Use your own laptop, run Matlab and try the following examples with a single Matlab command and see what happens:

MATLAB Tools

Up to now, we saw some Matlab basics. Now we will learn how to deal with selection statment.

Let's continue with matrix operations

```
v=[5;10;7;18;20]

v =

     5
    10
     7
    18
    20

>> [m,idx]=max(v)

m =

    20


idx =

     5




>> v1=[54 33 4 78 32]

v1 =

    54    33     4    78    32

>> v=v1(v1>6)

v =

    54    33    78    32


>> x=zeros(6,3)

x =
```

```
     0      0      0
     0      0      0
     0      0      0
     0      0      0
     0      0      0
     0      0      0


>> x =

    12     13      4     10
     1      6     11      2
     8      5     10      7
     4      9     11     15

>> x([2,4],[2,4])

ans =

     6      2
     9     15


>> x=[42 10 5 26 7]

x =

    42     10      5     26      7

>> y=[59 72 25 6 10]

y =

    59     72     25      6     10


>> z=[y;x]

z =

    59     72     25      6     10
    42     10      5     26      7


>> z=[x,y]

z =

    42     10      5     26      7     59     72     25      6     10


>> z=[y(:,1:3);x(:,1:3)]
```

```
z =

     59     72     25
     42     10      5



>> N=[3 1 2 5]

N =

      3      1      2      5

>> M=[1 2 3 4]

M =

      1      2      3      4

>> P=M.*N

P =

      3      2      6     20



>> M=[1 2 3;4 5 6; 7 8 9]

M =

      1      2      3
      4      5      6
      7      8      9

>> M(1:3,2)

ans =

      2
      5
      8



>> M=[1 2 3;4 5 6; 8 7 6; 5 3 2]

M =

      1      2      3
      4      5      6
      8      7      6
      5      3      2
```

```
>> N=M([1 end],[1,2])

N =

     1     2
     5     3
```

Let's see what happens when we use sprintf and fprintf functions

```
>> a=sprintf('Hello')

a =

Hello

>> a=fprintf('Hello')
Hello
a =

     5
```

Selection Statements: FOR, IF, IF ELSE, Nested IF ELSE

1. **FOR statement**

```
>> for i= 1:2:10
disp(i); end
     1

     3

     5

     7

     9


>> for i=10:-1:1
disp(i); end
    10

     9

     8

     7

     6

     5
```

```
      4

      3

      2

      1
```

```
>> for v= 1:3
a=v
b=v^2
end

a =

      1


b =

      1


a =

      2


b =

      4


a =

      3


b =

      9
```

2. **We can sum up the elements of a vector using two methods: sum function or statment FOR**

```
>> x=rand(1,7)

x =

    0.9157    0.7922    0.9595    0.6557    0.0357    0.8491    0.9340
```

```
>> sum(x)

ans =

    5.1420
```

Or

```
>> y=0

y =

    0

>> for i=x
y=i+y;
end
>> y

y =

    5.1420
```

3. **The IF statement**

In the following example we want to check whether the value of A is negative, if A is negative then the variable is modified by using absolute value function. If A is positive nothing is changed.

```
>> A = rand(1)

A =

    0.2785

>> if A<0
A=abs(A)
end
```

```
>> A = -20

A =

    -20

>> if A<0
A=abs(A)
```

```
end

A =

    20
```

4. **The IF ELSE statement**

   Here the IF ELSE is used to choose between two statements.

   ```
   >> n =15

   n =

        15

   >> if n<6
   c=n*2
   else
   c=n/2
   end

   c =

       7.5000



   >> if 3<4
   '3 is less than 4'
   else
   '3 is not less than 4'
   end

   ans =

   3 is less than 4



   >> A = 15

   A =

        15

   >> B= 7

   B =
   ```

```
    7

>> if B>A
'B is greater than A '
else
'B is smaller than A'
end

ans =

B is smaller than A

>> x = rand;
>> s='the number %g is %s 0.2\n';
>> if x<0.2
fprintf(s,x,'less')
else
fprintf(s,x,'more')
end
the number 0.905792 is more 0.2



>> x=rand

x =

    0.1270

>> if x(1==4)
      'True'
   else
      'False'
   end

ans =

False
```

5. **Nested IF ELSE statement**

   Used to choose from more than two statements.

   ```
   >> n=15

   n =

       15
   ```

```
>> if n<6
c=n*2
elseif n>20
c=n/2
else
c=n*10
end

c =

    150
```

Datetime function

Last, we learn how to use datetime function.

```
>> t = datetime(2019,9,22)

t =

   22-Sep-2019
```

```
>> t = datetime(2019,9,22,6:7,0,0)

t =

   22-Sep-2019 06:00:00    22-Sep-2019 07:00:00
```

```
>> t.Day

ans =

    22    22
```

```
>> t.Format = 'MMM dd, yyyy'

t =

   Sep 22, 2019    Sep 22, 2019
```