

Welcome students with paper

programming with MATLAB.

So in this module we will be

learning about nested loops and

nested conditional statements.

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So the outline will be or nested loops

and nested conditional statements.

The learning outcomes the student

will be able to use nested loops

within a script or function file,

or use conditional statements

within a script or function I.

So what are loops?

In fact, nested loop loop and

conditional statements can be nested

within the cells and each other.

So earlier in the earlier module we have

seen how to use loops like the for loop,

the while loop and even conditional

statements such as if LC fails.

Viola and so on South we can always use all
of them within themselves or each other.

In fact,

there is no limit to the number of loops and
conditional statements that can be nested,
but we need to remember that for each
case for while or whatever we are using,
we're nesting it.

We must have a corresponding end statement.

So let us take an example of the first
step of nested loop that for within a fall.

So here there are two loop there is one
outer loop and there's an inner loop that
is outer loop for loop is going from,
so the initialization of l.

So it is going from one and the
last value is going to be north,
so whatever is that it might
be some 4-5 anyone that is?

And the increment over here for both

the inner and the outer loop is 1.

So the middle fellow which is

there over here is going to be 1.

So first,

what is going to happen is

that and always the.

If you see the outer loop will give the

value one, then we'll enter this OK,

as long as the condition is satisfied

that I is less than or equal to north,

then the inner loop is going to get executed.

So the value of J also will

get installed J equal to 1.

One that we can check that as long

as it's not less than equal to M.

In fact,

as long as it is equal to less than

equal to that it will enter and

execute all these statements which

are there in the inner loop and then.

It will complete this loop till the

value of $J = M$ because it's going to

increment by one for each iteration.

Once that is done, what will happen?

The value of I will be incremented by

two by one and so I will go to and.

Again,

we'll check whether it has reached end.

If it is not,

it will come inside in the inner loop

and the inner loop again will go from

again it will start restart from one

till whatever is the value of M that is.

So this is going to repeat.

So the inner loop.

Again and again.

In fact, Outer Loop will stop only until

this I reaches north and for each value

of I so each time I increment the value

increments by one or increases by 1.

The next nested loop that is inner

loop will get executed and M times.

So overall we see the Group of commands

that is now to loop you are going

to get the group of commands are

executed M into North Times L Times

inner loop and M times the total.

It will be M into North Times.

So this is the flow chart

of the nested for loop.

So first it will check for the

condition of the outer loop.

If it is true,

it will enter and it will then check

the condition of the inner loop.

If the condition of the loop also is true,

it will go on to execute the statement

which are there within the inner loop

and then update the count of the

of the inner loop and again check

the condition of the inner loop.

As long as this is true,

it will get executed,

as we've seen earlier,

it will get executed for every ISM.

That value of model can be value,

it will get executed that many times

as long as this inner loop is true.

This inner loop statements are

executed and the count is updated by

whatever count is specified next.

In case in case the inner loop

turns out to be false,

it will go out and execute the

outer loop statements and then

update the count of the outer loop.

And again we'll check the now condition

of the outer loop if the condition

of the outer loop is true again,

you will come and check the condition

of the inner loop and the inner

loop will get executed for that

many amount of times,

and if the outer loop condition only turns

out to be false after some time will happen,

it will exit both the outer loop

and it will go outside the.

Nested for statements and can execute any
statement which are there outside the loops.

So again,

this simple example like now we just

specified the value of min Noa.

In fact N 3 and minus four.

So the inner loop and outer loop.

So if you see over here for the other

example I is 1 when I is 1 for first

the value of I will be one and then OK.

I is not less than equal to three,

so it will enter.

This will come in the loop.

So for J equals to one.

So the value of also believe one and

J is also less than equal to four.

So if you see here I will be 1.

And J will take the values of 1 2 3 and four,

then once the J becomes in fact 5,

so this condition will no longer satisfy

for the last value specified is 4.

Over here will come in the outer

loop and the

outer loop will increment by

one that I will become two.

And again, this inner loop will get

executed for four time 1234 and then

again you come out of the inner loop.

You go to the outer loop.

I will increment by one.

I will become three and again,

so I will come three and then look again.

We'll get executed.

421234 and then when I become four,

this condition no longer

will satisfy the vehicle.

Four is no longer in fact

less than equal to three,

so it will go out of the.

And from the outer loop as well.

So if we take another example

that is of 1/2 piramit,

so again we are going to use

using nested 4 over here,

so I will go from one to five with so

starting value 1 increment will be one

and the final value is going to be 5.

And the inner loop that is J having

J as the variable will again start

from one increment will be one,

but it will stop at.

So simple programs.

So what do you want to do?

Is it is going to print the value of G.

So first time the J is going

is dependent ion here.

So if you see first the

value of I will be one.

So J will start from one increment is 1

and the end value also is I so it is 1.

So what is going to happen?

It will print it will enter

this one is equal to 1.

The more you enter and is going to

printf the value of J SO J will be it

will see you in the command window.

It will show one and now next

time we'll just we'll increment

the value of J will become two,

which is not less than equal to 1.

So what will it will exit the

loop and go to the outlook,

but when it goes to before

go to the outer loop,

you can see there's a printer back slash,

no,

so it will go to the wait in the next line.

So when now the value of I will become two

again of the outer loop and we come inside.

Group now again be initialized to one,

so J will be 1,

Increment 1 and now the final

end value is going to be 2,

so we'll come inside printf percent DJ.

So now the value J will be one,

so it will print one.

Next we will come inside the loop again

into J will increment by 1 Loop 2,

so iOS 2 right now.

So 2 doesn't equal to yes true.

So to enter this loop and

print the value of J again,

which is right now two now third time when

it comes over here 2 and we know that.

Kind of a little girl.

I was two so three not less

than equal to so it will exit

the inner loop and go to

the outer loop again.

And so now I will become three.

So J will again now go from now

instead of going from one to two,

it will go from one to three for.

The value of `i` is incremented by 1 to.

It was two. It has become three now.

So when printing we again will print

one print two and print three and so on.

It is going to print because

final value of `i` is 5.

So we are going to get this.

No pattern

112123123412345.

Another example over here again

will be a multiplication table that

is from of 125 that multiplication

table and it is going to till 10.

So again the nested.

We are using the nest,

so `i` is going from one to five.

The increment of 1 and `j`

is going from one to 10.

Is the increment of 1.

So `F` printer, what we're doing in a loop

is percent D into percent D percent.

So we are just printing the value of

IJ and what it will get multiplied with.

So first time the value of

I is going to be one,

so it will enter the inner loop,

so one is less than or equal to five true,

so it will enter in the inner loop

J will get initialized to one,

one is 1 less than equal to.

And yes, we will enter the inner loop

as well and it will. It will do.

It is going to print I into J,

so it will take the value of IJ.

So it will be 1 into 1.

And then it will also going to multiply

this over here one into into J.

So we are going to get one into

one is equal to 1. Then this value.

This is going to be.

It's going to get repeated as long as.

So what you're going to happen are
value of I is going to remain fixed
to here only RJ is going to increment
by one each time and that value of
I is going to get multiplied by J.

So we're going to get one into
two is equal to two and so on
till 1 into 10 is equal to 10.

When the value of J becomes 11 then it
no longer satisfies this condition you go.

That this inner loop we will
go to the output.

Right now the value of I will be 2 again.

It will enter the inner loop
and the value of J will be again
initialized to one and I will,
so one is less than 10.

Again will come inside,
but now we'll get the table of two
because now the value of I will be
2 and G will again go from one to 10

and it will do the multiplication as well,

and so we will get the table

from one to five.

And this one printer back slash

channels once the outer loop,

we increment when the inner loop

it gets included ten times,

then eleven time it will fail will

come out this back slash and what

we'll do this to the new line over here.

So every time we go to a new table

we are going to go to the next line.

OK,

next we'll look at Nester conditional

statements so we have seen the nested.

We can always use nested

conditional statements.

I think that is if within if all

we can also mix if the for a while

that doesn't matter,

so we just look at some example.

So if nested if something looks

structure looks something like this.

So we have a.

If conditional expression one that

is outer again say outer expression,

if conditional expression two,

this is the unif and your,

so you know if if else end.

So the end this is associated with

the inner if and else and this end

is associated with the outer if.

So this is the flow chart

of the nested if statement.

So condition one if condition one is true,

it will come and check for condition two.

If it's false,

it will directly go to the else

block and after the else block

it will go to the outside.

Which are there if if the condition

is true to come and check

condition #2 if that also is true,

it will the whatever is there in the inner.

If block will get executed.

If the inner condition two is false,

it will execute the else statements

and finally it will go to the

after executing statement.

Go to the MATLAB outside and

you know once we know you block

statements executed then later

on it will also go to the teams.

Are there statement which are there?

So let us take an example of nested is.

Who simple example?

You'll just check if the any three numbers

are equal, so will it take 3 numbers?

We'll say #1, #2, #2, #1, #2,

#3 input will use input function,

enter number one, enter number 2,

and enter #3.

So what we'll do in the outer is is that

we'll check if NUM one is equal equal to.

We'll use.

This equality operator

is equal to NUM two yes,

then enter and check.

The second condition is none.

2 equal equal to NUM 3.

If both this condition satisfy,

we'll say printer yes,

they entered numbers are equal,

else which should print off that the enters.

Enter numbers are not equal,

and even if in the first if itself

if NUM one in this number equal

equal to two if it was false here

only it would have there was no

need to enter into the second.

If it's directly would have,

it would go to else and it would say

fprintf the entire numbers are not equal.

So let us take if we if we go in

the command window MATLAB and we

try to run this code, it's 1:00 PM.

So it will wait for us to enter.

It will say enter number one.

We'll enter 5, enter number two

will enter 5 enter #3 will enter 5

and once you press enter it will

get his due and we'll see that yes

the this message will pop up saying

yes the enter numbers are equal and

case two suppose again we run the

code and we say again wait for us

to enter the numbers enter number

one we will again enter 55 and

the third number will enter is 8.

So clearly what will happen over here is.

Number one was equal to #2.

It would enter the 2nd if statement

and but in the second if statement it

will find that this is no longer true,

so it will go to the else of the

second in the inner statement and it

is showing us the entire numbers are.

The third case would have been where

all the numbers were not equal.

So in the first if statement itself

where number one is equal that would

fail and it would directly go to.

The second effect is of the outer,

which is that it would come over

here and would again display.

Centered numbers are not go.

In fact, in the.

Another example wherein we see wherein

we can mix the four and the lift together,

that is a OK the if statement as well.

As a loop statement inside so

another example is over here.

So this is again a simple code.

It is checking the maximum value

which is then array and it will also

telling us where exactly that maximum value.

So just giving the value as well

as the position in the array.

So simple array is only 12945.

To a variable array array A.

So what we do is we will first say let

Max be the first value of the review one,

so that is inside that and

position also is 1.

So the first we'll say that the first

element in the array is maximum and the 1st,

and you do that the first position.

Next what we do is we will use

a loop for loop over here.

So we are already said

that our first value one,

so we don't no longer need to start from one.

We'll say I equal to two till length of a.

So whatever is the length right

now length that's the build.

What do you do?

It will give us the length of the array,

which is nothing but five,

so this fall is going to go from

two to five with the increment of 1.

The increment is not specified,

so wherever the increment is not specified,

we had seen earlier that by default it is 1.

So I will go from two to five so it

will take values of 2, 3, 4 and five.

So after that, so first the value

five will be 2. It will enter this,

so two is less than five, so good it

will enter this condition fulfilled.

It will enter the follow and what will do?

It will check if your file

is greater than Max now.

For the first value,

in case second element that is now

of two that is greater than Max,

what we'll do it will make the

2nd element the maximum fellow.

So in this case we take.

Our second element was in which

two first element was one.

So two in fact was greater than one.

So what will enter this if it will

make Max the 2nd element as the maximum

value and the position will change to two.

So this will.

So next time we'll come to 9 again,

the value of I will increment 2-3,

then a of three.

A of three is 90.

Is it greater than Max?

Yes is greater than two.

It will so Max will become your of

three and position will come three.

Next time I will take the value of four,

which is still less than

five at the length of it.

So four if you take over here a

of four is not greater than Max,

plus four is not greater than nine,

so it will not even enter this.

It will directly go to equilibrium and I.

I will become five.

It will get into is a of five which

is also five or greater than Max.

No, so will not enter there.

Then directly it will now the value of.

I will become six so it will enter the exit.

The follow up as well.

It will come out of it and if it's

going to display the maximum value in

the array is so the value what is and

it is position is 8% to replace the

value of whatever is of Max and position.

So if we go execute this code and look

at the command window what we'll find

is the maximum value in the array is.

So percent did this maximum order the Max,

which was nine we found out.

So it will come over here

and its position is that.

3.

So these are the reference

book MATLAB and introduction

with application by Amos Gilad.

Thank you for this.