




2. Lab

Script files, data and variable types

-  First, see in the lectures' part of the Laboratory manual (polycopié des TPs), the counterpart chapter of this Lab.

2

1. Do the basic calculations given in listings 2.1–2.7, and check that you get the correct answers.

Listing 2.1: Usage of the whos command

```
1 >> b = 3
2 b =
3 3
4 >> a = 2
5 a =
6 2
7 >> c = a*b
8 c =
9 6
10 >> info3 = a+5
11 info3 =
12 7
13 >> whos
14 Nom          Taille          Bytes  Classe
15
16 a             1x1             8      double
17 b             1x1             8      double
18 c             1x1             8      double
19 info3         1x1             8      double
```

Listing 2.2: Create a row vector

```
1 >> x = [1 2 3]
2 x =
```

```
3 1 2 3
```

Listing 2.3: Create a column vector

```
1 >> y = [4; 5; 6]
2 y =
3 4
4 5
5 6
```

Listing 2.4: The transpose operator

```
1 >> x'
2 ans =
3 1
4 2
5 3
6
7 >> y'
8 ans =
9 4 5 6
```

Listing 2.5: Creating vectors using a range of values

```
1 >> z = 8:1:10
2 z =
3 8 9 10
4
5 >> v = linspace(0,10,5)
6 v =
7 0 2.5000 5.0000 7.5000 10.0000
```

Listing 2.6: The dot operator.

```
1 >> clear
2 >> a = [2 3; 5 1]
3 a =
4 2 3
5 5 1
6 >> b = [4 7; 9 6]
7 b =
8 4 7
9 9 6
10 >> a*b
11 ans =
12 35 32
13 29 41
14 >> a.*b
15 ans =
16 8 21
17 45 6
18 >> c = [1 2 3 4]
19 c =
20 1 2 3 4
21 >> a*c
22 ??? Error using ==> mtimes
23 Inner matrix dimensions must agree.
24 >> a.*c
25 ??? Error using ==> mtimes
26 Matrix dimensions must agree.
```

Listing 2.7: Accessing the elements of a matrix

```
1
2 >> w = [1 2 3 4; 5 6 7 8; 9 10 11 12]
3 w =
4 1 2 3 4
5 5 6 7 8
6 9 10 11 12
7
8 >> size(w)
9 ans =
10 3 4
11
12 >> w(1,1)
```

```

13 ans =
14 1
15
16 >> w(3,1)
17 ans =
18 9
19
20 >> w(3,:)
21 ans =
22 9 10 11 12
23
24 >> w(2,4) = 13
25 w =
26 1 2 3 4
27 5 6 7 13
28 9 10 11 12
29
30 >> v = w(1:2,2:3)
31 v =
32 2 3
33 6 7
34
35 >> z = w([2,3],[2,4])
36 z =
37 6 13
38 10 12
39

```

2. This part guides you through all necessary the steps for developing a Matlab program (a script file).

- (a) Create a new script file by clicking on the *New M-File* icon in the Matlab window toolbar, shown in figure 2.1. This launches Matlab editor with a blank *script file*.
- (b) Insert the following code in this blank script file :

```

surf_circ.m
1 radius=2; %
2 surface=pi*power(radius,2); %
3 diameter=2*radius; %
4 circumference=pi*diameter; %

```

- (c) Save the script file as `surf_circ.m`.
 - (d) Try to understand the proposed program : it is a script that calculates the area and circumference of a circle from its radius.
 - (e) Run your program by typing `surf_circ` at the command prompt `>>`, to get a result.
 - (f) Describe the action performed at each line of the program using a comment.
 - (g) Can Matlab know the value of the constant `pi` ? What is this value ?
 - (h) In your opinion, what does the `power(radius,2)` instruction correspond to ?. Can you replace it with another equivalent instruction ?.
 - (i) Give your explanations and answers in a form of comments in your program ?.
 - (j) You will try again with a radius $\frac{\sqrt{pi}}{2}$.
3. Write a program that calculates the area of a triangle whose dimensions are : Height=2.25 cm and Base=5.5 cm ?.
4. Briefly explain, in your own words, what the following program does

```

no_title.m
1
2 a = input('Enter an integer number a: ');

```

```

3  b = input('Enter an integer number b: ');
4  if a < b
5      fprintf('a is the smaller of the two numbers\n');
6  elseif a == b
7      fprintf('a and b are equal\n');
8  else
9      fprintf('a is the larger of the two numbers\n');
10 end

```

Type the script, then run it several times with different values for *a* and *b* to confirm that it works as expected. In particular, choose combinations (*a*,*b*) so that all three branches of the `if` statement are tested.

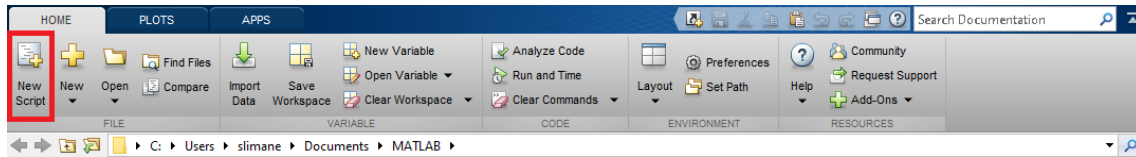


FIGURE 2.1 – The *New M-File* icon on the toolbar in the Matlab window.