Decision Making Under Uncertainty
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Lecture - 0
Tutorial - How to Install Octave and using Octave

Hi. We are going to be using a software called Octave. Octave is a freely available software and it is much like MATLAB that some of you may be familiar. Why do we need Octave? Well! For this course, we are going to be doing some things like matrix manipulation, random number generation and use of that, as well as some little bit of numerical integration. For that, we first have to download this software called octave.

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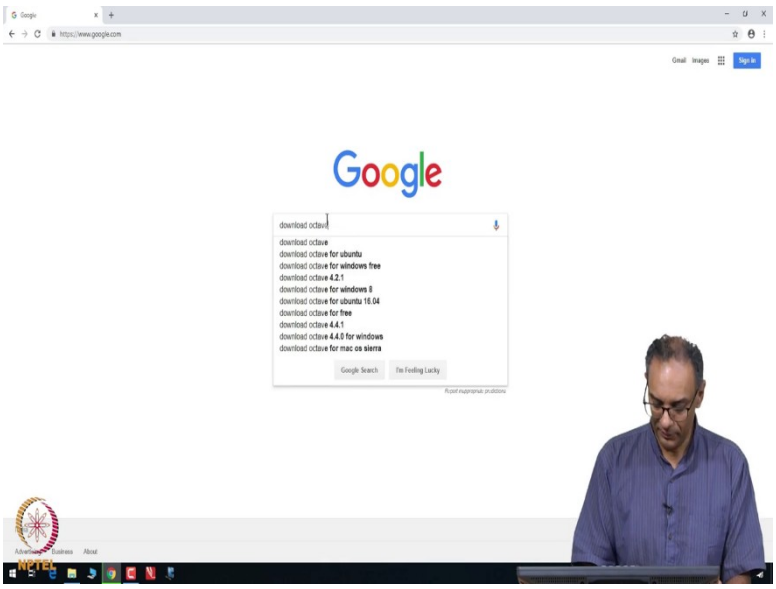

So, use your favorite browser and go to Google and then type – "download octave".

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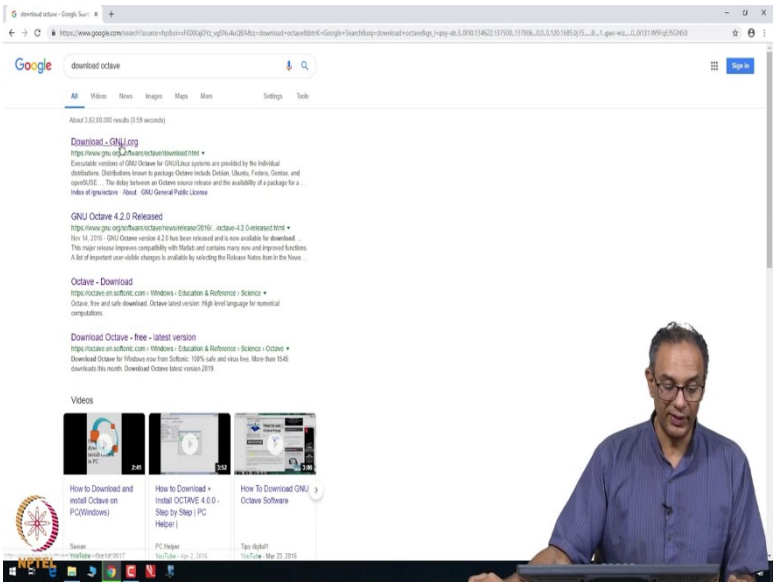

And, I typically like to download it from this GNU website.

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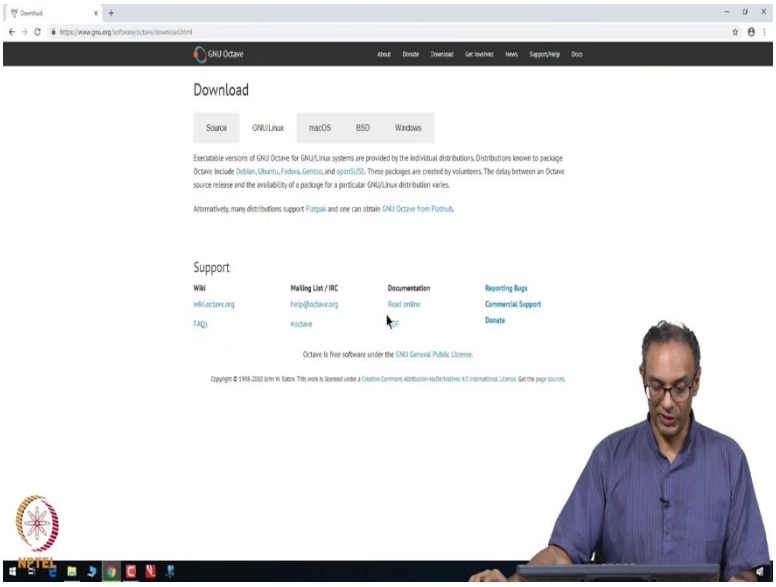

And, if I click download GNU.org, it sends me to this site. Obviously, there are versions for Linux, for macOS, as well as for Windows.

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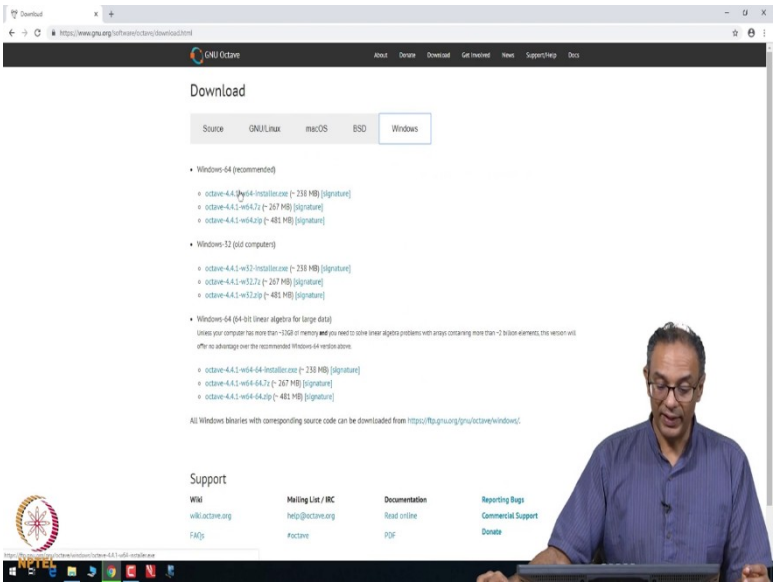

And, since I am using a Windows machine, I am going to click Windows and then, I click the very first point here that says – "octave windows 64 installer". If you had other types (say an old computer), you would click the appropriate category. So, let me click – "windows installer" and it will take some time for it to download.

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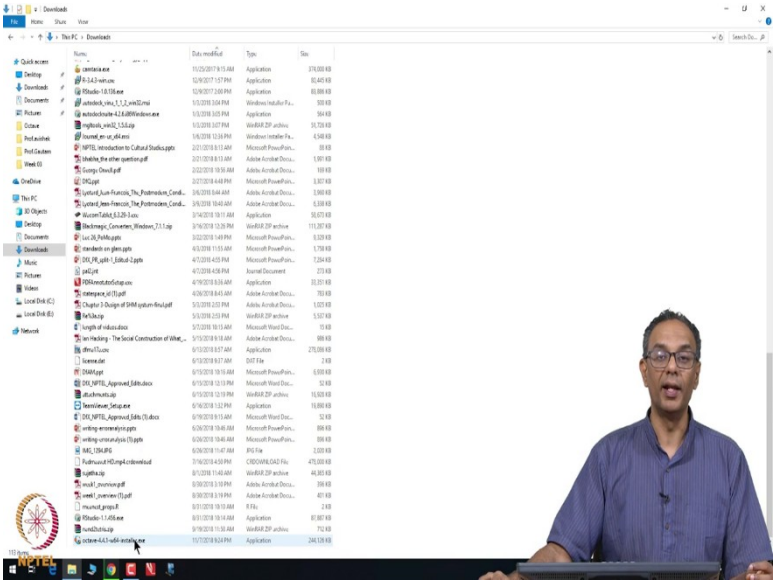

And, once it downloads, you will find the folder in what you call as - "Downloads". That's at least how it is on my machine. You could obviously move it to another place and once you click on that file, it will ask you – "Do you want to install this?" And, you will click – "Yes".

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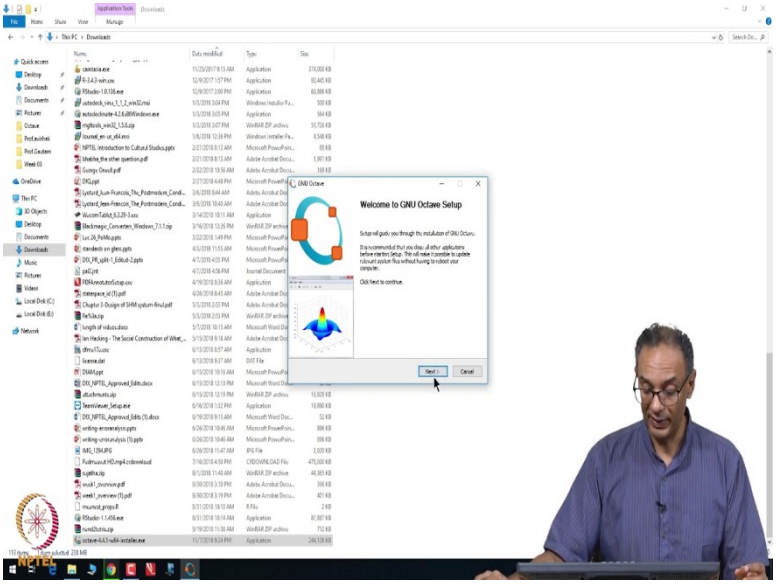

It will go ahead and start to install it. It will first say – "Welcome to the GNU Setup". You click "Next" to continue.

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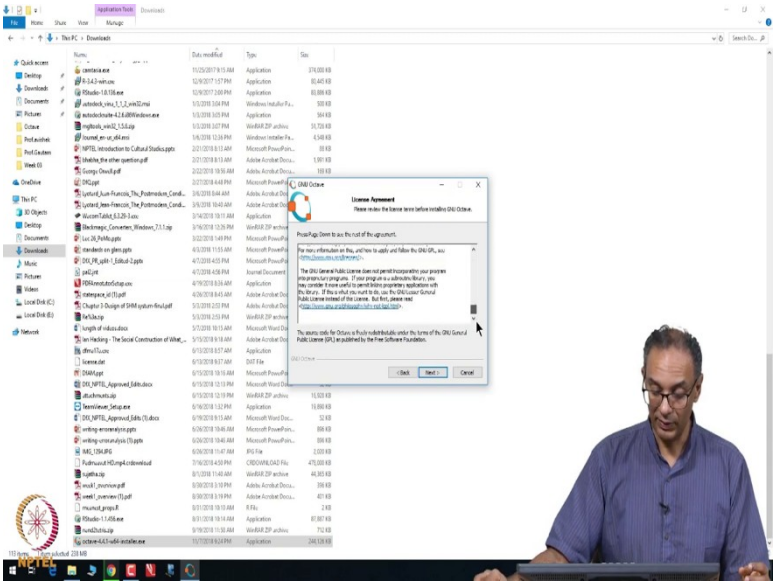

And then, you are okay with this license and click "Next".

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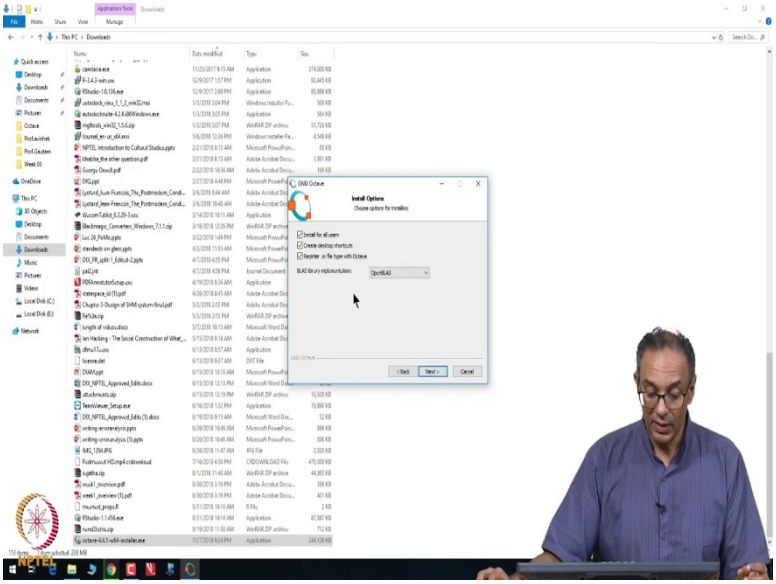

And then, it will give you a few options. And, you go ahead and click “Yes” for all users. That is typically what we do. And, you can register with Octave and things like that. Also, it creates a desktop shortcut and you click “Yes”.

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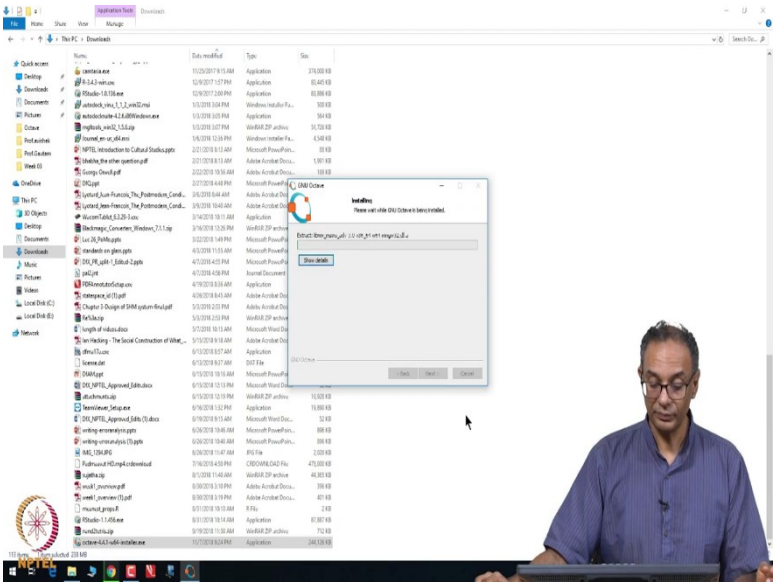

And, you hit “Install”. It will go ahead and start installing. It will take a few minutes for it to completely install and once you are installed, you should be able to see a little icon on your desktop that you can click and use.

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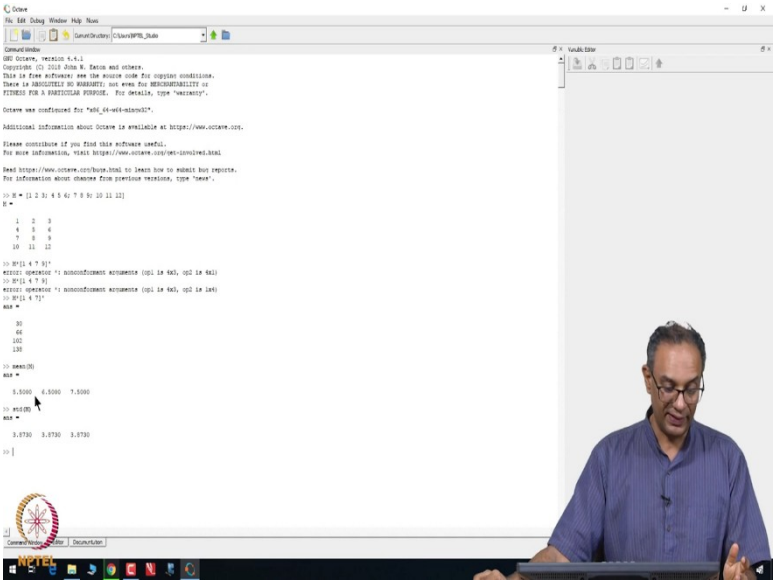

So, once you click on Run Octave, Octave will open a screen up like this.

And, if you go to the very bottom of the screen, there are three options - Command Window, Editor and Documentation.

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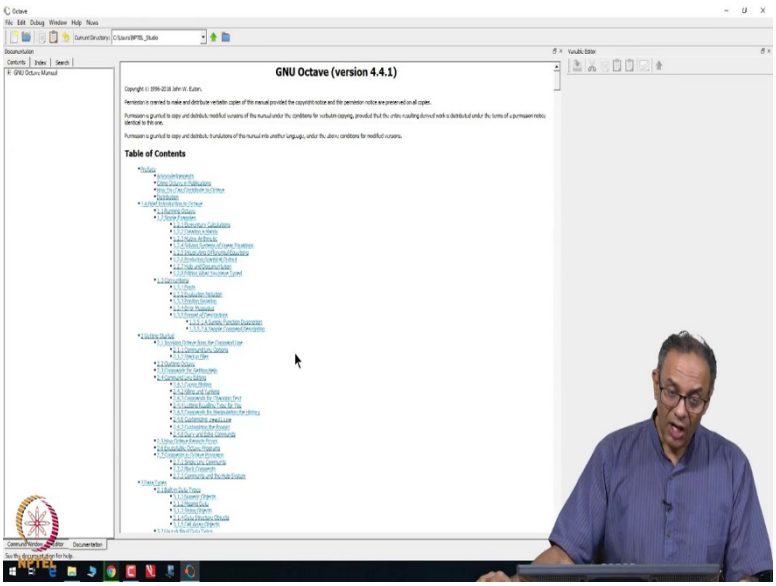

The documentation tells you a lot about how do you go about getting started, what you need to do, what are the data types and so on.

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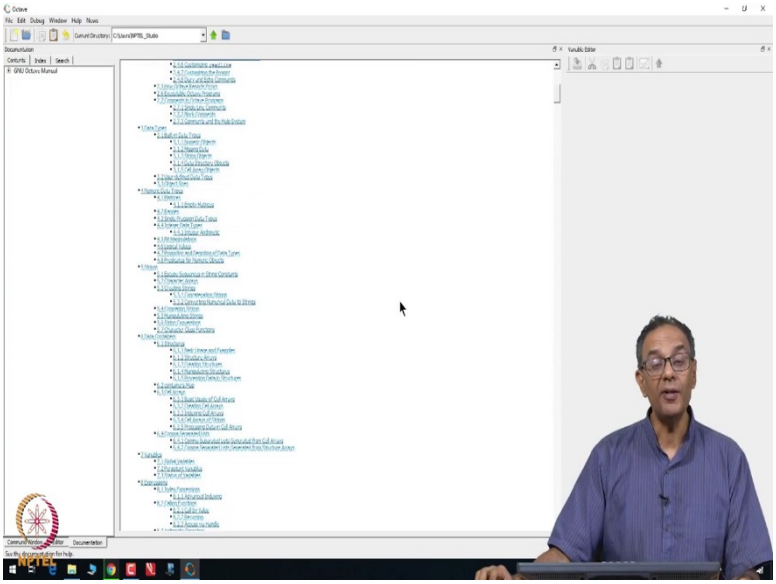

If you are not familiar with the software, I would encourage you to look through this documentation. Now, before we go into the editor, let me first start with what we call as Command Window. So, in this command window itself, you can directly put down computations.

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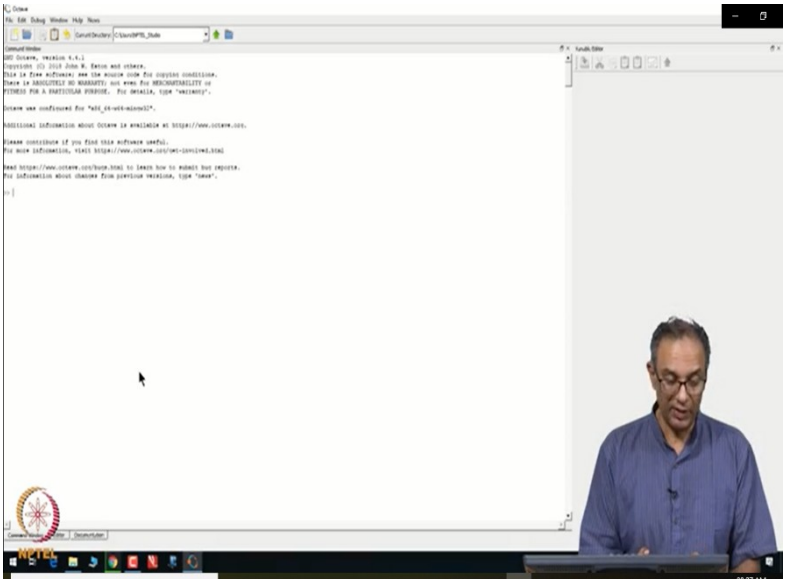

For example, you can write down a matrix M as 1 2 3 and then, the second row is 4 5 6 and the third row is 7 8 9 and the fourth row is 10 11 12. And, if you close this, this gives you a matrix which is a 4 by 3 matrix with these numbers that we type. Notice how I type the

numbers. I type [1 2 3; 4 5 6; 7 8 9; 10 11 12] with semicolons in between and that basically separates various rows from each other.

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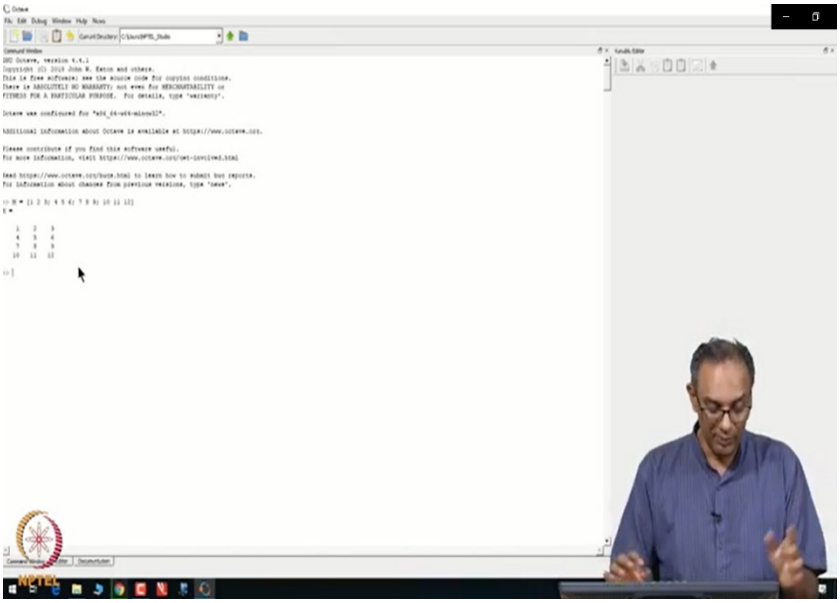

You can do matrix manipulations such as you can do M times the matrix 1 4 7 9. So, remember this is a 1 by 4. What we need is a 4 by 1 times; you put the prime out there that tells you that you have to multiply by the transpose of that. Oh yeah! I guess I did not realize. I need to have only 3, not 4. So, 1 4 7. It gives you an error every time you make a mistake. So, it tells you that something is very weird. This is something very nice about Octave and then, you click here, it multiplies by 1 4 7 transpose.

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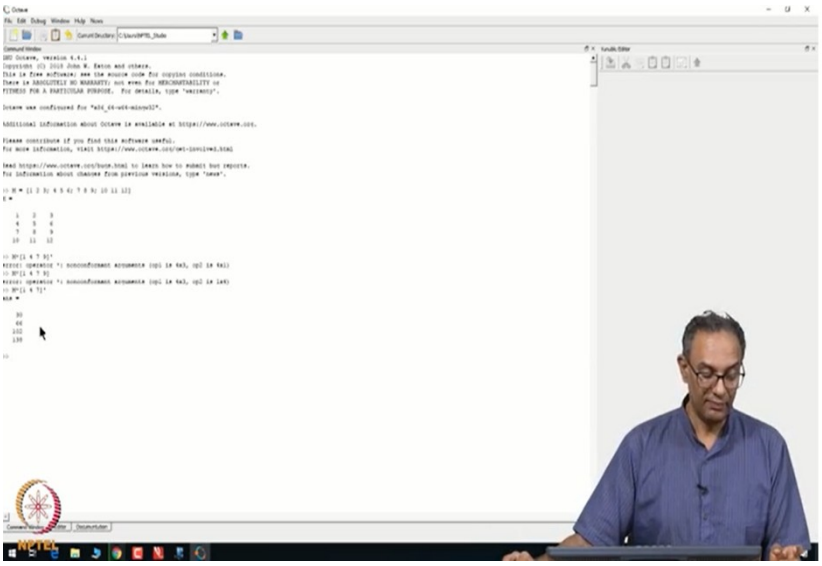

So, you can do a whole bunch of matrix calculations on the command window itself.

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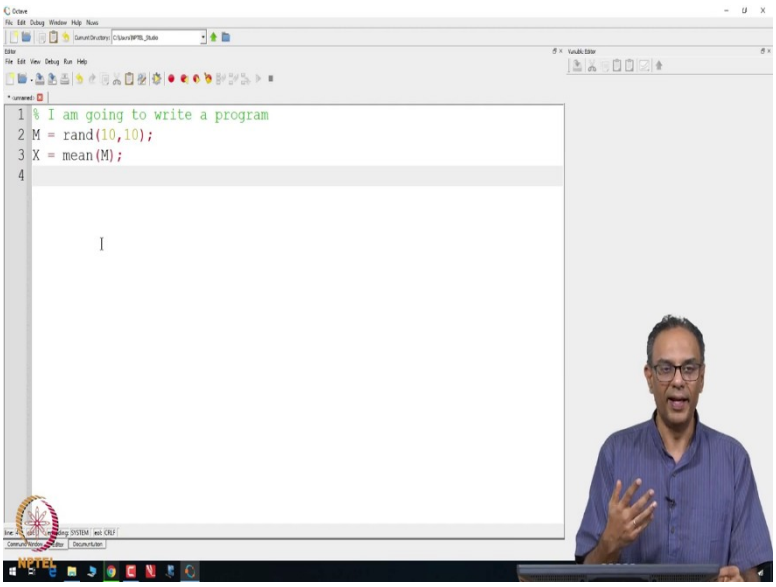

However, many times what we do is, we write a little program using the editor function. In fact, there are many commands that are even available right here as functions. For example, if you want to compute say certain functions such as the mean. Let us say, we take the mean of M. It is an already inbuilt function. You do not have to write a program to actually compute the mean. However, you need to learn some of the strangeness of Octave. When you ask it to compute mean, it will compute mean for each column here of this M.

So, 1+4+7+10 divided by 4 is 5.5 and so on. So, it computes this; they are inbuilt functions. There are functions to compute the standard deviations as well. It will give you the standard

deviations of those quantities and so on. Now, sometimes the inbuilt functions are not enough for us. Then, we have to sit down and write a program using the editor.

I am not going to write a program. But, I do want to show you by placing this percentage symbol, you can write something like – "I am going to write a program" and after that, you hit Enter. So, what have you put in this symbol of percentage is not going to be executed; it will just ignore that line. Here, you could write something like M is a random matrix with 10 rows and 10 columns.

And, you want to compute the mean of M. You can write a little program like this and then, also look at something like what is going to be the value of this vector called mean. You can assign that a name such as X equals mean of M. Then, if you run this program, it will basically compute the mean.

So, you can write a long program. I am not going to give you such programs here in this introductory video. However, if you go to the course, you will find nine programs in there and I would have written out the various programs. My suggestion is to go through those programs, understand what is going on. In my lectures itself, I would have gone through some of that. But, I would recommend that you download those programs and then see line by line what is going on, make any edits, play with those programs. I am not expecting you to know how to write your own programs in this course. But, I do expect you to be able to take the programs that I provide, make some edits to them, run it by yourself and see how it goes.

So, this is a very short tutorial on how to download Octave and what are the various options. Let me quickly summarize. To download Octave, go to Google and ask for it to download the software called Octave. Once you do that and you install it, you will get this Octave software up and running which you have to do. You cannot run your programs that we provide unless you get this software downloaded and running. Once you do that, there are three options. Either you could use a command window directly or use one of these programs or write your own code. I do not expect you to write your own code right up front.

So, I have provided 9 pieces of code that you can take and manipulate however you want to, in order to provide the results that you need to for this course. If you have any questions about Octave or how the program is written or what a particular part of the code is doing, please feel free to email me or the TA and they will be able to help you with how the various parts of the codes are working. Thank you very much and I wish that you have a wonderful

time exploring this fantastic software called Octave and let us know if you have any questions or suggestions.

Thank you.