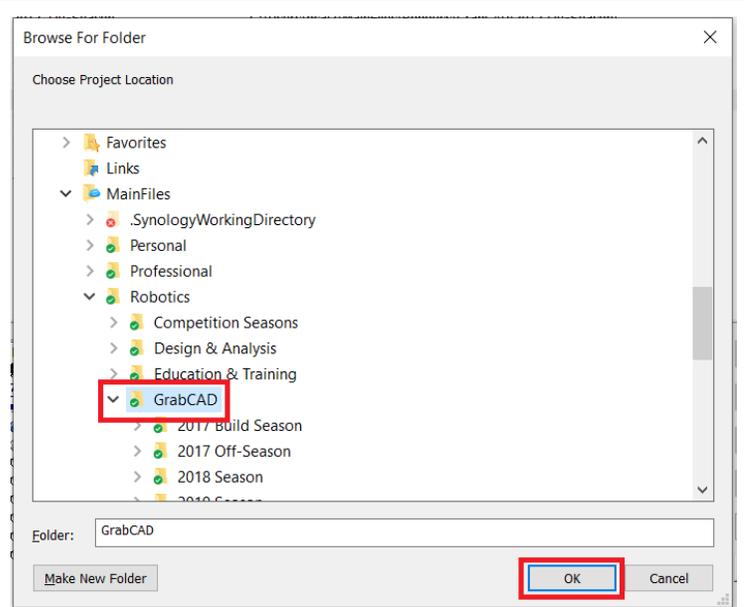


At the top of the second page, enter a name for this new project file. It can be anything, as long as you will always know what it is, but ideally it should be something descriptive such as "Team 1732 GrabCAD" or "Robotics GrabCAD".

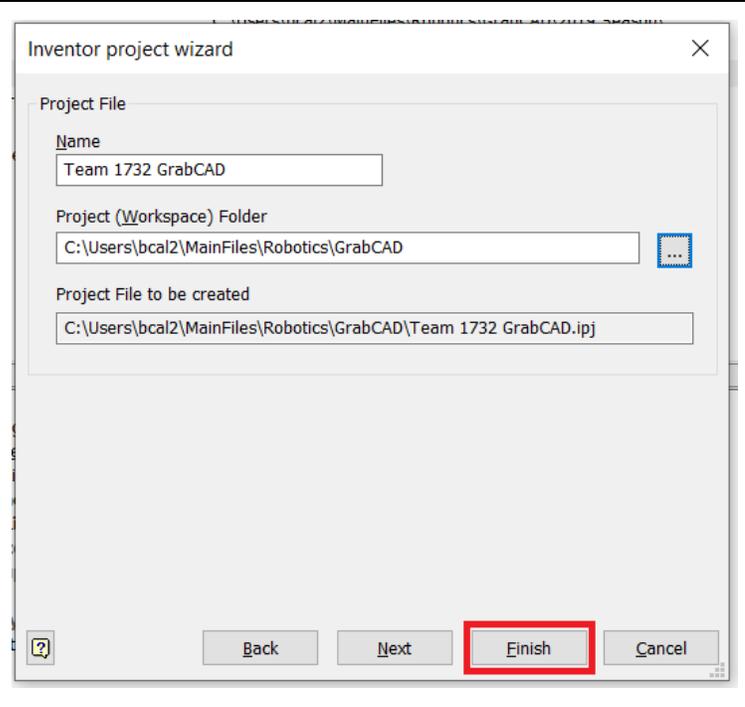
Then, select the three dots beside the "Project (Workspace) Folder" field.



In the file tree that opens, browse to find your GrabCAD folder. Select it, and then click "OK".

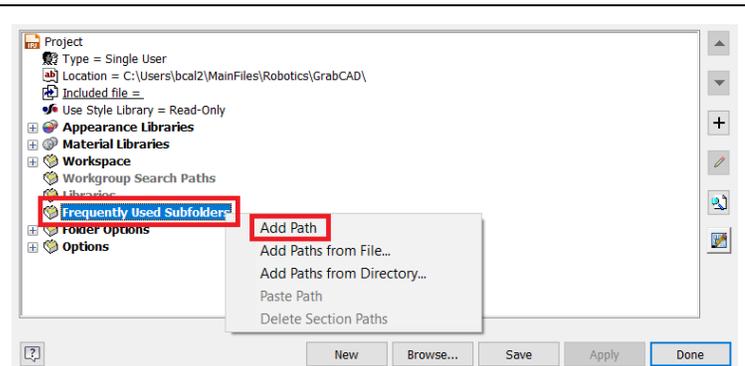


Double-check that the name and folder location are correct, and then click "Finish" to complete the operation.

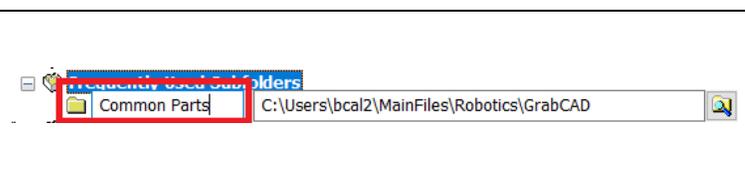


This returns you to the Projects dialogue box. You can see that the project you just made has become the active project, so if you try to open a file, Inventor will default to the GrabCAD folder, since that is where the project file is located. At this point, your project file is ready to use, but we will make a few more changes to make your Inventor workspace even easier to use.

In the lower half of the box, right-click on "Frequently Used Subfolders" and select "Add Path".

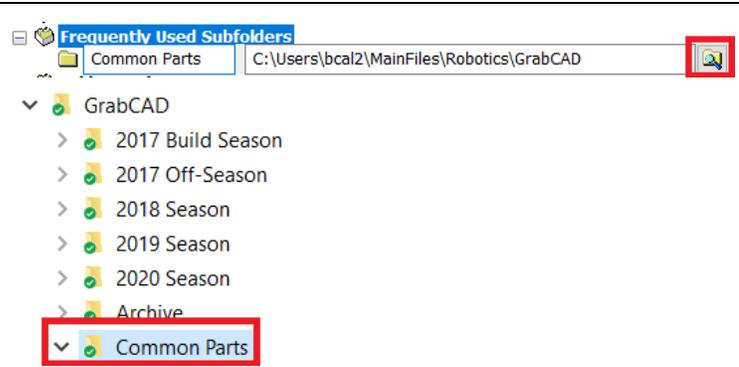


We will designate Common Parts as a frequently used subfolder, so in the first field, type "Common Parts".

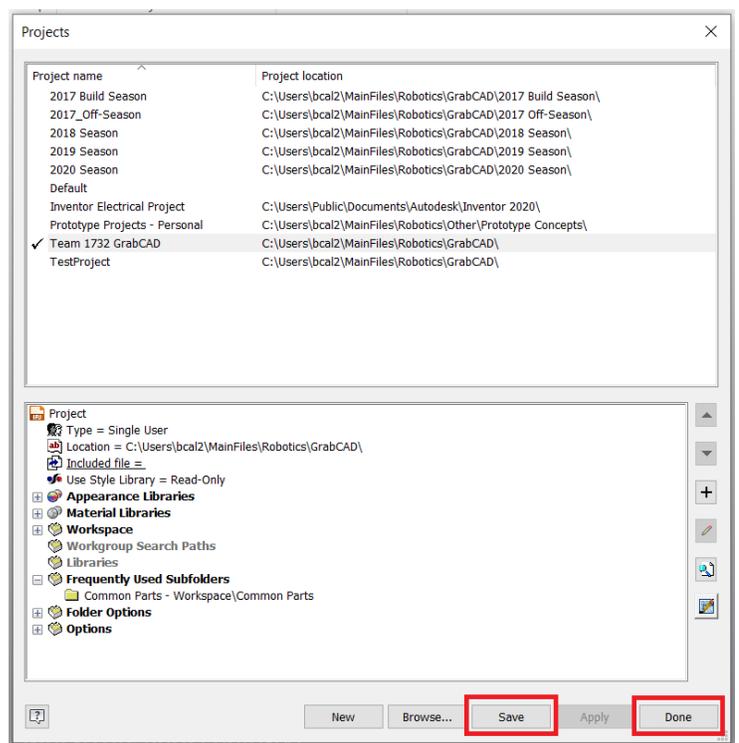


Then, select the folder icon on the right, and browse through the file tree to find the Common Parts directory, and select "OK".

Press enter to finish the operation.



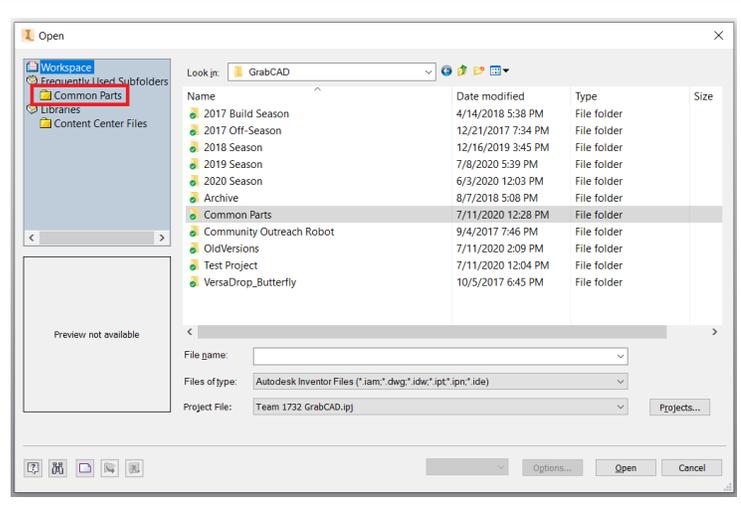
Finally, click "Save" and then "Done".



Now that Common Parts is designated as a Frequently Used Subfolder, it will be easier to find any time you browse for files, such as opening and saving files or placing components in assemblies. To see this, try to open a file.

Select "Open" from the Launch tab on the Toolbar.

By default, the browser will display the base Workspace directory, i.e., your GrabCAD directory. In the top-left corner, however, you can see a list of your Frequently Used Subfolders. In this list, select "Common Parts," and you will be taken to that folder.



Of course, here it would have been just as easy to select Common Parts from the file tree in the browser, but once you are switching back and forth between Common Parts and a folder of custom robot parts, it will be much easier to do it this way. In fact, you can make any folder into a Commonly Used Subfolder. If you were working extensively on the 2020 robot, for instance, you might want to make the folder "GrabCAD\2020 Season\Competition Robot" into such a folder so that you can switch between that and Common Parts very easily. You would just need to repeat the steps shown above to do that.

This concludes the tutorials on setting up GrabCAD and your Inventor project. You are now ready to begin working with the Team 1732 design subteam!