Step-by-Step Guide:

1. Install a suitable version of Python 3.x for your machine/OS from
   https://www.python.org/downloads/
   Note: If you are using Windows, please check that you dowload the appropriate version for your processor. AMD and Intel processors each have their own version of Python. You can check your system information by right clicking on "Computer" in the Start Menu and selecting "Properties".
   Note 2: Make sure the networkx folder is located in the same directory as the script, otherwise the script will not run. (Networkx is a Python module for constructing graphs, which are used to trace the relationships among the proteins in the script)

2. Find IDs for proteins of interest. The script will recognize KEGG ID, NCBI-GeneID, NCBI-GI, or Unitprot ID.

   Example: BRAF (KEGG ID = hsa:673), RAC1 (KEGG ID = hsa:5879)
   Note: KEGG ID is constructed from NCBI-GeneID by adding a 3 or 4 character organism code to the gene number. [i.e. BRAF (NCBI-GeneID = 673), BRAF (KEGG ID= hsa:673]

3. Input IDs into script when prompted.
   Example:

```
Please enter gene ID [KEGG-ID, NCBI-GENEID, or UNIPROT] : 673
Please enter gene ID [KEGG-ID, NCBI-GENEID, or UNIPROT] : 5879
```

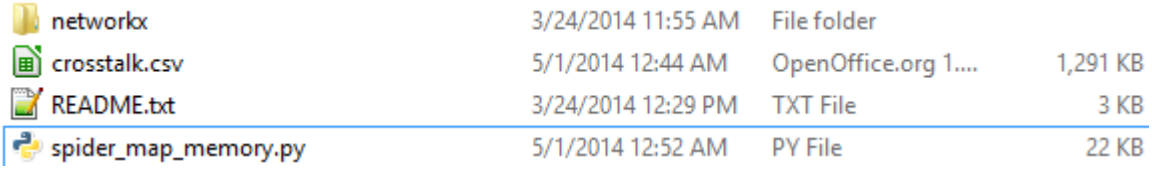
   Note: The script will attempt to validate the input ID. If you receive an error, double check that you input the ID correctly and using a supported format.

4. The script will begin to fetch and analyze data.
   Example:

```
Building data requests for hsa:673
Building data requests for hsa:5879
Fetching data for hsa:673
Analyzing data for hsa:673
Fetching data for hsa:5879
Analyzing data for hsa:5879
Finding points of crosstalk
Links:1757
```

   Note: This is the most time consuming part of the script. Expect for it to take about 5 minutes.

5. The script will output the data as a .csv file with the name "crosstalk.csv" in the directory where the script is located.
   Example:

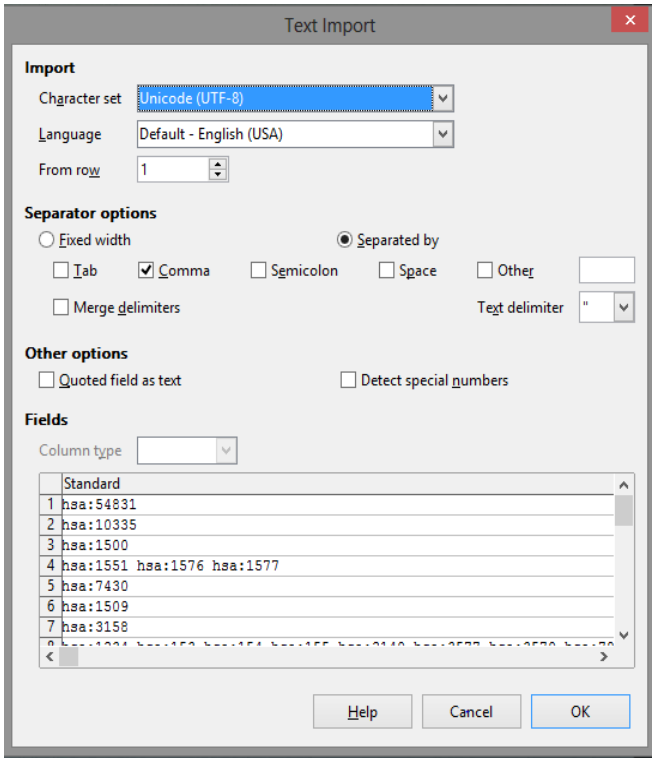


   Note: Be sure to change the name of the output file from "crosstalk.csv" to prevent your results

from being overwritten by a subsequent run of the script!

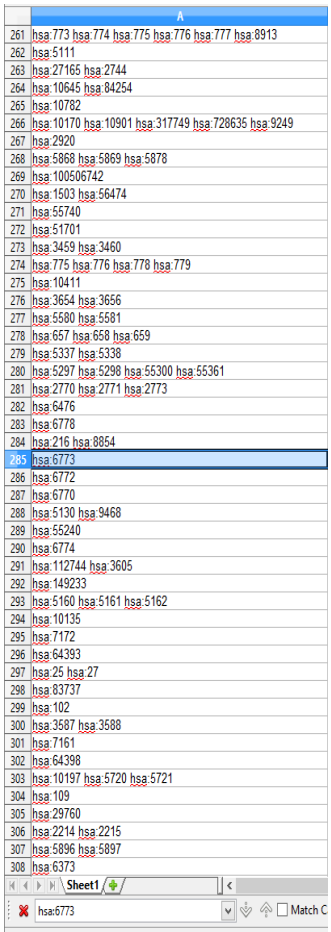
6. Open “crosstalk.csv” with spreadsheet program. Be sure to select commas as a delimiter.

Example:



7. The first column is a list of all the linking proteins. Search for your protein(s) of interest KEGG ID within this column.

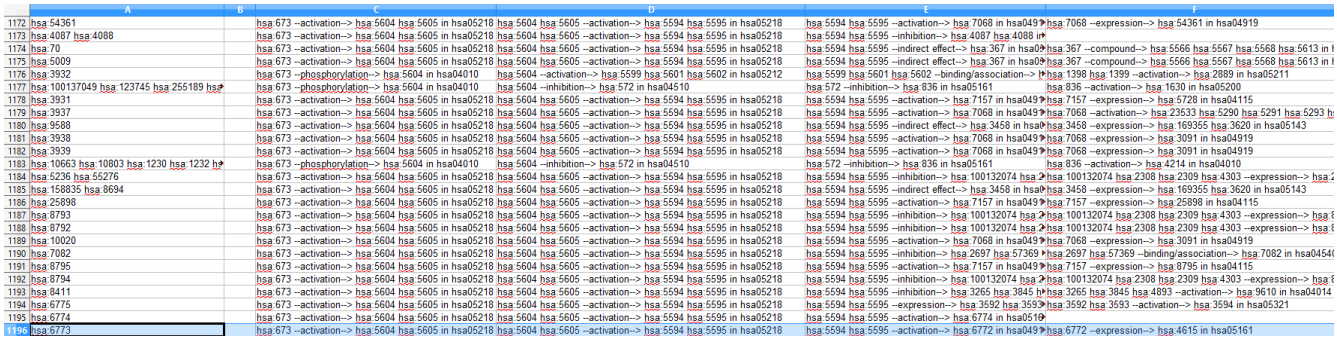
Example:



Note: It may be easier to search the column by copying it to a new spreadsheet.

7. If you wish to know more about the proteins/activities of the links, the columns after A show each step in the link. The tracing from the first input protein to the linking protein are first, followed by the tracing from the second input protein to the linking protein. Both tracings are preceeded by a blank column.The cells are formatted as follows: protein1 –activity--> protein2 in pathwayX

Example:



	A	B	C	D	E	F
1172	hsa:54361		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --activation--> hsa:7068 in hsa049	hsa:7068 --expression--> hsa:54361 in hsa04919
1173	hsa:4087 hsa:4088		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --inhibition--> hsa:4087 hsa:4088 in	
1174	hsa:70		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --indirect effect--> hsa:367 in hsa0	hsa:367 --compound--> hsa:5566 hsa:5567 hsa:5568 hsa:5613 in h
1175	hsa:5009		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --indirect effect--> hsa:367 in hsa0	hsa:367 --compound--> hsa:5566 hsa:5567 hsa:5568 hsa:5613 in h
1176	hsa:3932		hsa:673 --phosphorylation--> hsa:5604 in hsa04010	hsa:5604 --activation--> hsa:5599 hsa:5601 hsa:5602 in hsa05212	hsa:5599 hsa:5601 hsa:5602 --binding/association--> h	hsa:1398 hsa:1399 --activation--> hsa:2889 in hsa05211
1177	hsa:100137049 hsa:123745 hsa:255189 hsa		hsa:673 --phosphorylation--> hsa:5604 in hsa04010	hsa:5604 --inhibition--> hsa:572 in hsa04510	hsa:572 --inhibition--> hsa:836 in hsa05161	hsa:836 --activation--> hsa:1630 in hsa05200
1178	hsa:3931		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --activation--> hsa:7157 in hsa049	hsa:7157 --expression--> hsa:5728 in hsa04115
1179	hsa:3937		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --activation--> hsa:7068 in hsa049	hsa:7068 --activation--> hsa:23533 hsa:5290 hsa:5291 hsa:5293 h
1180	hsa:9588		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --indirect effect--> hsa:3458 in hsa	hsa:3458 --expression--> hsa:169355 hsa:3620 in hsa05143
1181	hsa:3938		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --activation--> hsa:7068 in hsa049	hsa:7068 --expression--> hsa:3091 in hsa04919
1182	hsa:3939		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --activation--> hsa:7068 in hsa049	hsa:7068 --expression--> hsa:3091 in hsa04919
1183	hsa:10663 hsa:10803 hsa:1230 hsa:1232 hs		hsa:673 --phosphorylation--> hsa:5604 in hsa04010	hsa:5604 --inhibition--> hsa:572 in hsa04510	hsa:572 --inhibition--> hsa:836 in hsa05161	hsa:836 --activation--> hsa:4214 in hsa04010
1184	hsa:5236 hsa:55276		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --inhibition--> hsa:100132074 hsa:2	hsa:100132074 hsa:2308 hsa:2309 hsa:4303 --expression--> hsa:2
1185	hsa:158835 hsa:8694		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --indirect effect--> hsa:3458 in hsa	hsa:3458 --expression--> hsa:169355 hsa:3620 in hsa05143
1186	hsa:25898		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --activation--> hsa:7157 in hsa049	hsa:7157 --expression--> hsa:25898 in hsa04115
1187	hsa:8793		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --inhibition--> hsa:100132074 hsa:2	hsa:100132074 hsa:2308 hsa:2309 hsa:4303 --expression--> hsa:8
1188	hsa:8792		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --inhibition--> hsa:100132074 hsa:2	hsa:100132074 hsa:2308 hsa:2309 hsa:4303 --expression--> hsa:8
1189	hsa:10020		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --activation--> hsa:7068 in hsa049	hsa:7068 --expression--> hsa:3091 in hsa04919
1190	hsa:7082		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --inhibition--> hsa:2697 hsa:57369	hsa:2697 hsa:57369 --binding/association--> hsa:7082 in hsa0454
1191	hsa:8795		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --activation--> hsa:7157 in hsa049	hsa:7157 --expression--> hsa:8795 in hsa04115
1192	hsa:8794		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --inhibition--> hsa:100132074 hsa:2	hsa:100132074 hsa:2308 hsa:2309 hsa:4303 --expression--> hsa:8
1193	hsa:8411		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --inhibition--> hsa:3265 hsa:3845 h	hsa:3265 hsa:3845 hsa:4893 --activation--> hsa:9610 in hsa04014
1194	hsa:6775		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --expression--> hsa:3592 hsa:3593	hsa:3592 hsa:3593 --activation--> hsa:3594 in hsa05321
1195	hsa:6774		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --activation--> hsa:6774 in hsa0510	
1196	hsa:6773		hsa:673 --activation--> hsa:5604 hsa:5605 in hsa05218	hsa:5604 hsa:5605 --activation--> hsa:5594 hsa:5595 in hsa05218	hsa:5594 hsa:5595 --activation--> hsa:6772 in hsa049	hsa:6772 --expression--> hsa:4615 in hsa05161