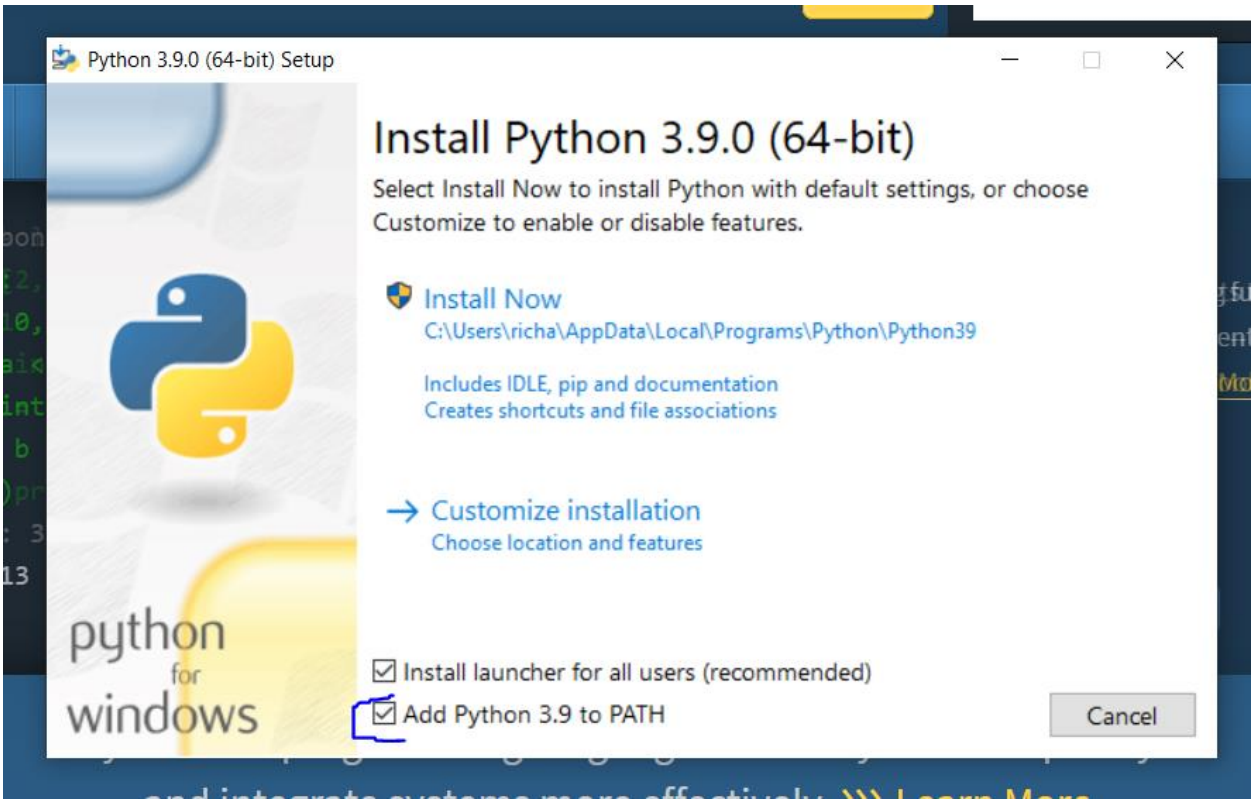
This guide from the perspective of a Windows user, so some steps could be different if you use a different OS.

Setting Up Python

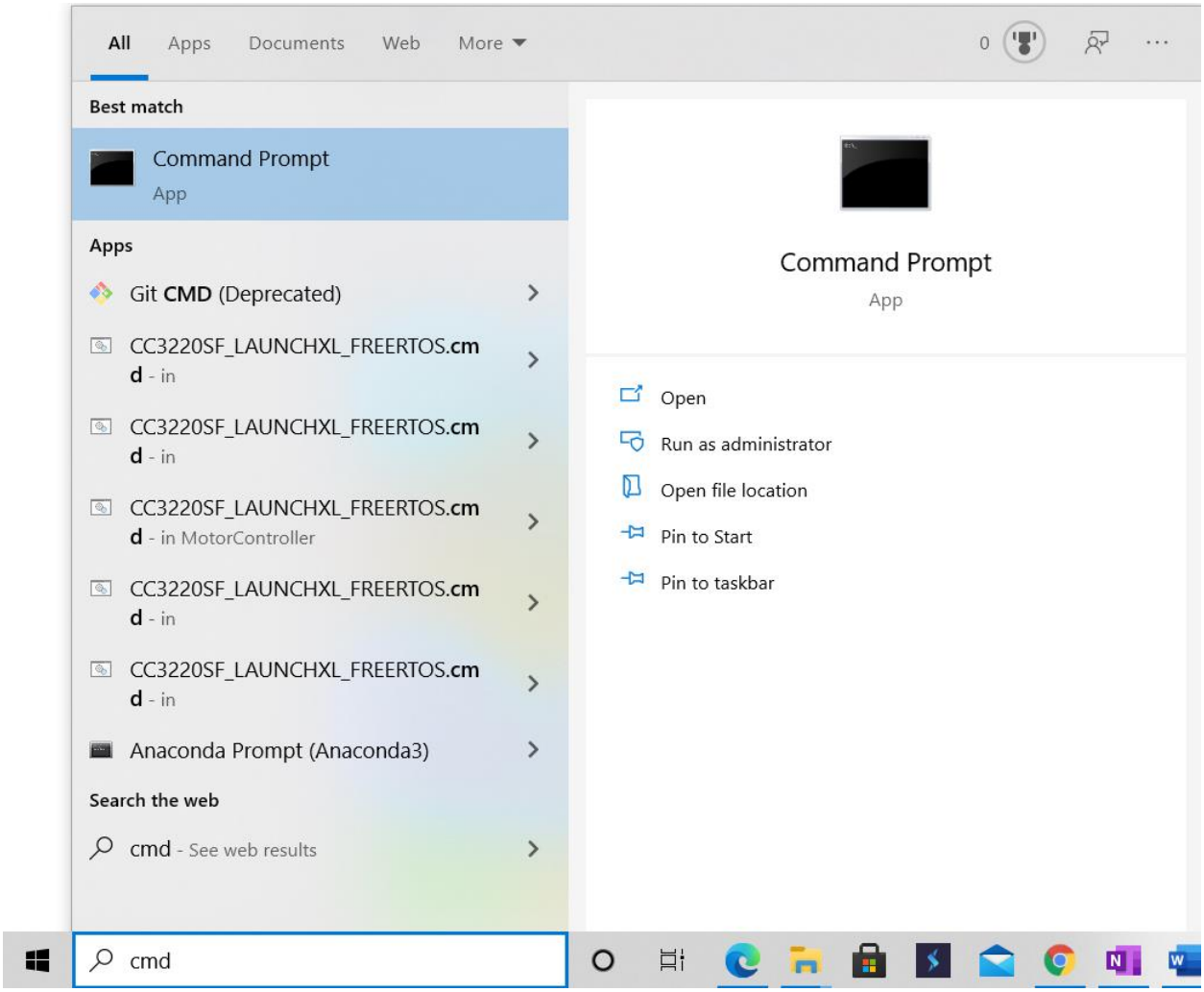
To set python up on your computer first install python from python.org

https://www.python.org/downloads/

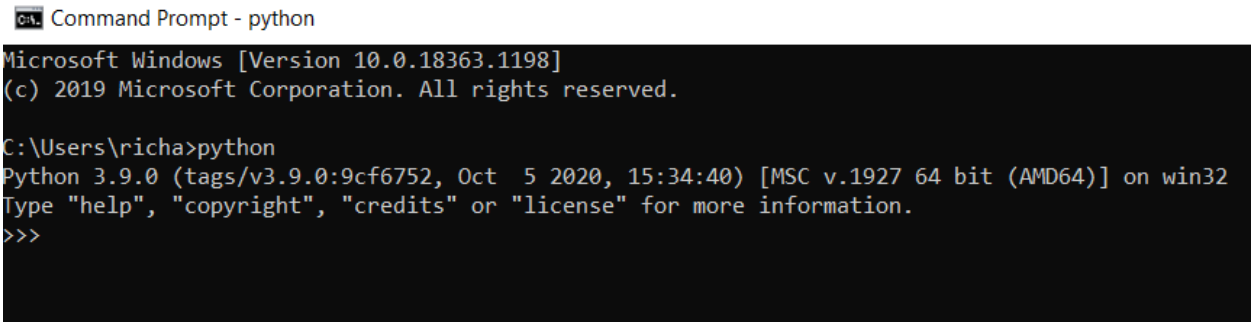
When installing, it is important to check the “Add Python 3.9 to PATH” box.



To check that python was installed correctly, open the command prompt on your computer



Then, type and enter “python”. If the installation was successful, your command prompt should look something like this



The three arrows (>>>) indicate that you are in python mode. For now, you will need to exit python mode to install modules for it. To exit python mode, type and enter “exit()”

After exiting python mode, you will need to install modules that are used in the program. These modules are, numpy, pandas, xlrd(version 1.2), and openpyxl

To install these modules, enter the following

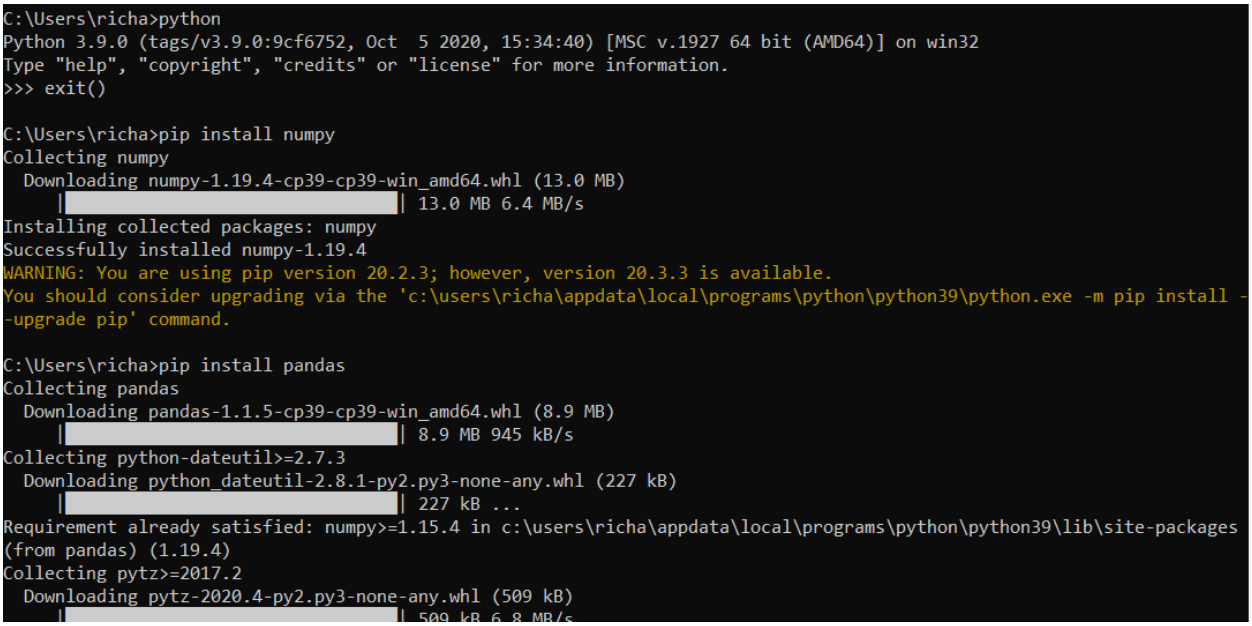
“pip install numpy”

“pip install pandas”

“pip install xlrd==1.2.0”

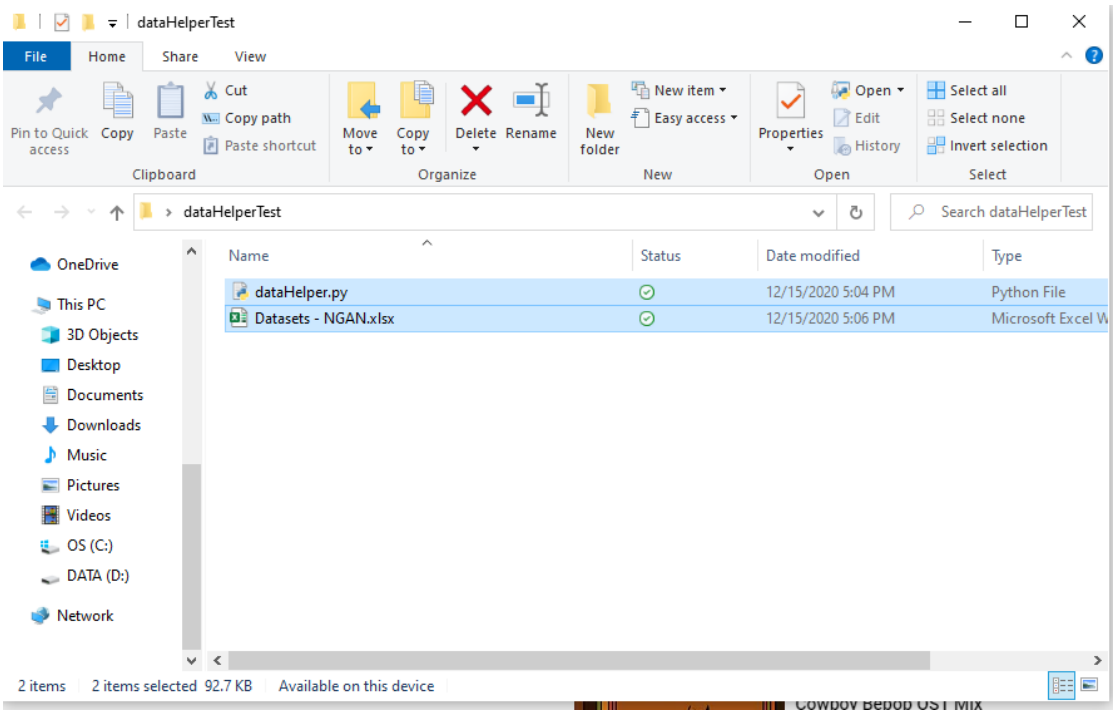
“pip install openpyxl”

The result should look something like this:

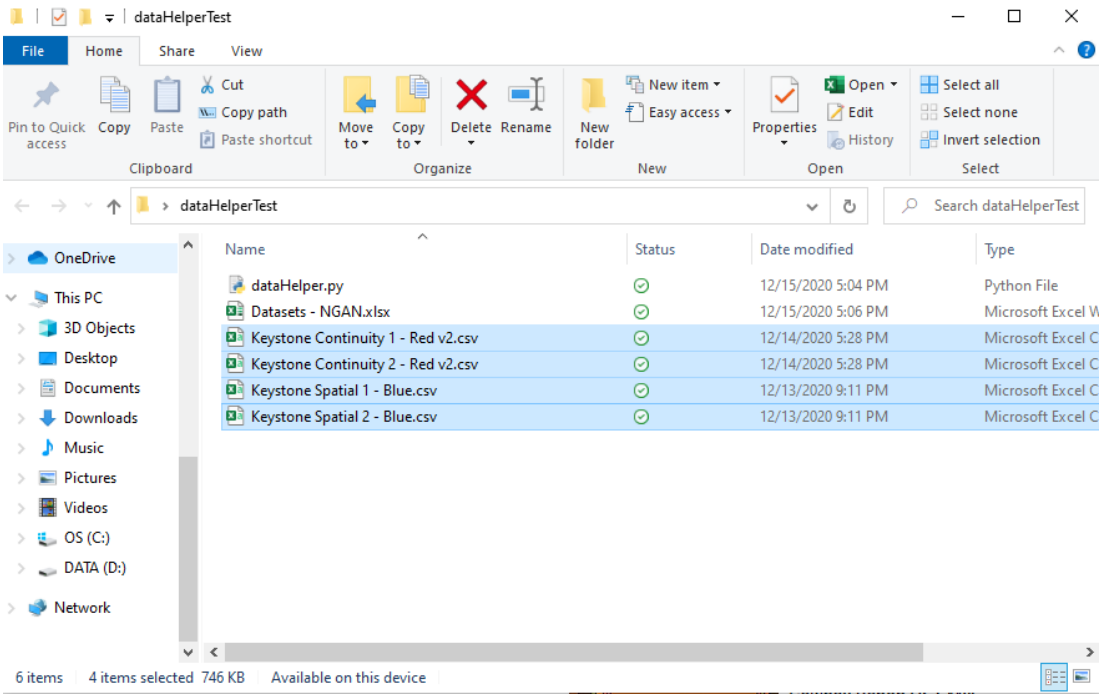


Setting Up the Script's Environment

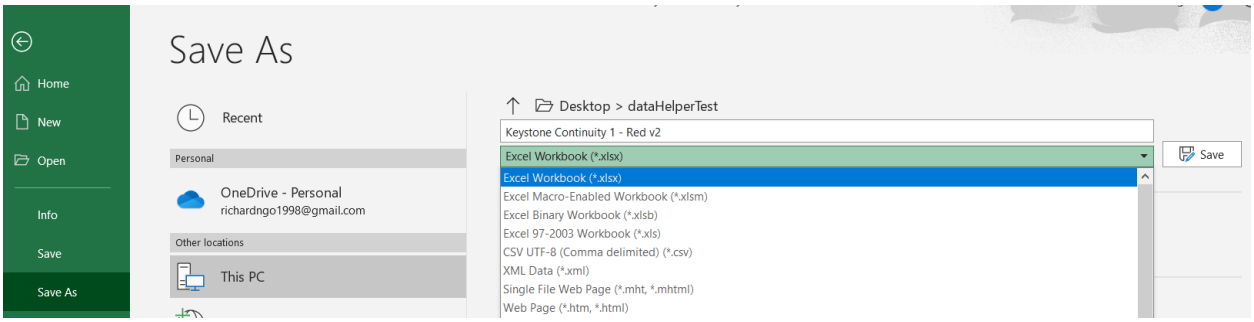
First, create a folder that you want to run the program in, and drag all the files inside the dataHelper.zip file into this folder

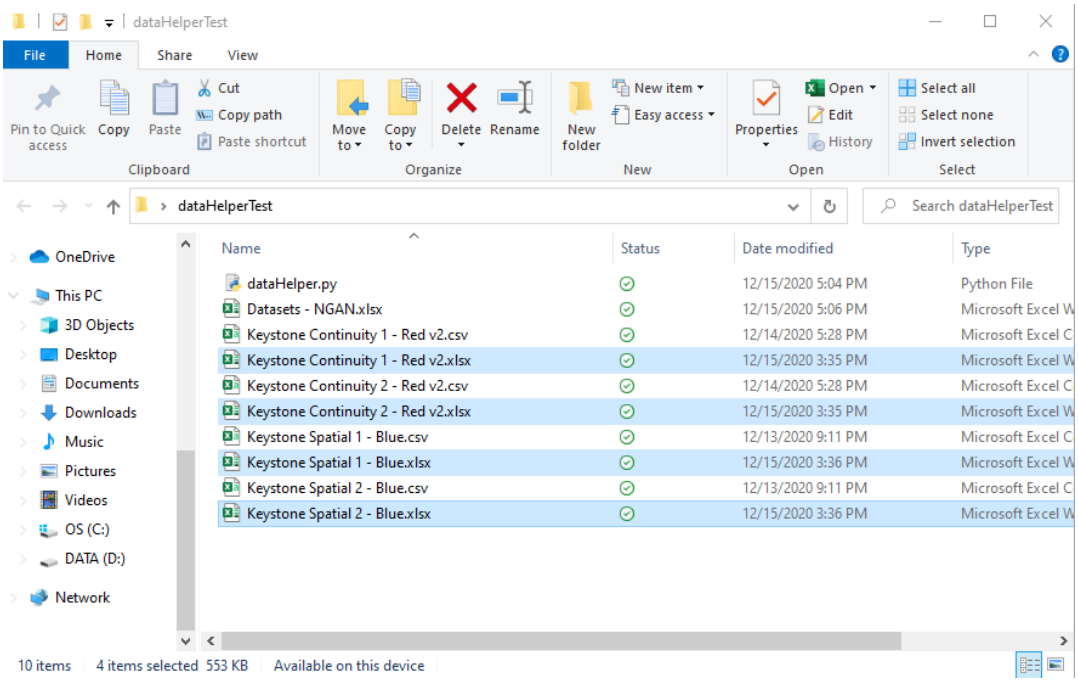


Next, drag in all the spacial and continuity files relevant to your current dataset.

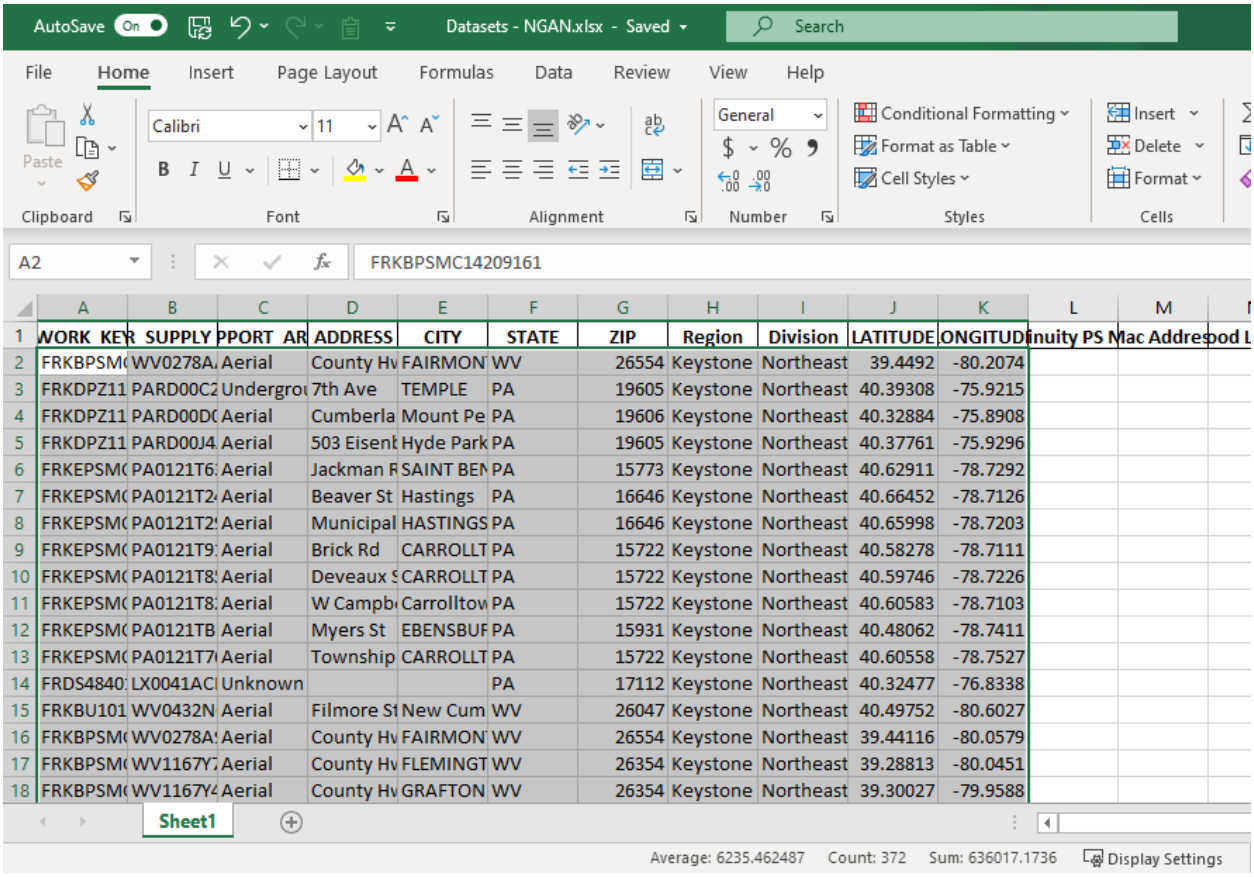


For some reason, the program sometimes has a hard time reading some files as csv files. To be on the safe side, you should resave xlsx versions of these files



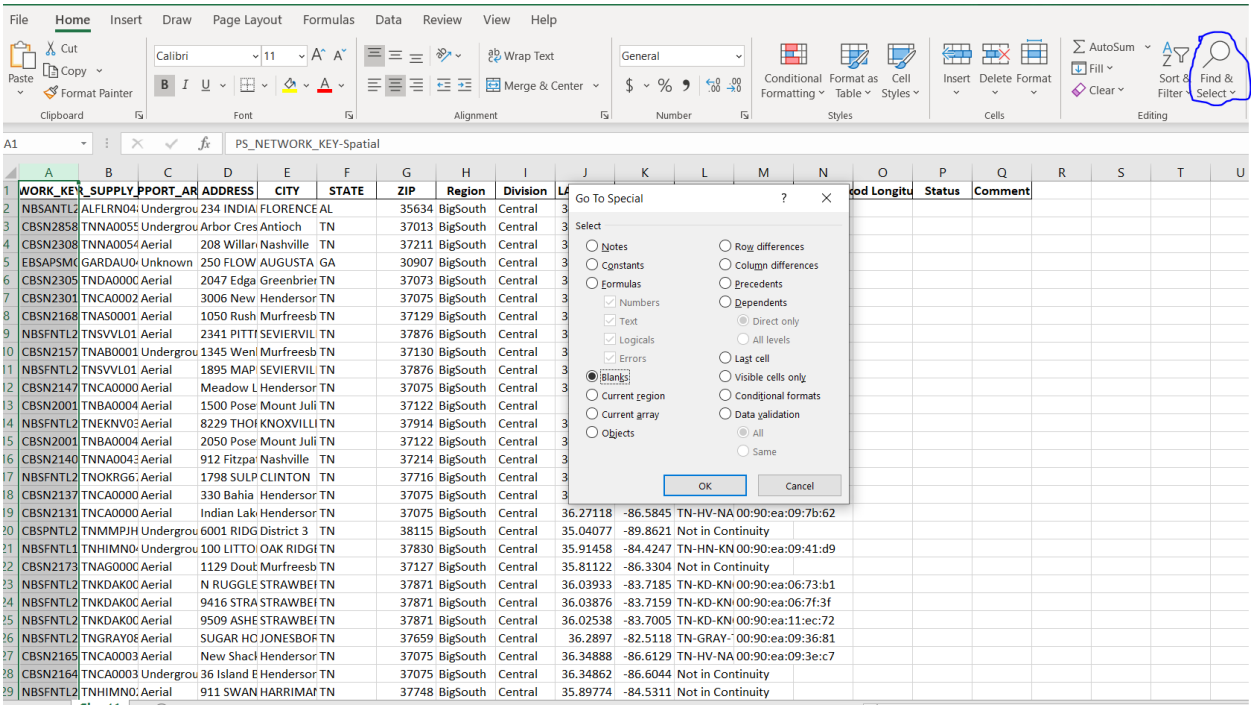


To add your own dataset in, open up the Datasets - NGAN.xlsx file, and replace the information in the dataset with your own. (The program uses the column names to understand what is what, so make sure to keep those intact)

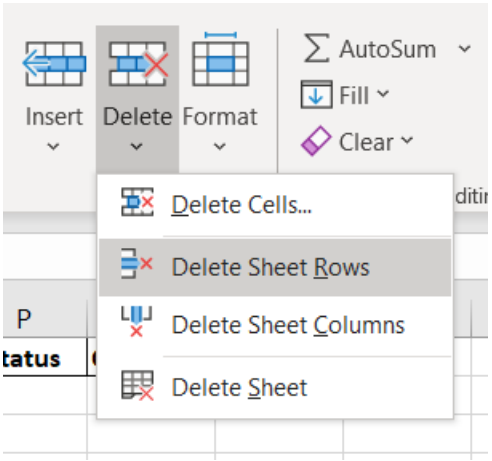


	A	B	C	D	E	F	G	H	I	J	K	L	M
1	WORK_KEY	SUPPLY	PPORT_AR	ADDRESS	CITY	STATE	ZIP	Region	Division	LATITUDE	ONGITUD	inuity PS	Mac Addres
2	FRKBPSM(	WV0278A/	Aerial	County Hv	FAIRMON	WV	26554	Keystone	Northeast	39.4492	-80.2074		
3	FRKDPZ11	PARD00C2	Undergrou	7th Ave	TEMPLE	PA	19605	Keystone	Northeast	40.39308	-75.9215		
4	FRKDPZ11	PARD00D(	Aerial	Cumberla	Mount Pe	PA	19606	Keystone	Northeast	40.32884	-75.8908		
5	FRKDPZ11	PARD00J4	Aerial	503 Eisenk	Hyde Park	PA	19605	Keystone	Northeast	40.37761	-75.9296		
6	FRKEPSM(	PA0121T6	Aerial	Jackman R	SAINT BEN	PA	15773	Keystone	Northeast	40.62911	-78.7292		
7	FRKEPSM(	PA0121T2	Aerial	Beaver St	Hastings	PA	16646	Keystone	Northeast	40.66452	-78.7126		
8	FRKEPSM(	PA0121T2	Aerial	Municipal	HASTINGS	PA	16646	Keystone	Northeast	40.65998	-78.7203		
9	FRKEPSM(	PA0121T9	Aerial	Brick Rd	CARROLLT	PA	15722	Keystone	Northeast	40.58278	-78.7111		
10	FRKEPSM(	PA0121T8	Aerial	Deveaux S	CARROLLT	PA	15722	Keystone	Northeast	40.59746	-78.7226		
11	FRKEPSM(	PA0121T8	Aerial	W Campb	Carrolltow	PA	15722	Keystone	Northeast	40.60583	-78.7103		
12	FRKEPSM(	PA0121TB	Aerial	Myers St	EBENSBUF	PA	15931	Keystone	Northeast	40.48062	-78.7411		
13	FRKEPSM(	PA0121T7	Aerial	Township	CARROLLT	PA	15722	Keystone	Northeast	40.60558	-78.7527		
14	FRDS4840	LX0041AC	Unknown			PA	17112	Keystone	Northeast	40.32477	-76.8338		
15	FRKBU101	WV0432N	Aerial	Filmore St	New Cum	WV	26047	Keystone	Northeast	40.49752	-80.6027		
16	FRKBPSM(	WV0278A!	Aerial	County Hv	FAIRMON	WV	26554	Keystone	Northeast	39.44116	-80.0579		
17	FRKBPSM(	WV1167Y7	Aerial	County Hv	FLEMINGT	WV	26354	Keystone	Northeast	39.28813	-80.0451		
18	FRKBPSM(	WV1167Y4	Aerial	County Hv	GRAFTON	WV	26354	Keystone	Northeast	39.30027	-79.9588		

Currently, empty rows will also throw the program off. To remove empty rows within the Datasets-NGAN.xlsx file, highlight just the first column (click on A), go to Home->Find & Select->Go To Special, and choose Blanks



Then go to Delete Sheet Rows to remove them.



Your environment should be set up

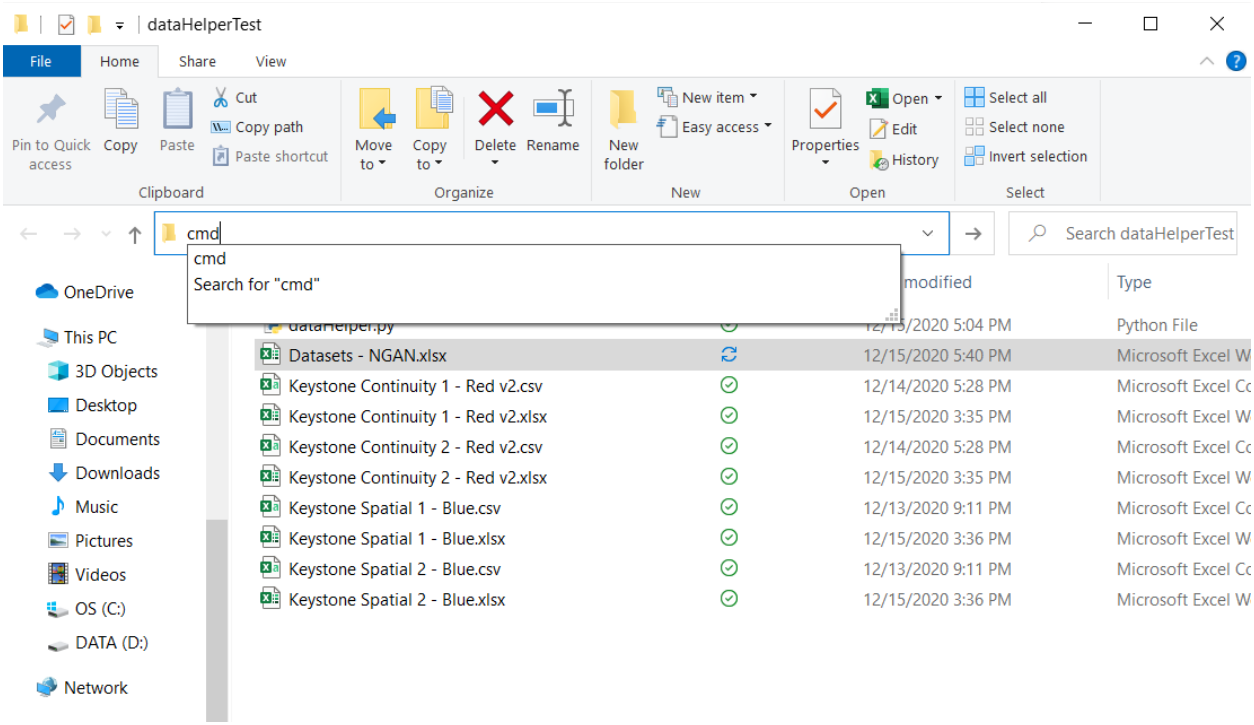
Using the Script with your Dataset

Within dataHelper.py, the only portion that needs to be changed is the Settings section.

```
10
11  import pandas as pd
12  import numpy as np
13
14  global myFile
15  global spaFiles
16  global conFiles
17  global myDB
18  global spaDB
19  global conDB
20  global KeepInput
21  global maxRange
22
23  #Settings
24  #your dataset file name goes below
25  myFile = 'Datasets - NGAN.xlsx'
26  spaFiles = ['Keystone Spatial 1 - Blue.xlsx','Keystone Spatial 2 - Blue.xlsx']
27  conFiles = ['Keystone Continuity 1 - Red v2.xlsx','Keystone Continuity 2 - Red v2.xlsx']
28
```

Open this file with notepad or any other text editor, and replace the filenames inside of spaFiles with the spatial files of your dataset, and conFiles with the continuity files of your dataset.

Now, to finally run the script, open up the folder that you are using for this program, and type and enter cmd into the file location bar to open the command prompt within your folder.



In this command prompt, enter python mode by entering “python”.

Then, enter “import dataHelper” to load the script, and then run the functions inside by entering the following:

“dataHelper.findClosestReds()” -Finds and saves the closest continuity to each spatial point

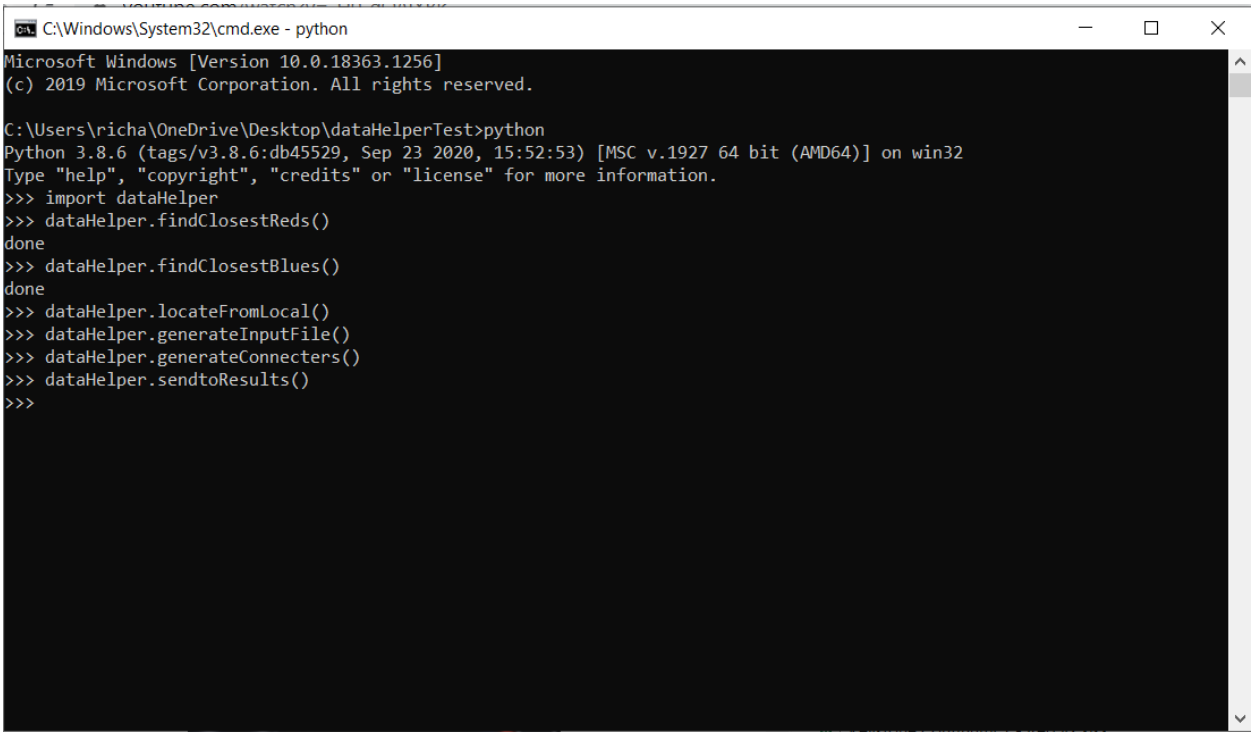
“dataHelper.findClosestBlues()” -Finds and saves the spatial closest to each continuity point

“dataHelper.locateFromLocal()” -Gets pairs for your dataset in Datasets-NGAN.xlsx

“dataHelper.generateInputFile()” -Creates a file needed for the next two functions below

“dataHelper.generateConnecters()” – Creates a kml file that can be imported to Google Earth, visually shows what pairs were predicted. (when importing, make sure you change the file filter to include all files and not just .txt and .csv, otherwise you won’t be able to see kml files)

“dataHelper.sendtoResults()” – Sends results back to the Datasets-NGAN.xlsx file



The Datasets-NGAN.xlsx file should now be updated with all the predicted pairs for your set.

Depending on how many spatial or continuity files you are using, the functions findClosestReds() and findClosestBlues() may take a while. However, these two functions only need to be run once for every set of spatial and continuity files you use.

Whenever your own dataset in Datasets-NGAN.xlsx is changed or updated, functions from locateFromLocal() and below will need to be run again.

Note: if you get an error similar to whats shown below, try using numpy (version 1.19.3) instead

pip install numpy==1.19.3