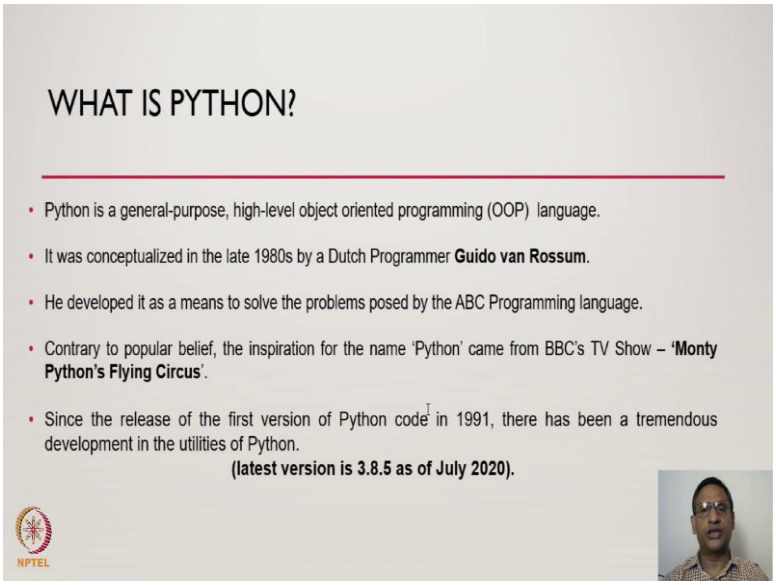
Computational Mathematics with Sagemath
Prof. Ajit Kumar
Department of Mathematics
Institute of Chemical Technology, Mumbai

Lecture – 01
Installation of Python

Welcome to this course on Computational Mathematics with Sagemath. In this particular video, I am going to explain two things; first a very brief introduction to Python and second Installing Python in your system or using it online.

(Refer Slide Time: 00:44)



So, let us get started. What is Python? Python is a general purpose high level object oriented programming language. It was conceptualized in the late 1980s by a Dutch programmer Guido van Rossum. He developed it as a means to solve the problems posed by the ABC programming language. Contrary to popular belief, the inspiration for Python came from BBC's TV show Monty Python's Flying Circus. So, it has nothing to do with the snake Python.

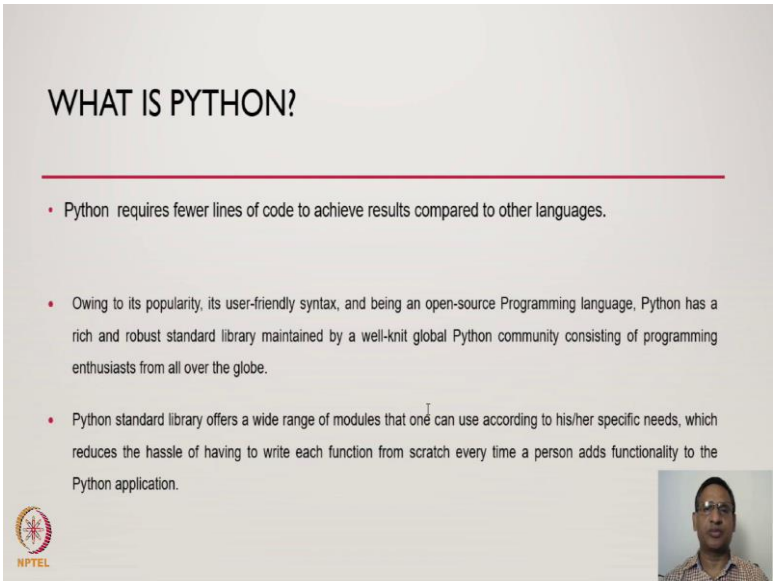
Since the release of the first version of Python code in 1991, there has been a tremendous development in the utilities of Python. The current version of Python is 3.8.5 as of July 2020.

(Refer Slide Time: 01:49)

Python is by far one of the most widely used programming languages. It has wide range of applications such as web development, game development, creating desktop applications, scientific computing, symbolic manipulations and it is one of the highly sought programming language in machine learning and data analysis.

One of the main reasons why this language became a huge success is the readability of its codes. Unlike other programming languages such as C, C++, Pascal etc, Python allows you to use English keywords instead of punctuations.

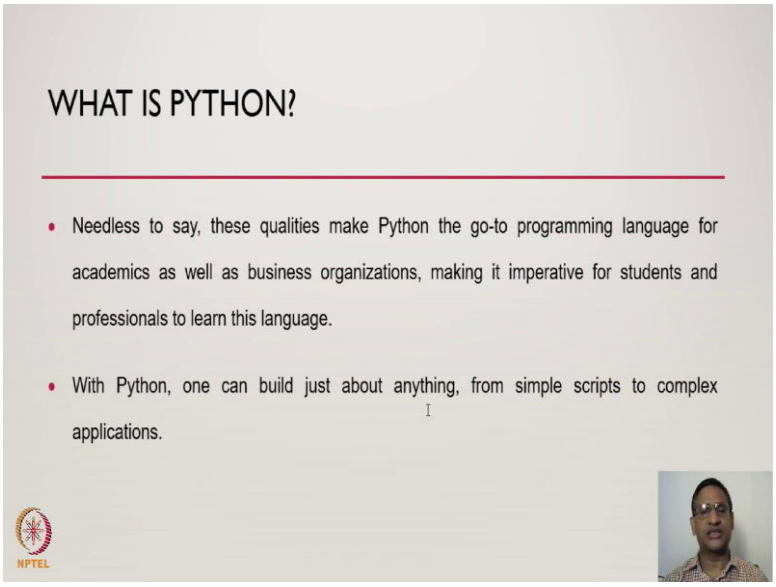
(Refer Slide Time: 02:41)



Python requires fewer lines of codes to achieve results compared to other programming languages. Due to its popularity, its user friendly syntax and being an open source programming language, Python has a rich and robust standard library maintained by a well-knit global Python community consisting of programming enthusiasts from all over the globe.

Python standard library offers a wide range of modules that one can use according to his or her specific needs. And it reduces the hassles of having to write each function from scratch every time a person adds functionality to its Python application.

(Refer Slide Time: 03:40)

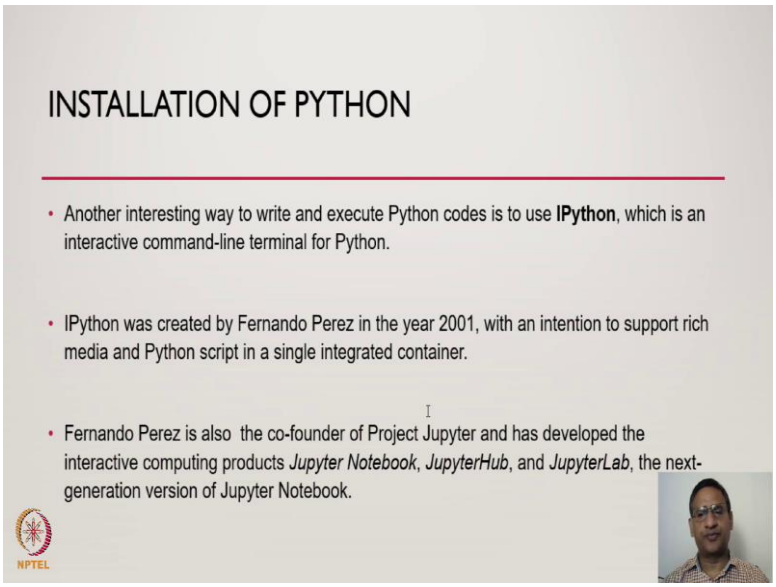


Needless to say, these qualities make Python the go to programming language for academics as well as business organizations, making it imperative for students and professionals to learn this language. With Python, one can build just about anything, from simple script to complex applications.

(Refer Slide Time: 04:09)

Now, let us see how we can start installing python. One can install python in any operating system. One can download from its official website python.org and install. Once you have installed python, then you can start coding using Python command line.

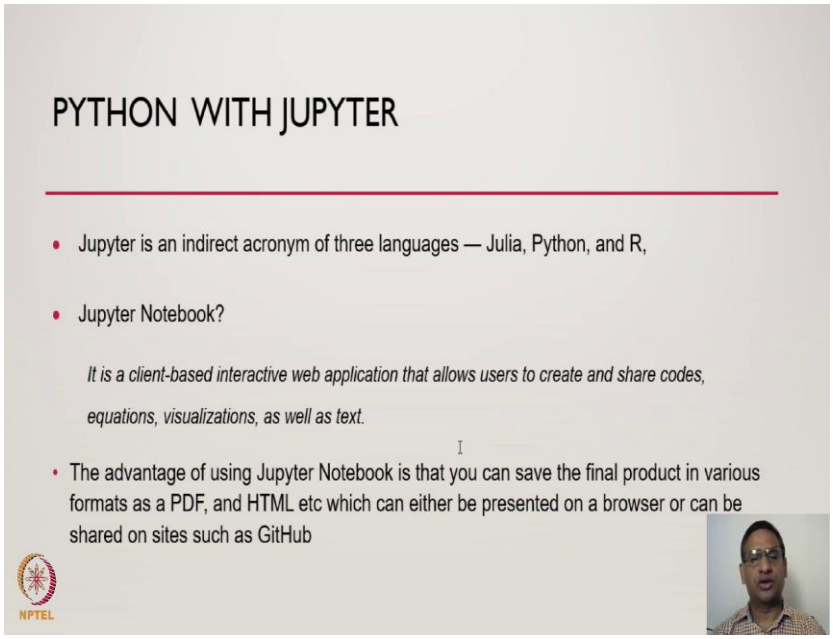
(Refer Slide Time: 04:39)



Another interesting way to write and execute python codes is to use IPython, which is an interactive command line terminal for python. IPython was created by Fernando Perez in the year 2001, with an intention to support rich media and python scripts in a single integrated container. Fernando Perez is also the co-founder of the project Jupyter and has developed the

interactive computing products such as Jupyter Notebook, Jupyter Hub and Jupyter Lab which is the next generation version Jupyter Notebook.

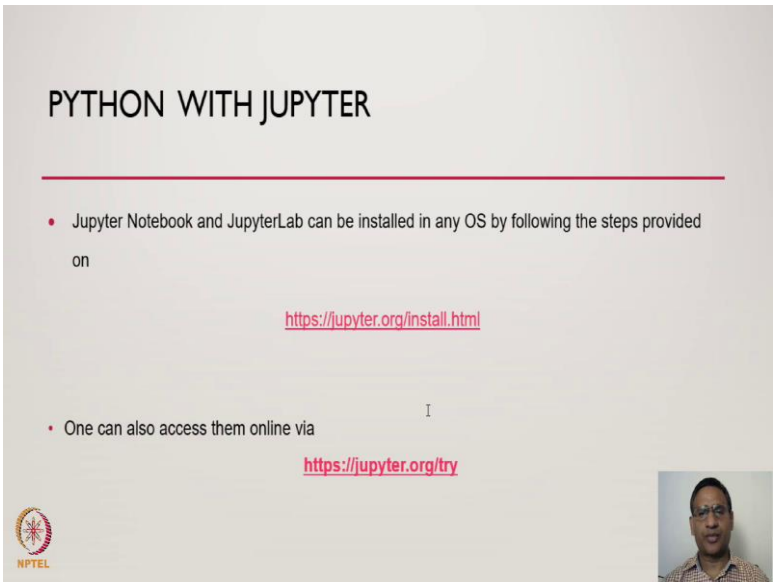
(Refer Slide Time: 05:42)



During this course, we will be using Jupyter notebook sometimes JupyterLab. Jupyter is actually an indirect acronyms of three programming languages Julia, Python and R. So, what is Jupyter Notebook? It is a client based interactive web applications that allows users to create and share codes, equations, visualizations as well as texts.

The advantage of using Jupyter Lab is that, one can save the final product in various formats such as in PDF format, HTML format etc and it can either be presented on a browser or can be shared on sites such as GitHub.

(Refer Slide Time: 06:33)



Jupyter Notebook and JupyterLab can be installed in any operating system by following steps given on its website ***jupyter.org***. One can also access them online from **jupyter.org/try**.

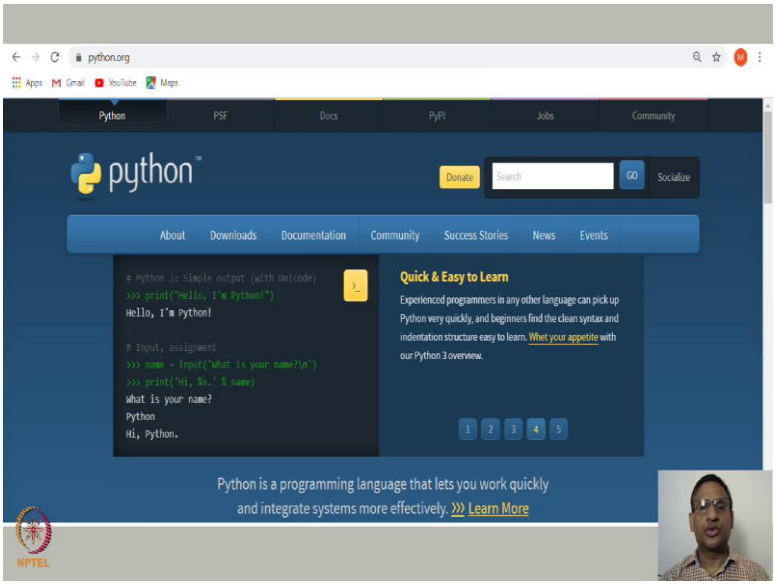
(Refer Slide Time: 06:57)

However, it is much easier to install all these things through one of the most popular distributions of python, which is a free and easy to install package cum environment manager known as Anaconda. So, I recommend you all to install Anaconda and once you install anaconda, all these things will be available. So, what is Anaconda?

It includes actually scientific packages such as data science packages, including Jupyter Notebook, JupyterLab, Spyder editor and all these things can be installed in any operating system such as Linux, windows and macOS. To install Anaconda, you can simply go to its website and follow the instructions on from

***docs.anaconda.com/anaconda/install*.**

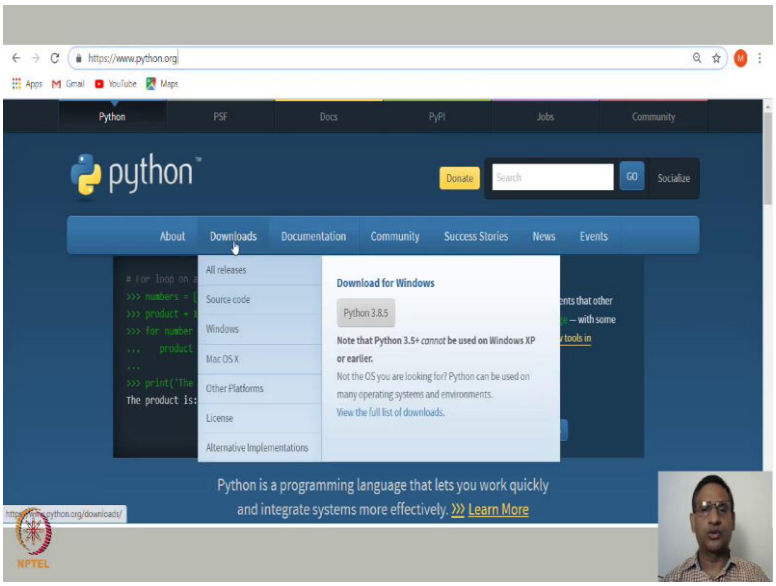
(Refer Slide Time: 08:15)



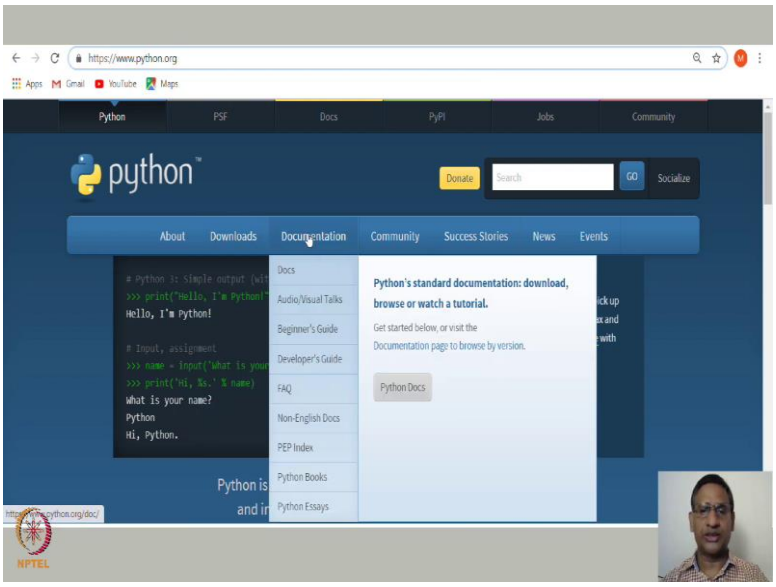
Let me show you all these things by visiting each of this website. So, if you want to install python, you can simply go to its website **python.org**.

And go to download and you can download based on your operating system, whether you are using Windows or you are using Mac or you are using Linux; then you can go to source code. So, for example, this is 3.8.5 window version you can download and just double click and it will install. And once you have installed this, you can open the python command line and then start coding.

(Refer Slide Time: 08:23)



(Refer Slide Time: 08:55)

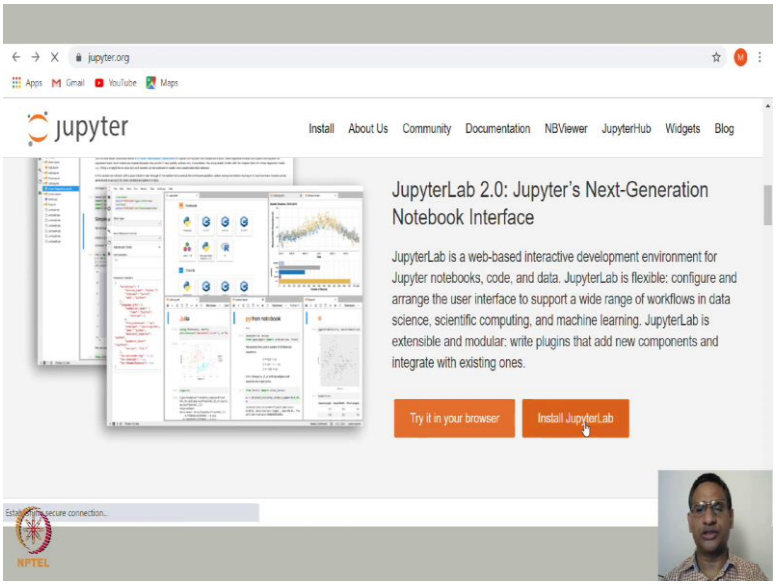


You can also look at these documentations, which provides some books, beginners guide and even developer guides etc. Actually for learning python, this is one of the best resources.

(Refer Slide Time: 09:16)

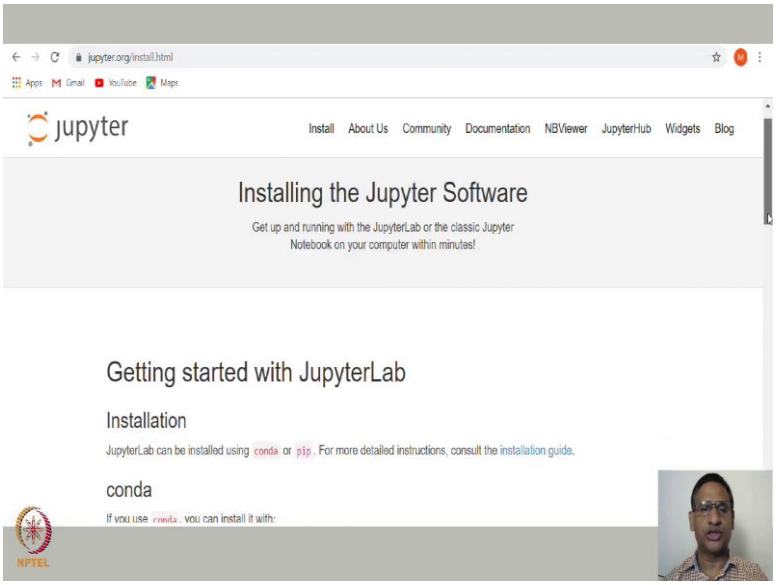
If you want to install Jupyter, you can visit its website ***jupyter.org***.

(Refer Slide Time: 09:26)



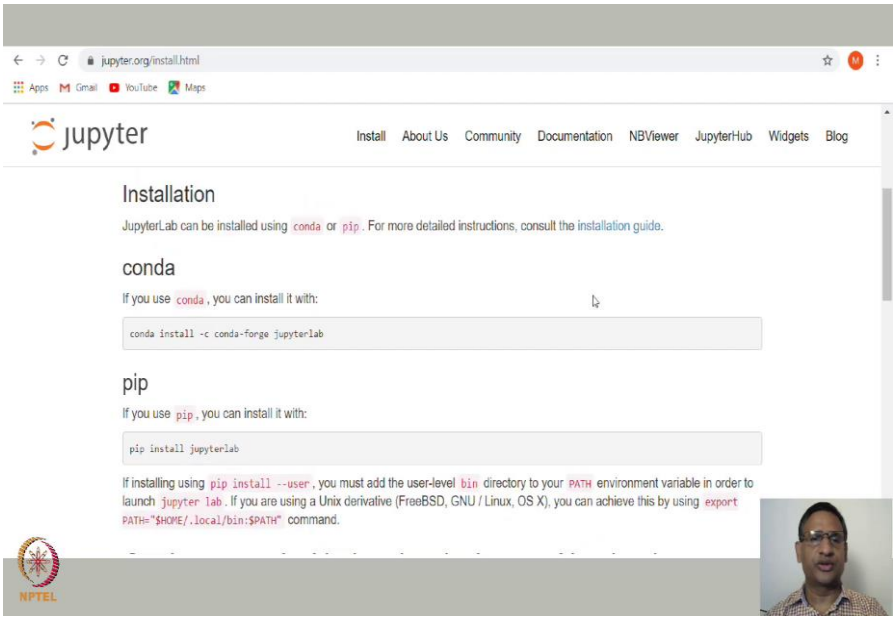
And if you go down, you see the first thing it shows a Jupyter Lab which is version 2.0 and it says that it is Jupyter's next generation note book interface. You can use this online without installing new system or you can install JupyterLab in your own system.

(Refer Slide Time: 09:48)



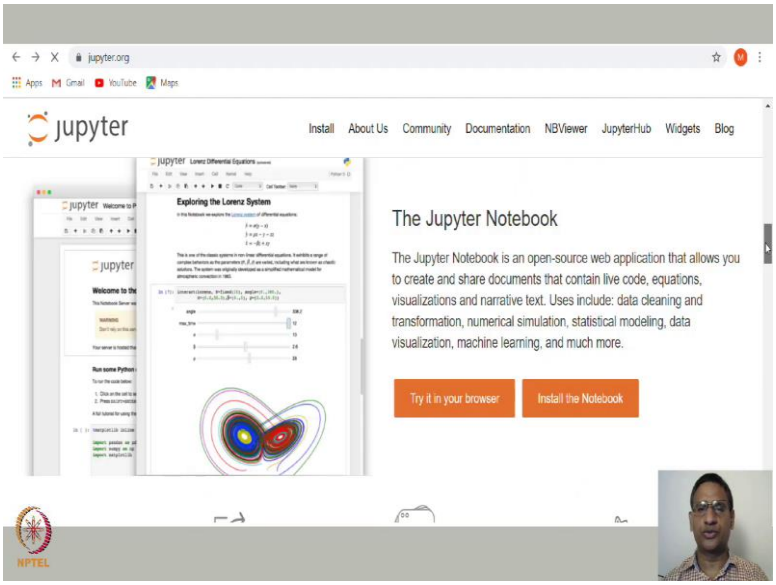
So, if you just click on this, it will show you the installation steps. So, you can install using conda or you can install using pip.

(Refer Slide Time: 09:51)



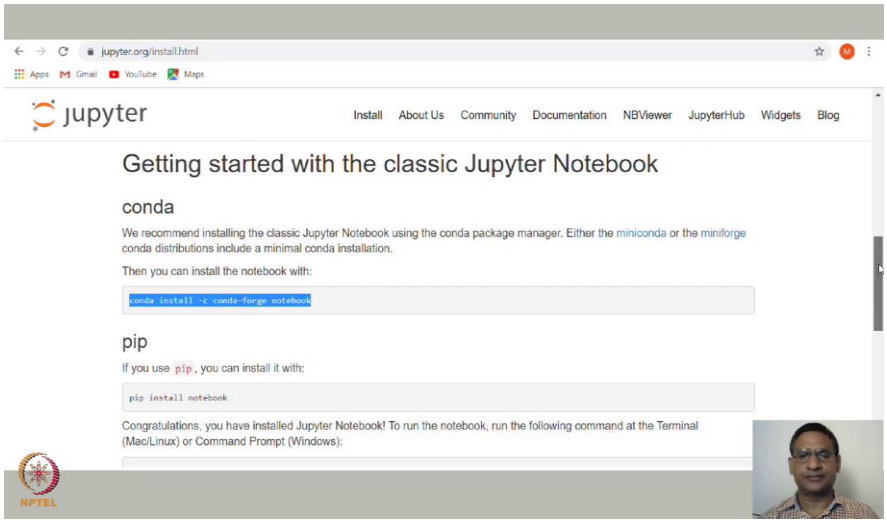
.

(Refer Slide Time: 10:09)



Similarly you can also install Jupyter Lab, from ***jupyter.org***. So, if you just go down here, this is Jupyter Notebook; again you can use this in your browser without installing it or you can install this by following the steps like this. So, if you go to ***jupyter.org/install.html*** again you can install using this conda or you can install using pip install comma.

(Refer Slide Time: 10:38)

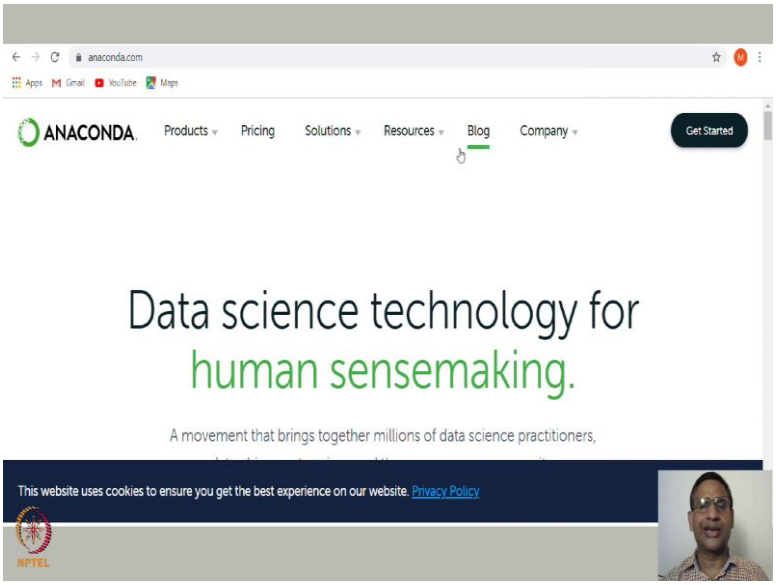


Once you have installed this, you can set it up using this command

conda install -c conda-forge notebook

and you can get started.

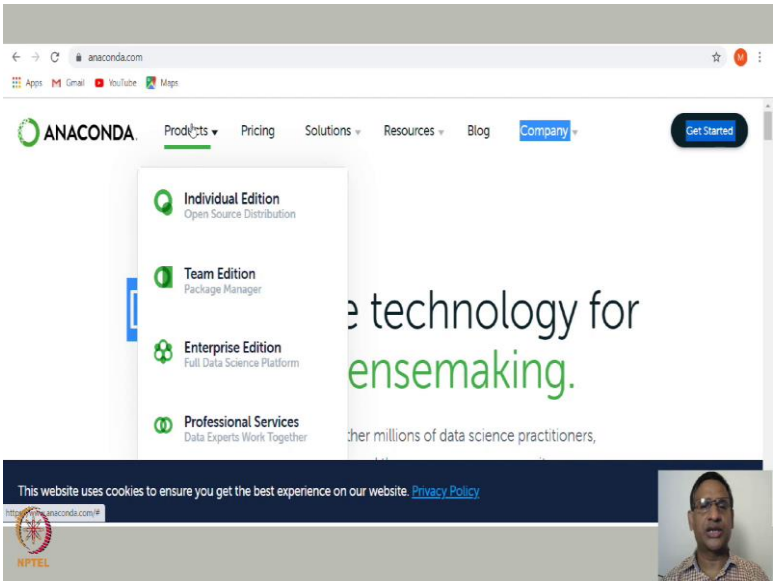
(Refer Slide Time: 11:01)



But as I said, it is much easier to install, what is called Anaconda. So, you just visit the website anaconda dot com and then actually it has various options. So, you just visit the website ***anaconda.com*** and then actually it has various options.

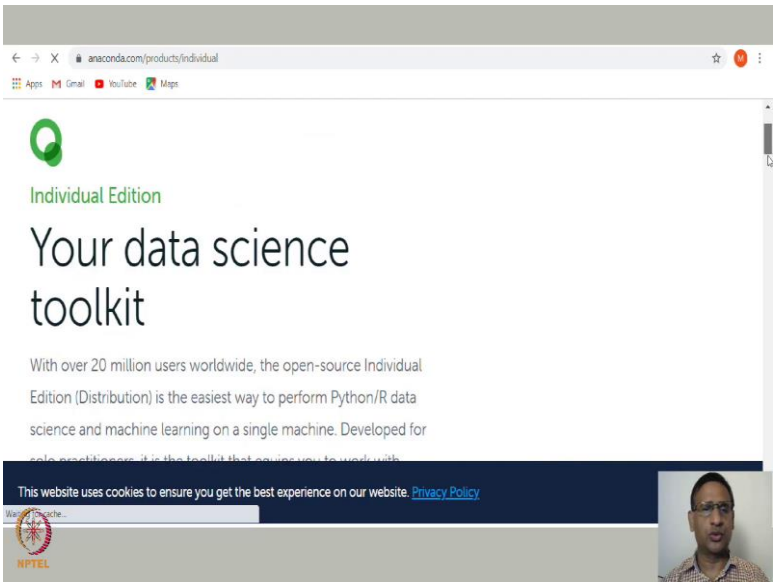
You just click on the product, it has individual edition, which is open source and free; it also has team edition, it has professional edition, enterprise edition.

(Refer Slide Time: 11:11)

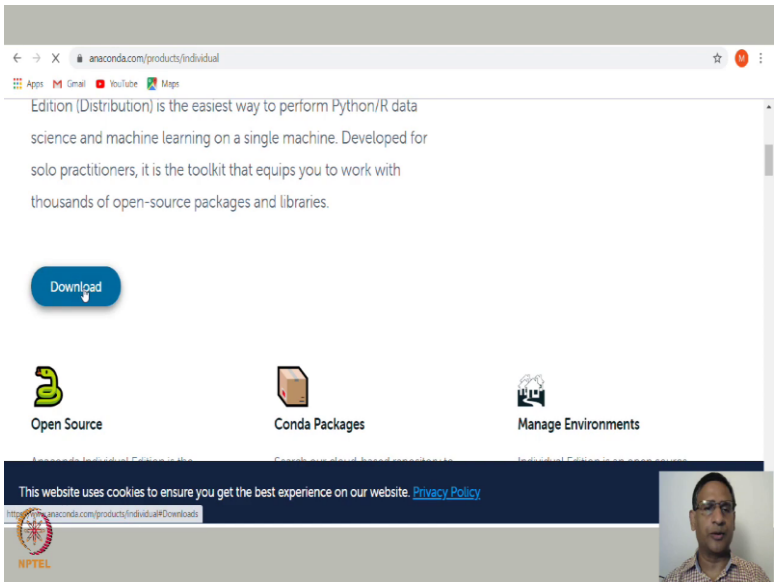


So, let me click on individual edition.

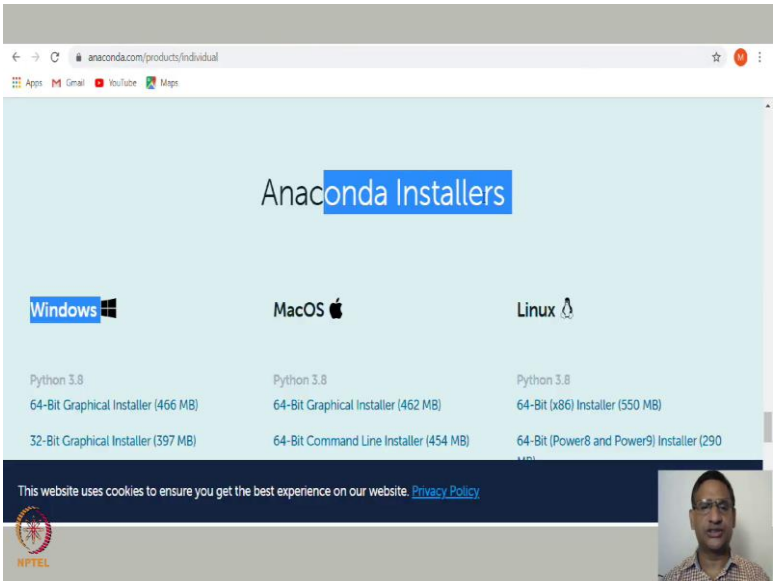
(Refer Slide Time: 11:28)



(Refer Slide Time: 11:31)

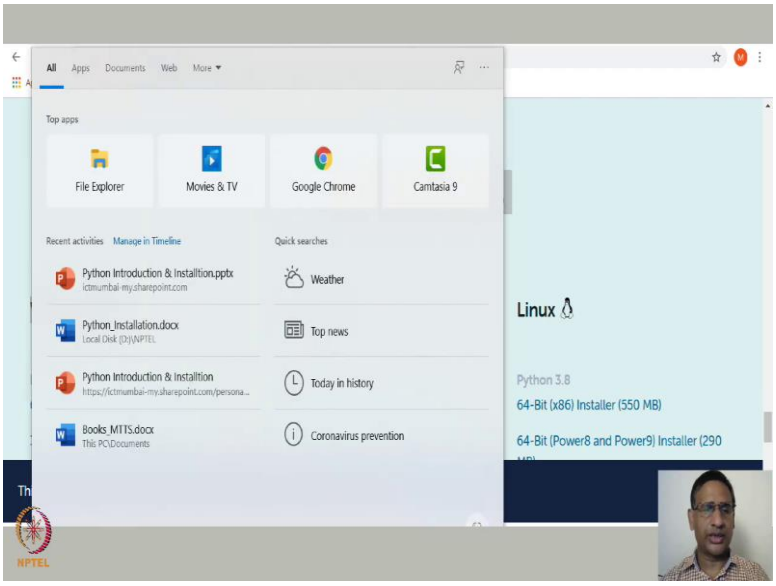


(Refer Slide Time: 11:35)

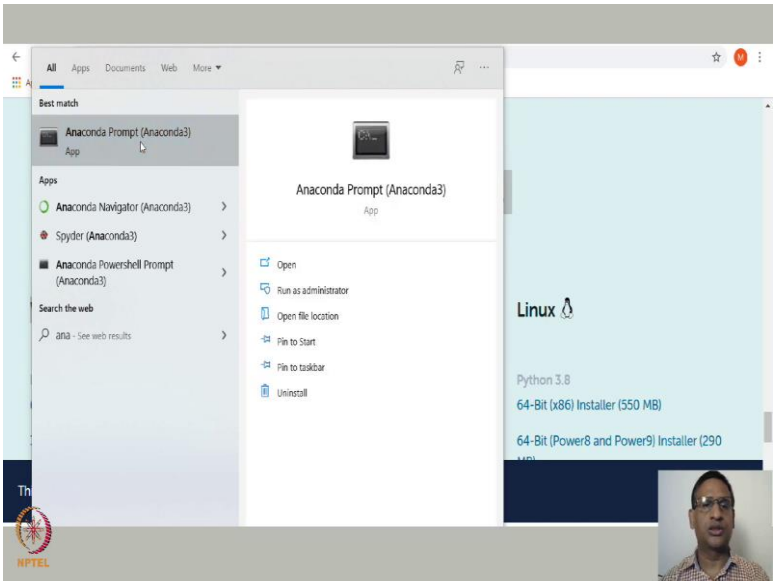


So, once you click on individual edition, you just go down; then you can go to down, click on download. Once you click on download, it will give you option to download window version or Mac version or Linux version. So, let me click on this window version. So, we know window version, it has 32 bit and also 64 bit. So, you can just download whichever is appropriate for you. So, if you click on for example, let us say 64 bit graphically installation, install installer, then it will download.

(Refer Slide Time: 12:22)

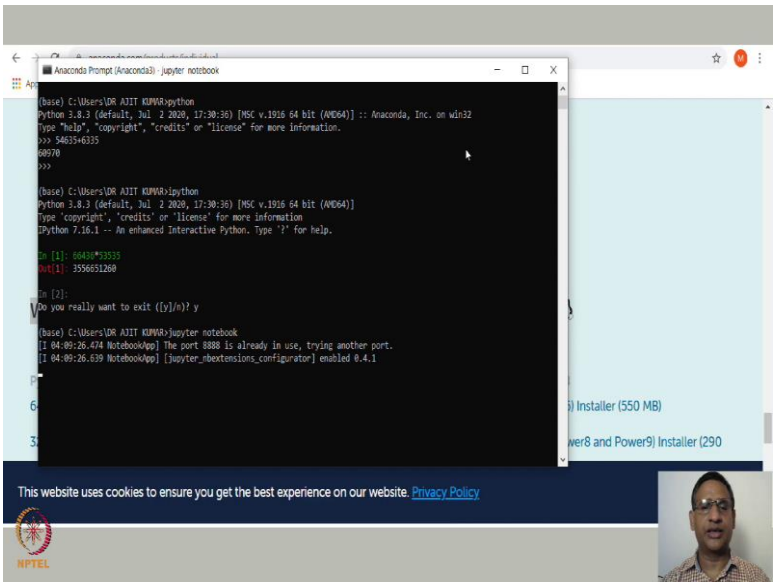


(Refer Slide Time: 12:26)



Once you install, it may take little while to install. Once you install, then you can open what is called Anaconda Prompt. So, let me just open anaconda prompt.

(Refer Slide Time: 12:31)



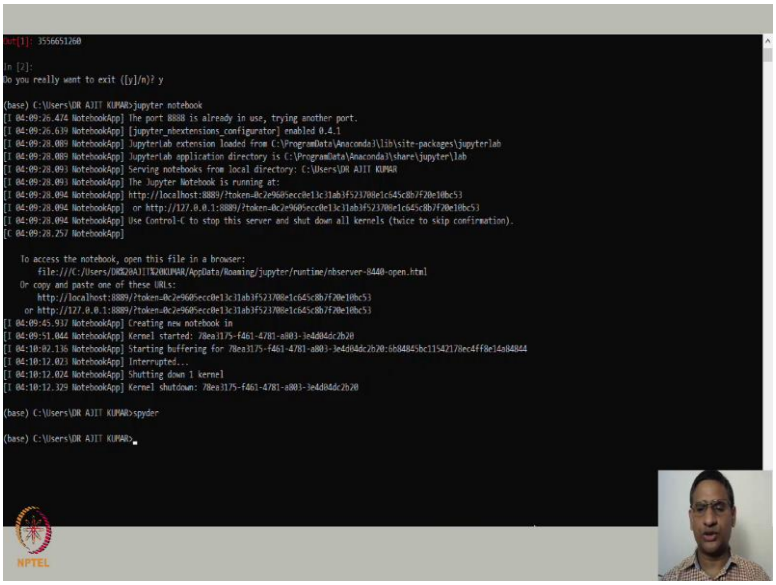
Once you have opened this Anaconda Prompt, then you can start python just by typing command python and you can start programming in python.

Add two numbers, press enter, it will give you the output. You can exit this using control d command.

(Refer Slide Time: 13.04)

Similarly you can start Ipython by typing ipython. So, this is ipython. Again you can multiply these two numbers, by giving star in between and press enter, it will give you the output. And again, if you want to exit this, you can type control d. It will ask you do you really want to exist; you can press yes, if you want to exit, no otherwise.

(Refer Slide Time: 13:47)

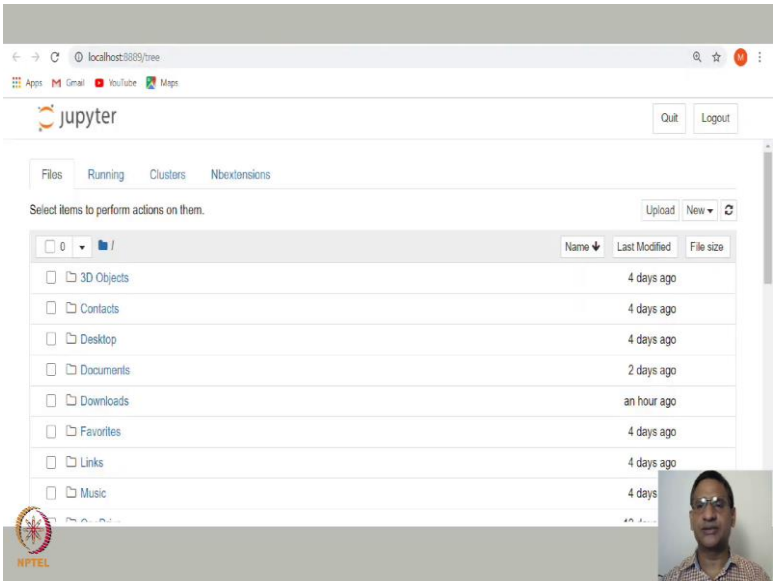


Similarly, if you want to start Jupyter Notebook, then you can type

Jupyter notebook

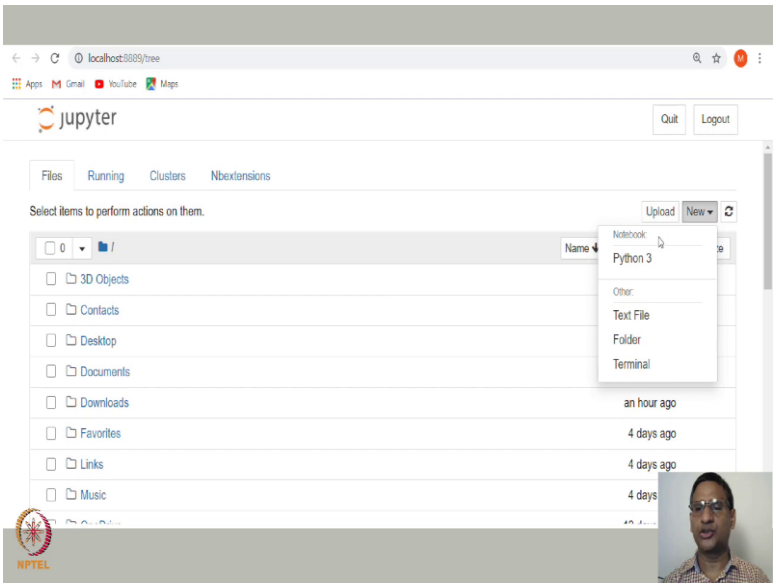
and then hit Enter.

(Refer Slide Time: 13:50)



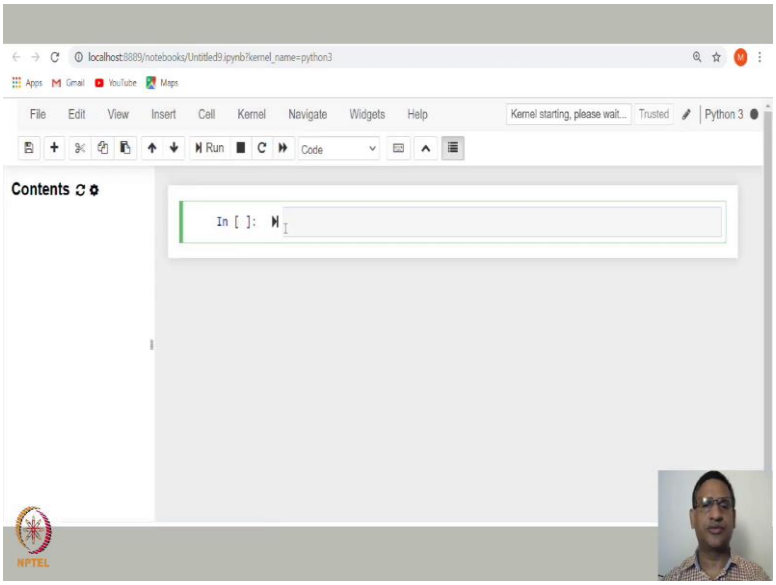
It will start Jupyter Notebook in your browser, so this is the Jupyter Notebook and you can see it gives you some of the files in this directory.

(Refer Slide Time: 14:02)



And in order to get started, you can go to new and then choose python, click on python.

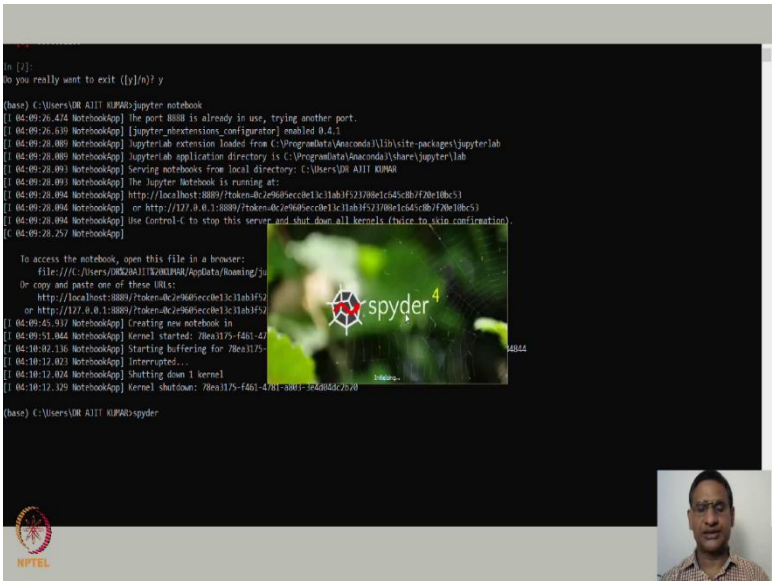
(Refer Slide Time: 14:05)



It will open Jupyter notebook and this is where you can start coding.

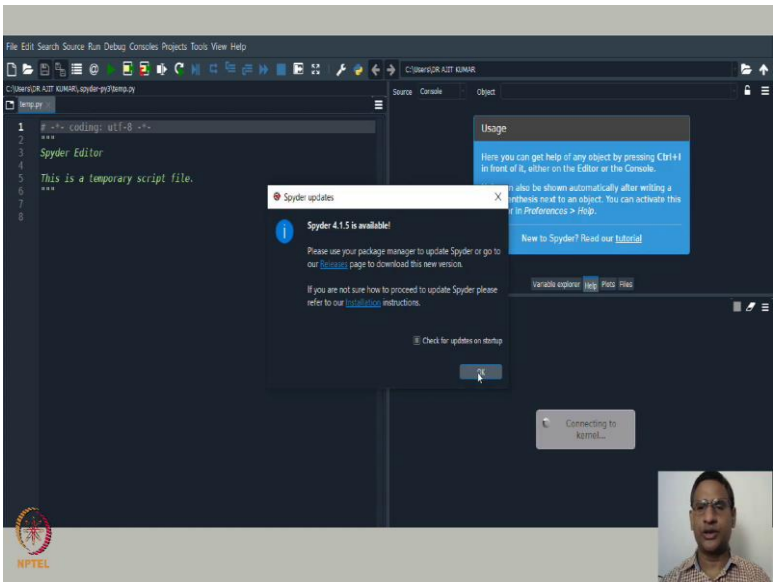
We will be using the Jupyter Notebook throughout this course. Let me exit this and exit this.

(Refer Slide Time: 14:52)



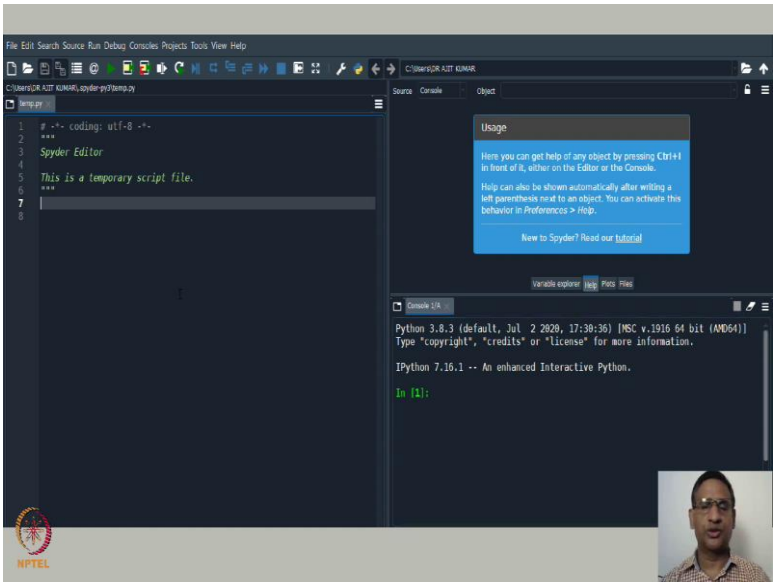
Let us go to again anaconda command prompt. Let us exit this by typing control c. Once you have, you can also type for example, Spyder, Spyder; it will open Spyder editor which is a very good editor for python programming, it takes little bit time.

(Refer Slide Time: 14:57)



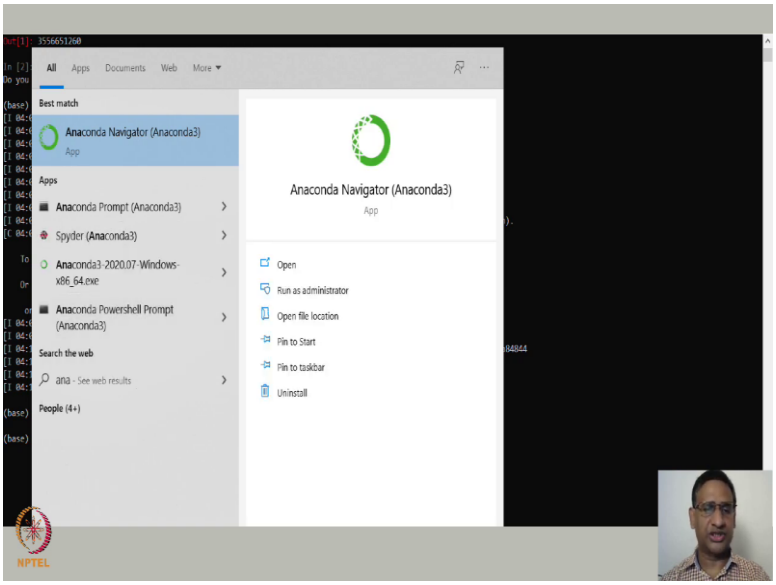
So, this is Jupyter editor and this is where you can type any code and then in order to execute, you can click on run or use shortcuts.

(Refer Slide Time: 15:11)



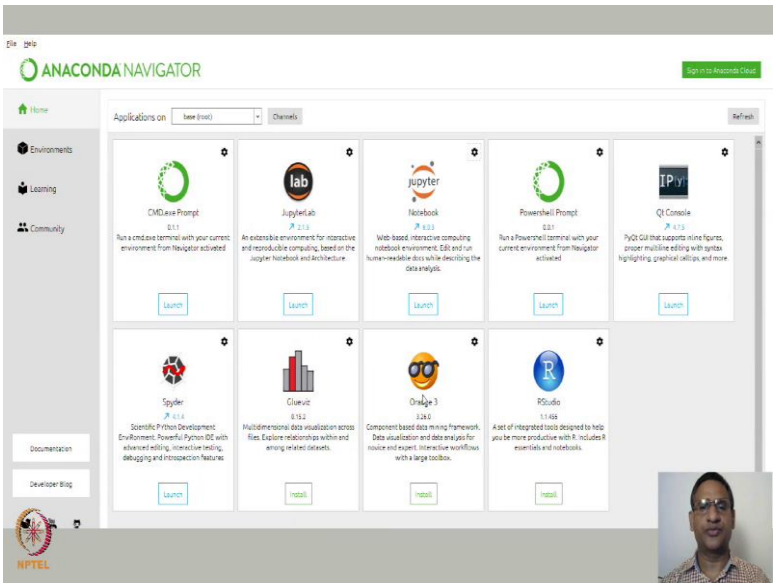
So, here execution is also done through Ipython that is what you see here this is python ipython console, ok. Let me exit this.

(Refer Slide Time: 15:47)



You can also launch all these things, Jupyter or JupyterLab or Spyder through what is called Anaconda Navigator. If you type Anaaconda in search box, then you see there is one Anaconda Navigator.

(Refer Slide Time: 15:57)



So, if you click on this and open this Anaconda Aavigator, this is what you will see. So, you can see here all these things are available from this navigator; you can launch Jupyter Lab, you can launch anaconda Jupyter notebook, you can launch Spyder, it also has various other things

which we may not be using. So, this is another way of launching Jupyter Notebook or Spyder or JupyterLab.

So, we will be actually using Jupyter Notebook throughout this course, uh even SageMath will be executed through Jupyter Notebook. So, I hope all of you ah will be able to install anaconda and we will get started with Python. So, in the next class, we will start using Python from the scratch.

So, thank you very much and see you in the next class.