Scope :

The scope of a variable is the part of the code where that variable is defined.

Ex: (myvar not defined before)

```
for  k=1:5
    myvar = k;          } only defined in the loop.
end
```
myvar is defined   =5
(myvar still not defined!!)

total = 0;   ← very important!

Ex:
```
for  k = 1:10
    total = (total+k);
end
```
otherwise total goes away

not even defined before we use it!

Functions :

```
function  result = square(x)
    tmp = x·x ;
    result = tmp;
end
```

When I run this function, the variable tmp is not part of Workspace. The scope of the variable is just the body of the function!

Why is scope **Good**.

- keeps the workspace cleaner and less polluted
- makes sure variables we've already defined don't accidentally change the function's behavior

Ex: FILE temp_celsius2kelvin.m

```
function tempk = temp_celsius2kelvin(tempc)
      dtemp = 273.15;
      tempk = tempc + dtemp;
end
```

Cool program:
```
>>  temp = 39
>>  dtemp = -14
>>  tnew = temp_celsius2kelvin (temp);
```

To understand behavior of functions,
I need to understand scope.

FILE: myfunction.m
```
function    z = myfunction(x)    ↙2
    z = 5;
    y = x;  ←2        ← output
    z = y;  Z = 2
end
>> x = 1;
>> y = 2;
>> z = 3;
>> X = myfunction(y);
        this is the end
```

Quest: What are the values of x, y, z at the end?

Sergio: y = 2
          z = 3

X = myfunction (2)
X = 2

More loop practice :

```
x1 = 1;
x2 = 1;

for k = 1:5
    tmp = x2;
    x2 = x2+x1;
    x1 = tmp;
end
```

Quest :

What is $x1$, $x2$
at the end of the code?

loop k=1
tmp = 1
$x2 = 1+1 = 2$
$x1 = 1$ $x1=1, x2=2$

loop k=2
tmp = 2
$x2 = 1+2 = 3$
$x1 = 2$ $x1=2, x2=3$

loop k=3
tmp = 3
$x2 = 2+3 = 5$
$x1 = 3$ $x1=3, x2=5$

loop k=4
tmp = 5
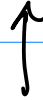$x2 = 3+5 = 8$
$x1 = 5$ $x1=5, x2=8$

loop k=5
tmp = 8
$x2 = 5+8 = 13$
$x1 = 8$ $x1=8, x2=13$

$$5 \neq \text{'}5\text{'}$$

number

word with one character (5)

'apple' , 'banana3'

"Cool expression"