Welcome students to module number three for the paper programming with MATLAB. So, in this module, what we're going to see is, various display format, elementary math building functions defining scalar variables using the assignment operator, rules about variable names and predefined variables. So, learning outcomes based on outlines you will learn about various display formats, various elementary math built-in functions will learn to defines scalar variables using assignment operator. Some rules about to declare variable names and some predefined variables in MATLAB, so these are some of the elementary math built-in functions. So, first is something called a square root, which finds the square root of a given number. So, this X can be any scalar value, for example, over upset sqrt 81. I write this in the prompt next to those two. Then signs or you call is a prompt. I just sqrt 1 and present I'll get. Answer is 9again in the default variable in is because I'm not as any variable to it. So, well I can say find sqrt 9. I'll get the answer is 3 and so on. So next we'll see something dollars. What if I don't want to find the square root and I want to find say the 5th root or the 3rd third root or the 4th root of any number. For example, I want to find the 5th through the nobility. So, I'll say NTH root,80, comma 5 so it will do. The function will find the 5th root of 80 and then I press enter. For example, if I want to find the cube root of 27 so the cube root of 27 and nothing but three, so I'll say NTH root, 27 comma, three, Allegan to answer as three next, if I want to find the exponent, erase 2 some number here is 2X, or there's 25, so I can't use it directly or using something called you something dollars Exp function. It means he raised two only. So, for example I'm saying over here exponent. In Bracket 5, so it means here as 25. The answer is nothing, but if you want to write this and press enter, you'll get answers 148.4132. So, you can try say expert to experience on depending on what value you want next. Absolute value. Suppose we want to find absolute value. What is absolute value? It is nothing but the positive get the magnitude of that particular scalar value or the positive value. So, if I say BS in bracket minus 24. And press enter. What I'll get is I'll get. The negative part will go, I'll just get the absolute value 24 so I can say a BS minus five and press enter. I'll get answer is 5. It just gives a positive value, removes a minus sign altogether. Next, if you want to find the natural log natural log in nothing but log to the base e. So, the function for that we don't have something called Ln. What we use is log only we say log and whatever you want to find. So, I say log 1000 in the command prompt in the command window and it's presenter. I get my answer is 649078. Now if I want to find log to the base 10 to base 10 logarithms, I use log to base. I write log 10 impacted X and say log 10 for example as a log 10,000. So, the log log to the base 10 of 1000 in nothing but three. So, if I say log 1000, answer will be 2. Log 9:50 will be one, and so on. Next factorial of a number. So, what is factorial of a number? This in your previous classes. So factorial, what it does is supposed to find factorial of five, so you find it I say 5into 4 into 3 into 2 into 1, so it will be nothing but 120. So, I can say factorial of 6. So, but remember, always X must be a positive integer, so factorial can only found of positive integers such as factor of 6. I'll get 720 and so on, but remember, it should just ask should be this X should be a positive integer. Next, defining scalar variables, the assignment operator now variable is the name made of a letter or a combination of several letters or digits that is assigned a numerical value. Once a variable assigned a numerical value, it can be used in mathematical expressions, functions and in any MATLAB statements and commands. So, what is a basically a variable? It's nothing but a name for our memory location. Now, when a new variable is defined, MATLAB will assign some space memory space to that variable. Now, if a variable is assigned anew value, the content of that memory location is replaced. For example, I say equal to five and then after some time I say equal to 10, so that value 10 will get updated in that memory location. Now in MATLAB, the sequel to sign is called. Assignment operator did not call. We call it the assignment operator, not the assignment operator, assigns

a value to a variable. The left-hand side is always your variable name. The right-hand side it can be an expression or it can be a number which. We have seen earlier. It can include again numbers variables that were previously assigned as well. So, when the enter key is pressed, the numerical variable. Alright, and said it gets assigned to that variable name, so the format is given over your variable name equal to a numeral numerical value order. Computable expression. And then you press enter. So, some examples are shown over example one. I say try to define scalar variable is X = 6. Press enter in the Command prompt command window and press enter. I get X equal to six. Similarly, I can define an expression. So, the previous value X was six over here. So, if I substitute this value six, it was six for the 24 -- 2 and press enter. So, I got the answer as22.So we are example three. So, if Input a semicolon after X equal to six, the variable X is not displayed because of semicolon type at the end of the assignment. Now several assignments can be done on a line by using a comma operator like I can say equal to 3, comma, backward to it and press enter. So, both of them will get executed in one shot rather than saying equal to the presenter. Then again sequel to a presenter. And remember if there are more than two expressions or more than two declarations, it will always go from left to right. Statements are executed from left to right, so equal to

3 first. Then be equal to it. Next display formats in MATLAB, so the default display format is format short it means fixed point with four decimal digits after decimal point. For example, I said 22 / 7 and presenter in the command prompt. What I'll get is I get 3.141429that is 4 decimal digits after the decimal point. Next there is something called a format long. If I want more precision, I'll say format long. I'll type this in the command window before I type this expression. And then press enter and then try this expression. 22/ 7 I press enter. Now I get15 decimal places after the decimal point. Now these are known as fixed point format. If I want to scientific notation, scientific notation is similar to the normal fixed notation. Only thing now if you see the starting part over here, it's almost similar, but there's something added to it. It is a race 2.

Plus 00 it means nothing but into Tenris 2. Zero, so translations are nothing but one. So, this and this is almost the same. What is this value was 31.4 and 31.4 and all this big value? So, it was31.4 in the format logging in format long will happen is this would again be displayed that it displayed as 3.14 and this entire number. But now it would be rich 2 or E + 0 one because. You need this because I said 31.4. Similarly, if this was 314, so this would become zero. You have to shift it that many places shifting toward the right so 314if I want this. 3.14 This will become into tennis two. So, this will become 02 and so on. Now format Shorty is similar to format short. But only thing again, it is like similar to the scientific long notation with four decimal digits, but with the with this E + + 0. So, if I want to display 31.4290 then this will become as 3.1429E wrist plus 01. Similarly, if I want to display 314-point 291something, so this will become then 3.1429. That plus 02so this point remains. Or your only. This is known as scientific notation. Next format longer. Did you choose between format certain formats or tea and format Long ji it chooses automatically between that fixed or floating point of the scientific notation. So, either so when I enter this area, it automatically shows the normal fixed-point notation. And audio again when I use it, it shows the fixed-point notation. Now there are more display format bank. What it does is when I type in this expression 20 by 7 it will run. Up to two decimal digits if you remember it was 3.41429 in the previous slide, so now it is just rounded up to two decimal digits. Next format compact and format lose. It eliminates empty lines to allow more lines to be displayed, like for example here in MATLAB there's some empty lines over here. So, if I use format compact I'll get such type of compact format when there are no additional lines like this. Now if I want to go back from this compact format to this format. So, commanders format lose. So, when I say format loose and then type this expression what we get is I'll get back me lose. I'll get back my additional lines over there next predefined variables and give you keywords so MATLAB. There are some. So, whenever you define a variable name, be careful not to use predefined variables and keywords like some of the keywords are break case catch continue else while function all the one which I've highlighted in red are the ones which we are going to use in the in the modules ahead catch persistent driver never going to use, so the one in red are nothing for loops to define functions and so on. So never use this key word to dispel the centurion is next number π . If you want, I will just say pi. Now EPS is the smallest difference between 2 numbers is equal to tourist to minus 52, which is approx. Approximately 2.2 in two years 2 -- 16. So, any two floating point numbers. This is the smallest difference which is possible. Now if I want to define a complex number, I'll use i for example. I want to find a complex 3 + 4I, so what I'll do, I'll just say 3 + 4 and add I to it so I'll get my complex number. INF is used to define Infinity NAN stands for not a number. So, if we try to in the command prompt. Or Infinity divided by Infinity you'll get. NAN stand for not a number. These are some of the rules which need to be taken care of when we define variable images to begin with the letter it can be up to 63 characters in MATLAB, 7 in Mexico, 21 characters, it can contain letter digits and the underscore character. It cannot contain punctuation characters. It is case sensitive. It distinguishes between uppercase and lowercase. For example, a small or lower equal to five and not the same as uppercase equal to five. Then no spaces are allowed between characters. You can use underscore fields required award. The use of names will be built in function like. Don't use square root or log, so avoid that. So, for example ABC equal to five is a valid variable name, one ABC. Not aware valid variable in because you always start with the number. And remember avoid using built in functions. So, these are the references.