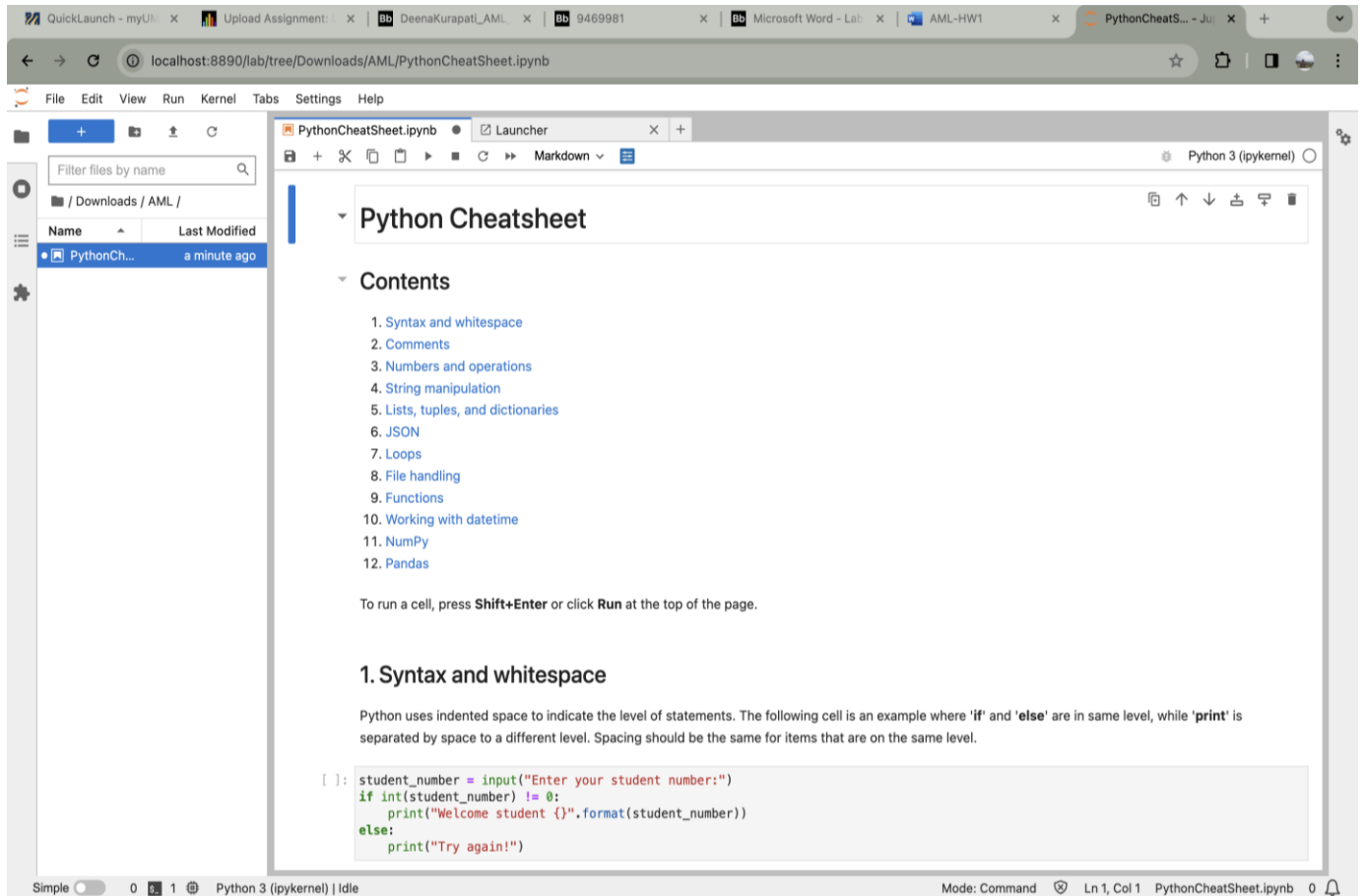**Jeevan Kumar Banoth - 02105145**
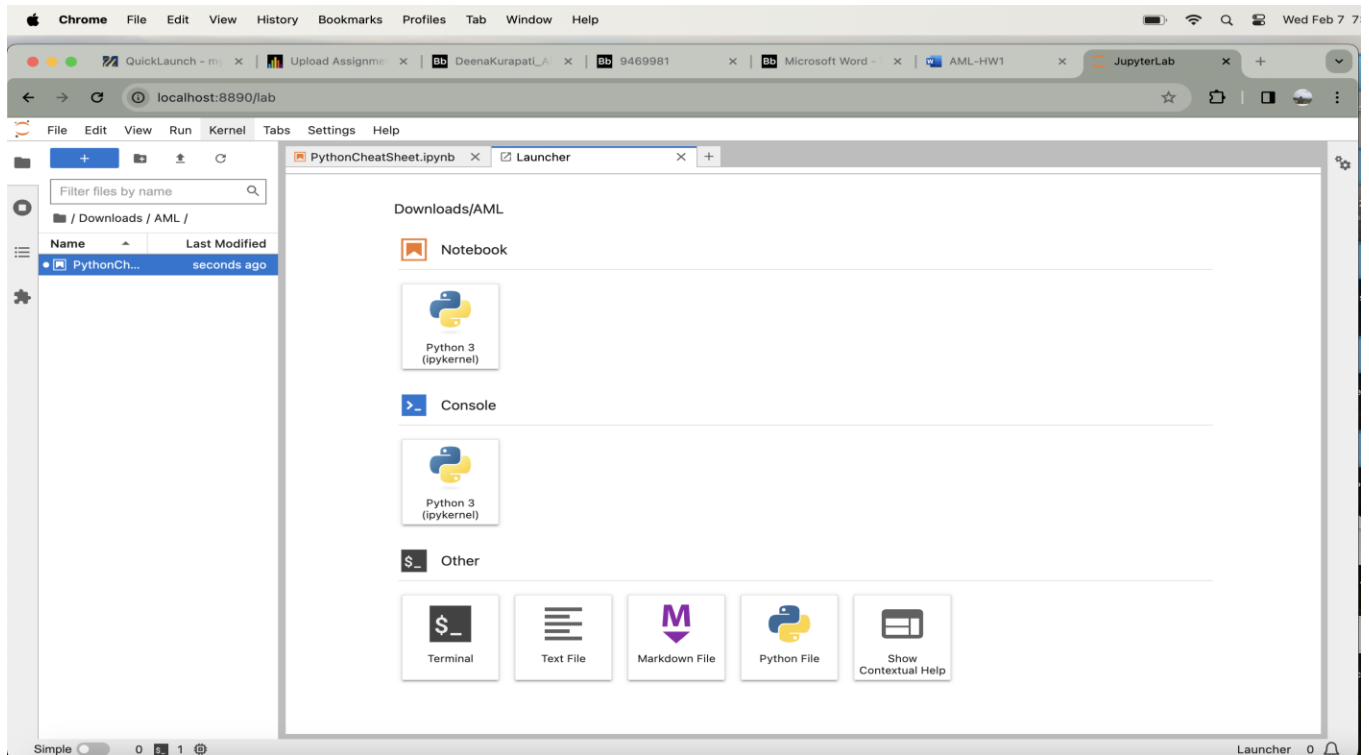
Advanced machine learning

Homework –1:

Task 1: Introducing JupyterLab:

→ Downloading the PythonCheatSheet.ipynb document from MyCourses and uploading it into the jupyter lab using the left corner button from the jupyter lab.

These two are the pictures of PythonCheatSheet.ipynb and the launcher.

As we can see here, there are different types of components used for interacting with the cell, creating, running, and editing etc. Only the left part of the area in the picture has all the components like creating file, uploading, extension and folder part etc.
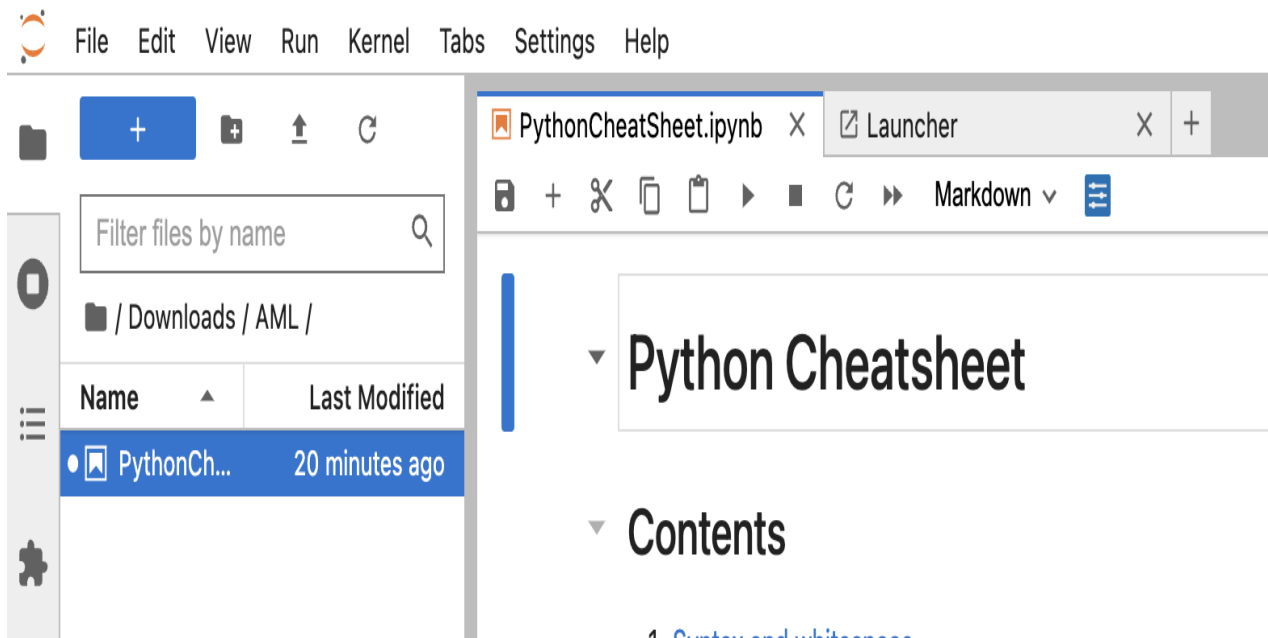
Under the tab of **PythonCheatSheet.ipynb** we can see different types of buttons which are used for saving, creating new cells, cutting, copying, markdown etc. So, the main functionality of the cell to perform some action is from there only.

By using the creation of new folder in the jupyter lab, created a folder called "Import_AML.ipynb".
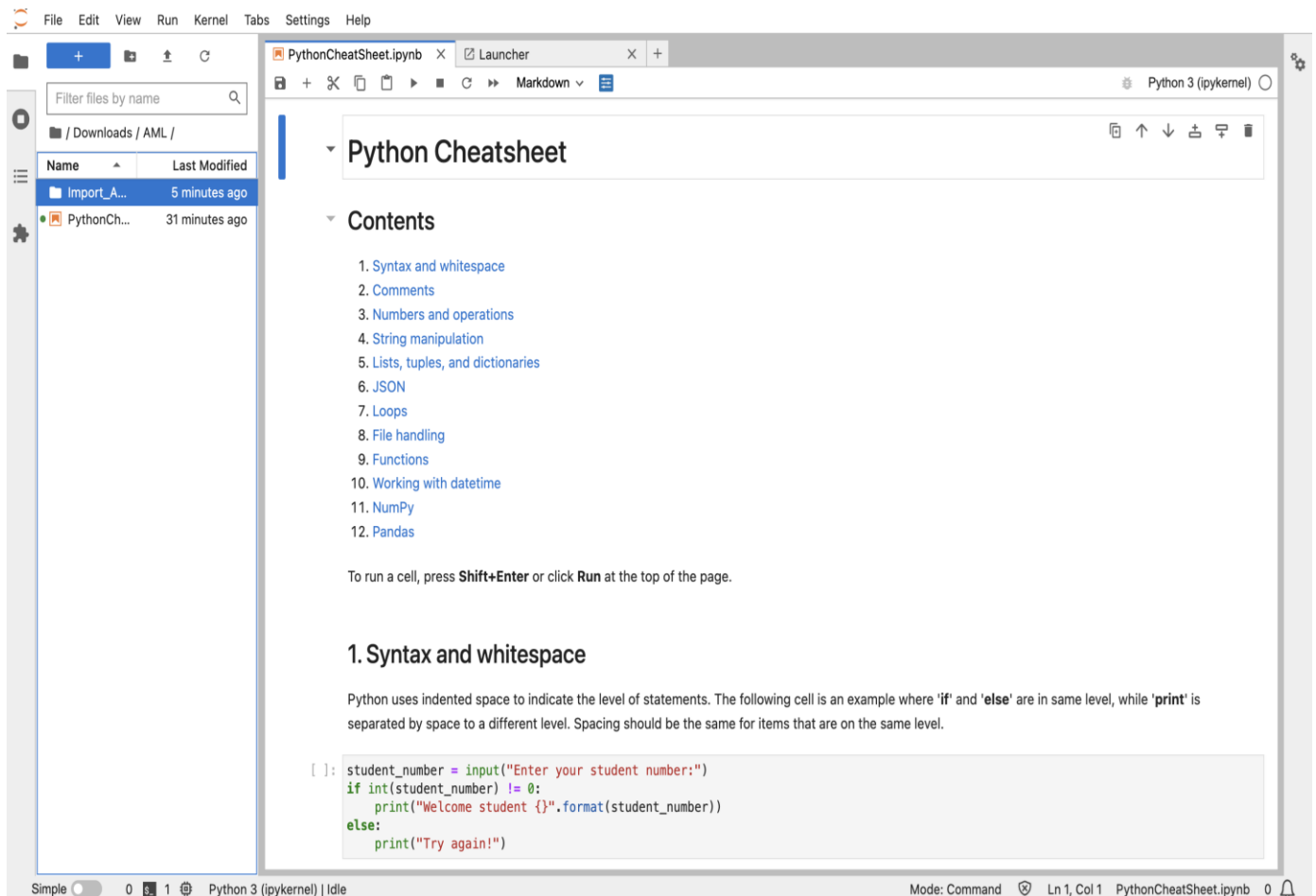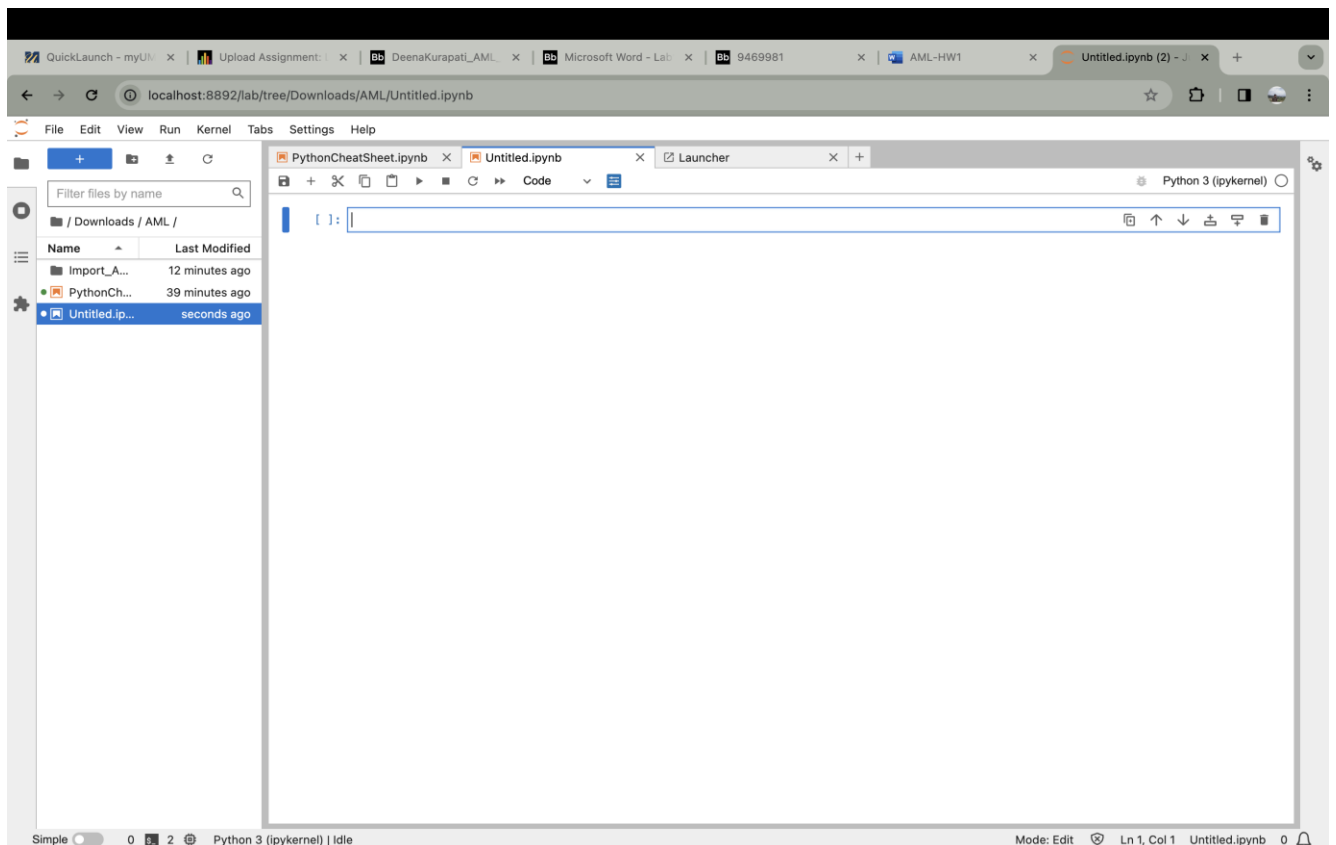

Task2: Importing Data:

→ Here for creating a new notebook, we need to go to file on top left most corner and then click on New then choose Notebook.

→ Choose Python3 (ipykernel) and then press enter.
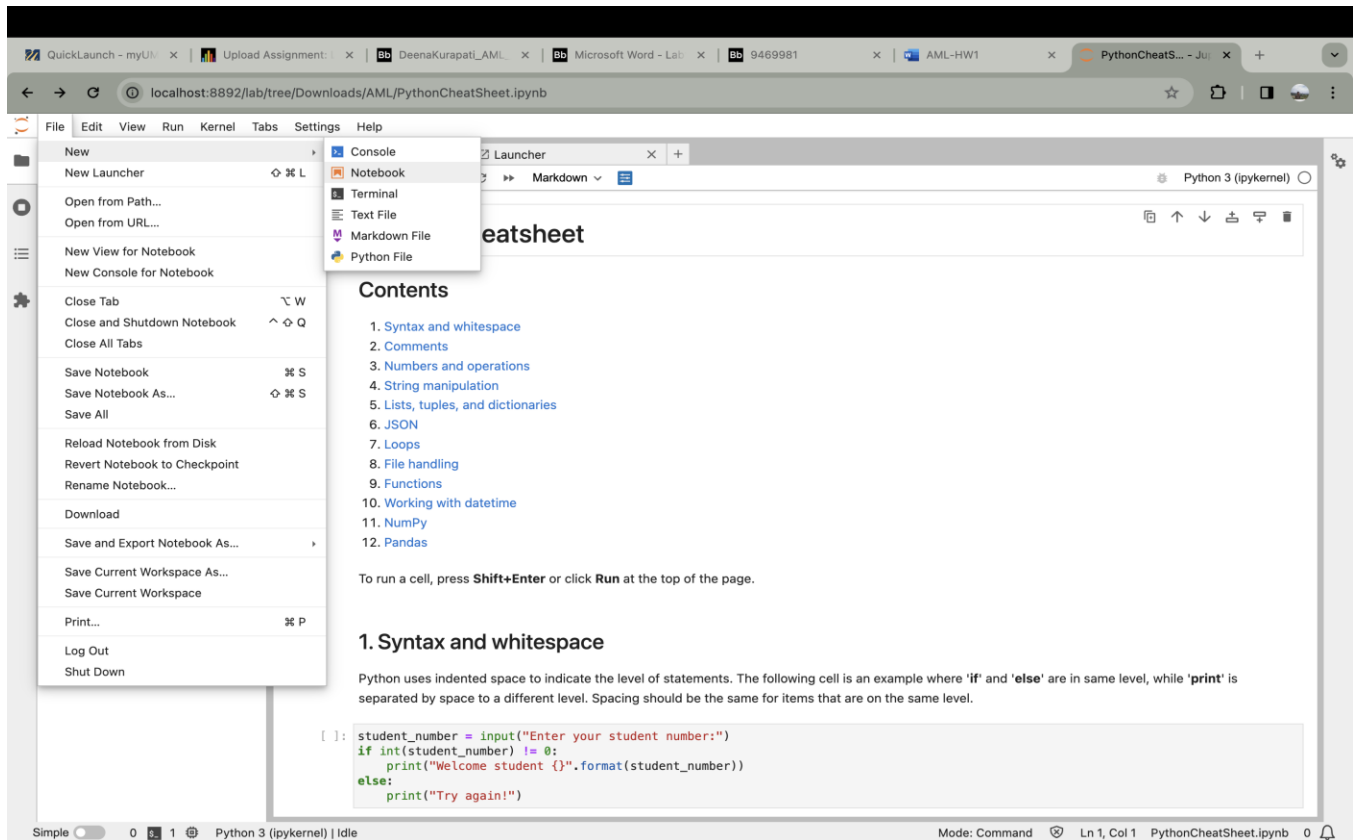
Below is the picture of how it looks after performing all these steps.

→ Importing of few libraries which helps from getting the error and warning messages. We need to write a few lines of code for that.
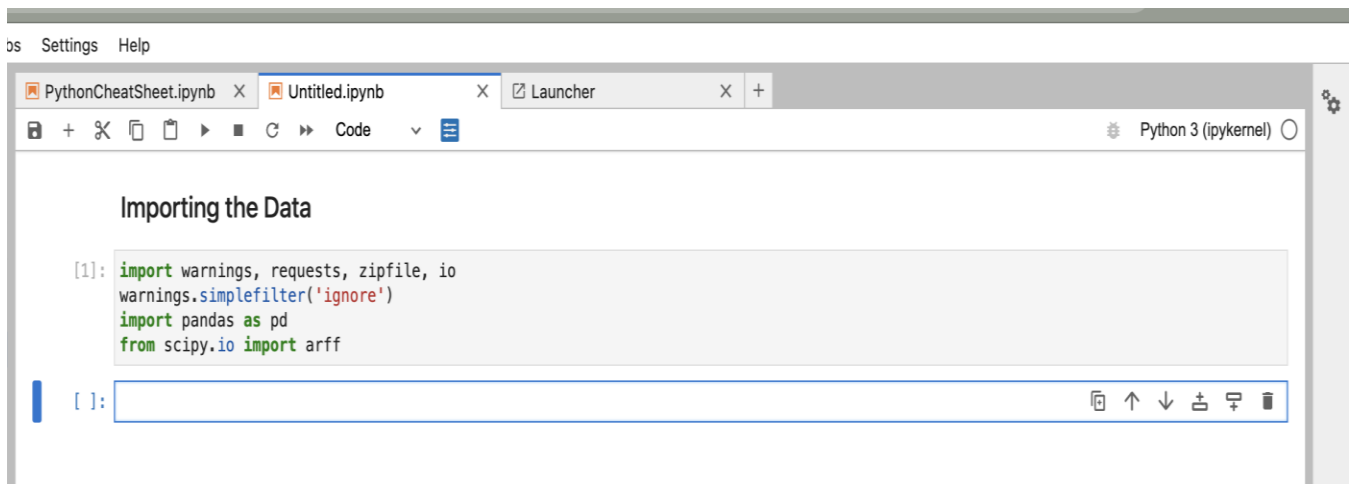
→ For getting a new cell we can use SHIFT + ENTER or we can use B when our cursor is out of the cell. Mentioned that don't run the code so we are using B in this case.

→ Enter the given code for downloading and extracting a zip file.
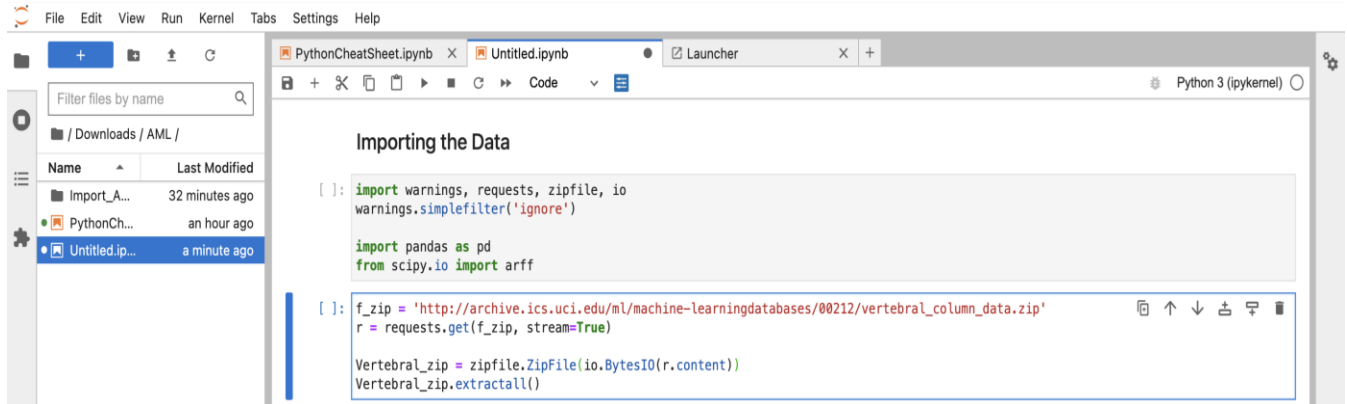
→ For running the code in the cells, we need to select the cell which we would like to run and then press SHIFT + ENTER so that cell will run.
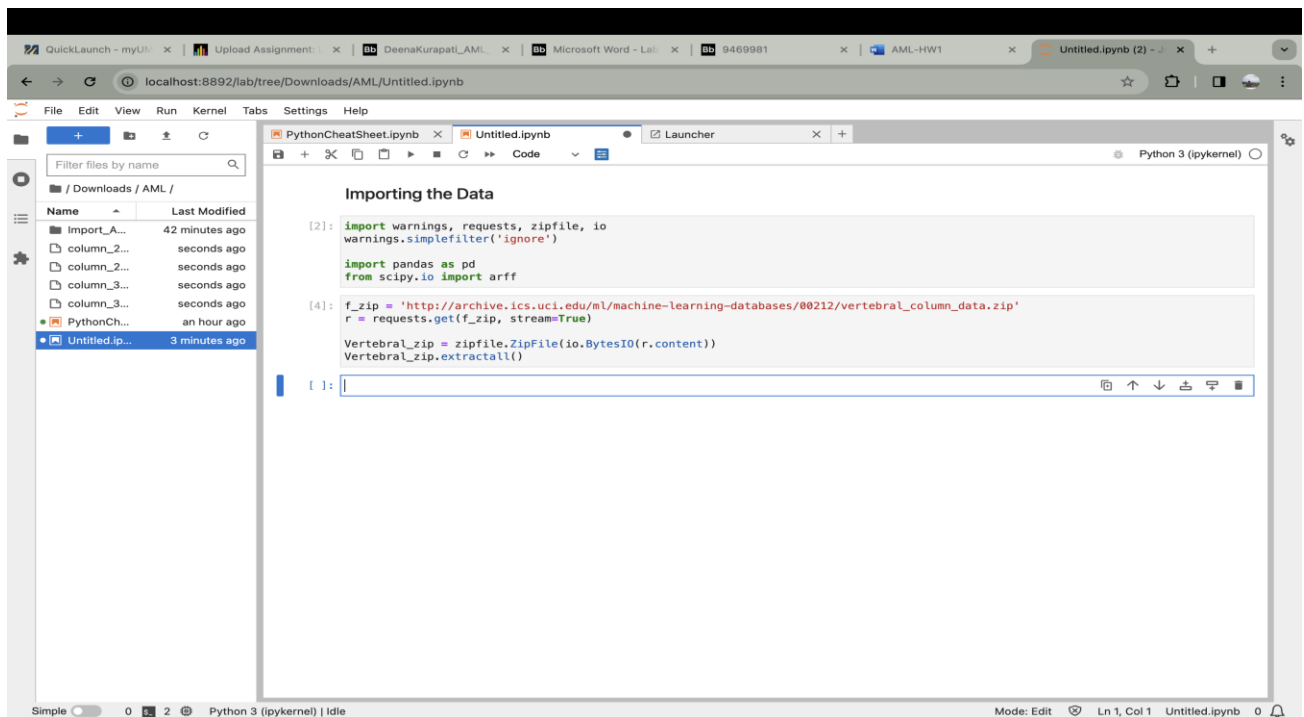
→ As we can see in the above picture, the cells have been executed successfully and the files downloaded into the same path as where we are creating a notebook. You can even check your file system to see that files have been downloaded successfully.

→ Click on those files to see the data inside of it.

First window — localhost:8892/lab/tree/Downloads/AML/column_2C.dat

```
1   63.03 22.55 39.61 40.48 98.67 -0.25 AB
2   39.06 10.06 25.02 29 114.41 4.56 AB
3   68.83 22.22 50.09 46.61 105.99 -3.53 AB
4   69.3 24.65 44.31 44.64 101.87 11.21 AB
5   49.71 9.65 28.32 40.06 108.17 7.92 AB
6   40.25 13.92 25.12 26.33 130.33 2.23 AB
7   53.43 15.86 37.17 37.57 120.57 5.99 AB
8   45.37 10.76 29.04 34.61 117.27 -10.68 AB
9   43.79 13.53 42.69 30.26 125 13.29 AB
10  36.69 5.01 41.95 31.68 84.24 0.66 AB
11  49.71 13.04 31.33 36.67 108.65 -7.83 AB
12  31.23 17.72 15.5 13.52 120.06 0.5 AB
13  48.92 19.96 40.26 28.95 119.32 8.03 AB
14  53.57 20.46 33.1 33.11 110.97 7.04 AB
15  57.3 24.19 47 33.11 116.81 5.77 AB
16  44.32 12.54 36.1 31.78 124.12 5.42 AB
17  63.83 20.36 54.55 43.47 112.31 -0.62 AB
18  31.28 3.14 32.56 28.13 129.01 3.62 AB
19  38.7 13.44 31 25.25 123.16 1.43 AB
20  41.73 12.25 30.12 29.48 116.59 -1.24 AB
21  43.92 14.18 37.83 29.74 134.46 6.45 AB
22  54.92 21.06 42.2 33.86 125.21 2.43 AB
23  63.07 24.41 54 38.66 106.42 15.78 AB
24  45.54 13.07 30.3 32.47 117.98 -4.99 AB
25  36.13 22.76 29 13.37 115.58 -3.24 AB
26  54.12 26.65 35.33 27.47 121.45 1.57 AB
27  26.15 10.76 14 15.39 125.2 -10.09 AB
28  43.58 16.51 47 27.07 109.27 8.99 AB
29  44.55 21.93 26.79 22.62 111.07 2.65 AB
30  66.88 24.89 49.28 41.99 113.48 -2.01 AB
31  50.82 15.4 42.53 35.42 112.19 10.87 AB
32  46.39 11.08 32.14 35.31 98.77 6.39 AB
33  44.94 17.44 27.78 27.49 117.98 5.57 AB
34  38.66 12.99 40 25.68 124.91 2.7 AB
35  59.6 32 46.56 27.6 119.33 1.47 AB
36  31.48 7.83 24.28 23.66 113.83 4.39 AB
37  32.09 6.99 36 25.1 132.26 6.41 AB
38  35.7 19.44 20.7 16.26 137.54 -0.26 AB
39  55.84 28.85 47.69 27 123.31 2.81 AB
40  52.42 19.01 35.87 33.41 116.56 1.69 AB
41  35.49 11.7 15.59 23.79 106.94 -3.46 AB
42  46.44 8.4 29.04 38.05 115.48 2.05 AB
```

Second window — localhost:8892/lab/tree/Downloads/AML/column_2C_weka.arff

```
1   @relation column_2C_weka
2
3   @attribute pelvic_incidence numeric
4   @attribute pelvic_tilt numeric
5   @attribute lumbar_lordosis_angle numeric
6   @attribute sacral_slope numeric
7   @attribute pelvic_radius numeric
8   @attribute degree_spondylolisthesis numeric
9
10  @attribute class {Abnormal, Normal}
11
12  @data
13  63.0278175,22.55258597,39.60911701,40.47523153,98.67291675,-0.254399986,Abnormal
14  39.05695098,10.06099147,25.01537822,28.99595951,114.4054254,4.564258645,Abnormal
15  68.83202098,22.21848205,50.09219357,46.61353893,105.9851355,-3.530317314,Abnormal
16  69.29700807,24.65287791,44.31123813,44.64413017,101.8684951,11.21152344,Abnormal
17  49.71285934,9.652074879,28.317406,40.06078446,108.1687249,7.918500615,Abnormal
18  40.25019968,13.92190658,25.1249496,26.32829311,130.3278713,2.230651729,Abnormal
19  53.43292815,15.86433612,37.16593387,37.56859203,120.5675233,5.988550702,Abnormal
20  45.36675362,10.75561143,29.03834896,34.61114218,117.2700675,-10.67587083,Abnormal
21  43.79019026,13.5337531,42.69081398,30.25643716,125.0028927,13.28901817,Abnormal
22  36.68635286,5.010884121,41.9487509,31.67546874,84.24141517,0.664437117,Abnormal
23  49.70660953,13.04097405,31.33450009,36.66563548,108.6482654,-7.825985755,Abnormal
24  31.23238734,17.71581923,15.5,13.51656811,120.0553988,0.499751446,Abnormal
25  48.91555137,19.96455616,40.26379358,28.95099521,119.321358,8.028894629,Abnormal
26  53.5721702,20.46082824,33.1,33.11134196,110.9666978,7.044802938,Abnormal
27  57.30022656,24.1888846,46.99999999,33.11134196,116.8065868,5.766946943,Abnormal
28  44.31890674,12.53799164,36.098763,31.78091509,124.1158358,5.415825143,Abnormal
29  63.83498162,20.36250706,54.55243367,43.47247456,112.3094915,-0.622526643,Abnormal
30  31.27601184,3.14466948,32.56299592,28.13134236,129.0114183,3.623020073,Abnormal
31  38.69791243,13.44474904,31,25.25316339,123.1592507,1.429185758,Abnormal
32  41.72996308,12.25407408,30.12258646,29.475889,116.5857056,-1.244402488,Abnormal
33  43.92283983,14.17795853,37.8325467,29.7448813,134.4610156,6.451647637,Abnormal
34  54.91944259,21.06233245,42.19999999,33.85711014,125.2127163,2.432561437,Abnormal
35  63.07361096,24.41380271,53.99999999,38.65980825,106.4243295,15.77969683,Abnormal
36  45.54078988,13.06959759,30.29832059,32.47119229,117.9808303,-4.987129618,Abnormal
37  36.12568347,22.75875277,29,13.3669307,115.5771163,-3.237562489,Abnormal
38  54.12492019,26.65048856,35.32974693,27.47443163,121.447011,1.571204816,Abnormal
39  26.14792141,10.75945357,14,15.38846783,125.2032956,-10.09310817,Abnormal
40  43.58096394,16.5088837,46.99999999,27.07208024,109.271634,8.992815727,Abnormal
41  44.5510115,21.93114655,26.78591597,22.61986495,111.0729197,2.652320636,Abnormal
42  66.87921138,24.89199889,49.27859673,41.9872125,113.4770183,-2.005891748,Abnormal
```

→ To download the data from the above files, we can use the code as follows and after that press SHIFT+ENTER.

→ Below is the picture of data which has been downloaded by using the code.

Task 3: Downloading your notebook and saving your work:

→ Right click on the file and then press download, then it asks you for path for the file select
the path where you want to save it and enter.
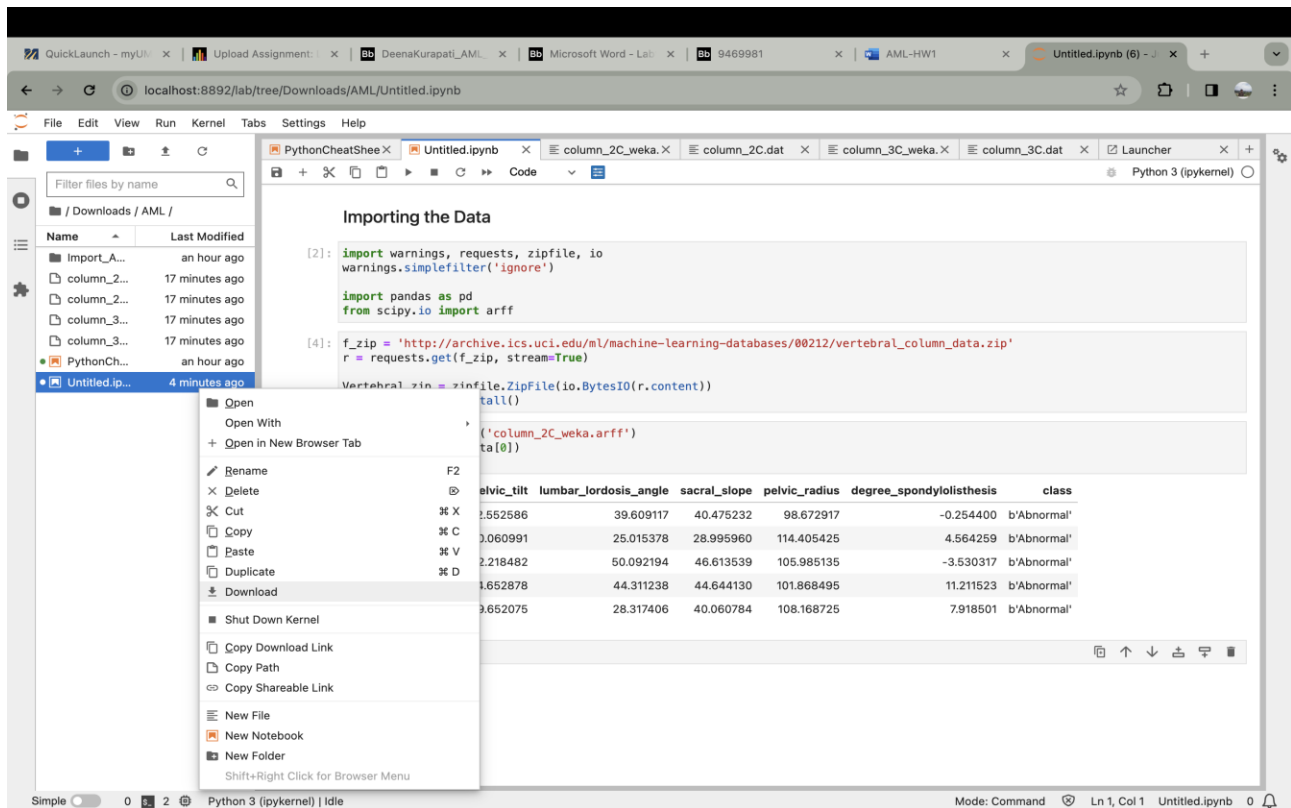
Conclusion:

→ Jupyter lab is the web-based environment and user friendly compared to other notebooks and applications.

→ It allows the user to work on various configurations like data science, scientific computing etc. (Previously I have used this in the scientific computing subject).

→ Finding the bugs or errors is easy.

→ We can save and download our work on the machine.

→ We can use this for creating the report files using cells markdown and other features.

→ I have faced a problem running the cell of extracting zip file in which I wrote the code for z_file wrong so after executing the cell it gave me exactly where i went wrong so I was able to find out the error easily.

In conclusion, I've succeeded in completing this lab. I did launch the Jupyter notebook and executed the code as instructed and got the results as expected.