

Course N°09

Function file in MATLAB



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1. Definition

Functions are useful when a certain part of the code must be repeated many times or if we want make into a basic tool available for future use.

This section covers the following points concerning a **function M-file**; how to :

- ✓ **Open** or **create** a function
- ✓ **Write** a **name** of this function in MATLAB
- ✓ **Select** a **folder** to **save** the function in MATLAB
- ✓ **Write commands** and **operations** in function
- ✓ **Run** a **function** and **display** the result

2. Syntax

Functions in MATLAB are stored in separate files. Unless specifically declared as global, all variables are local, which means that they are valid only within that function. Think about a function as a ‘watertight’ piece of code. Its communication with the outside world are the input and the output variables.

The formal syntax for a function definition is :

function [list_of_output_arguments] = **function_name**(list_of_input_arguments)

or

function [y1,y2,...,yn] = **function_name**(x1,x2,...,xn)

h { % y1,y2,...,yn are the function's output variables
e { % x1,x2,...,xn are the function's input variables
l { %
p { %

3. Naming

A call to a function will look for a file with the function's name in the MATLAB path. Therefore, it makes sense to set the file name and the function name to be the same. For example, if your function is called `draw_trapeze` but the file is named `trapeze.m`, MATLAB will not accept a call to `draw_trapeze`. It will, however, accept a call to `trapeze.m`, and will subsequently run file `trapeze` regardless of the name you have specified as the function declaration within the file (`draw_trapeze`).

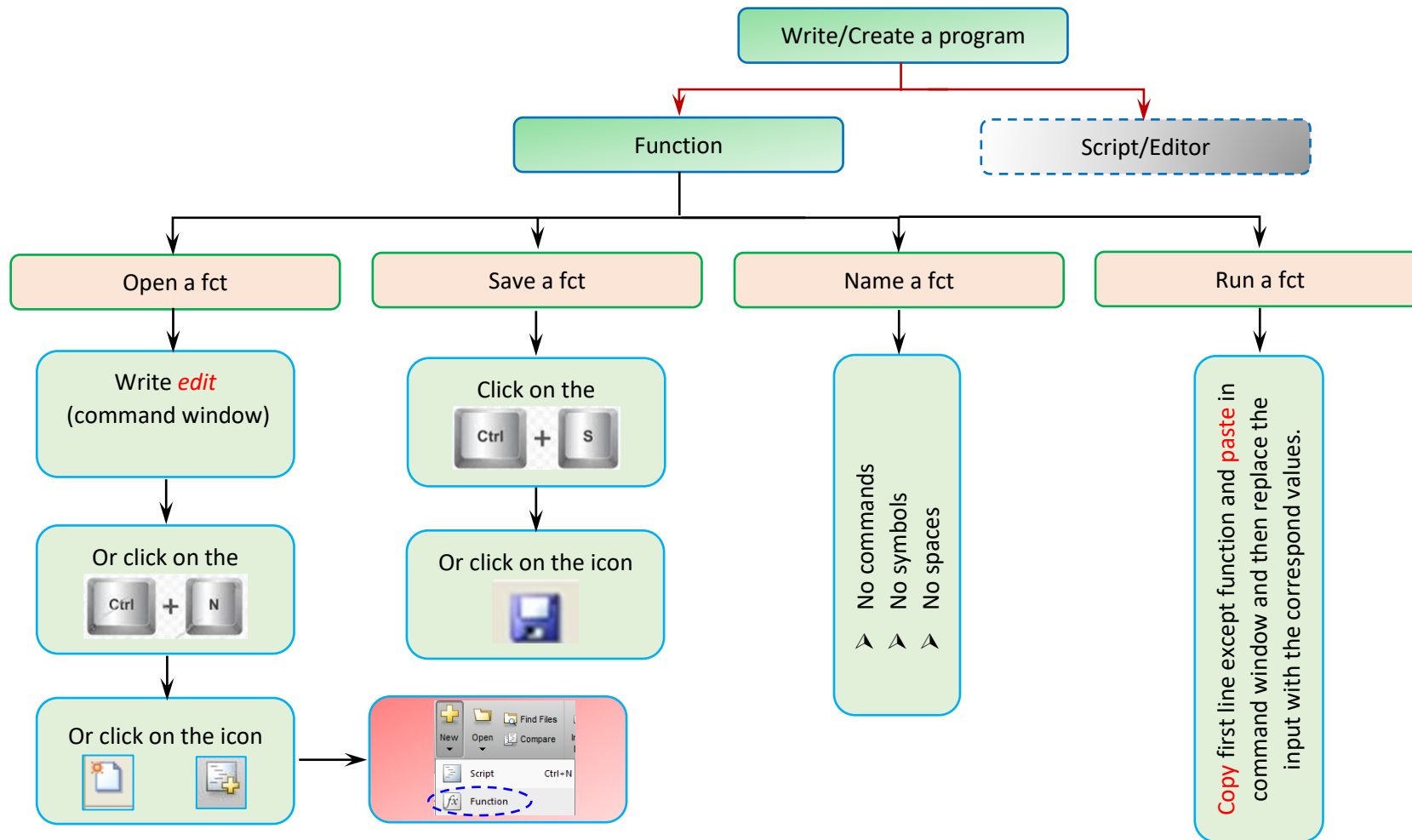


Fig 1. Summarizes the steps for writing a function in MATLAB

Some raccourci in keyboard

Raccourci clavier	Action
Ctrl + F	Recherche par mot clé (page Word, pdf, web...)
Ctrl + A	Sélectionne tous les éléments d'une page, d'un dossier.
Ctrl + Z	Annule la dernière action (si on le fait plusieurs fois, on annule plusieurs actions à rebours.)
Ctrl + X	Coupe un élément sélectionné (texte ou fichier)
Ctrl + C	Copie un élément sélectionné (texte ou fichier)
Ctrl + V	Colle l'élément que l'on vient de copier.
Ctrl + roulette de la souris	Zoom ou « dézoom » l'écran en cours.
Ctrl + clic gauche souris	Permet de sélectionner uniquement les objets que l'on clique donc non forcément contigus : mots fichiers
D'autres raccourcis qui peuvent servir...	
Ctrl + B	Mettre le texte sélectionné en Gras
Ctrl + E	Centrer le texte sélectionné
Ctrl + I	Mettre en italique le texte sélectionné
Ctrl + U	Souligner le texte sélectionné
Ctrl + P	Ouvrir la fenêtre pour imprimer
Ctrl + S	Enregistrer le document en cours

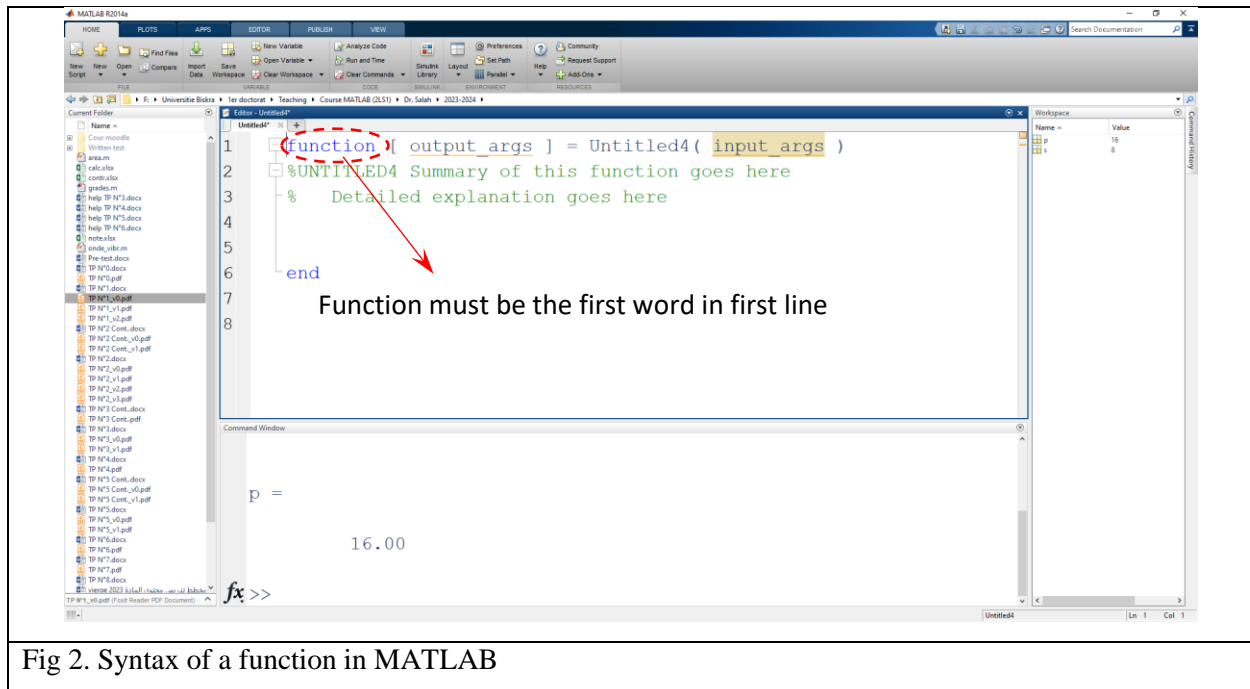


Fig 2. Syntax of a function in MATLAB

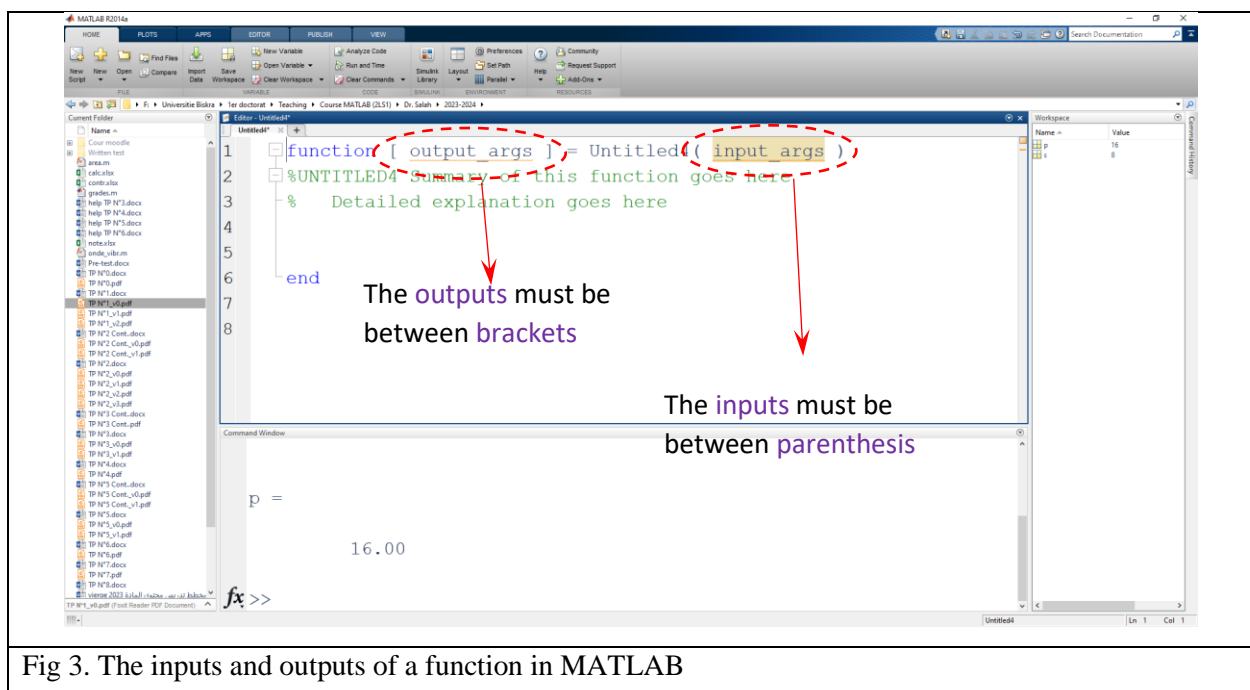


Fig 3. The inputs and outputs of a function in MATLAB

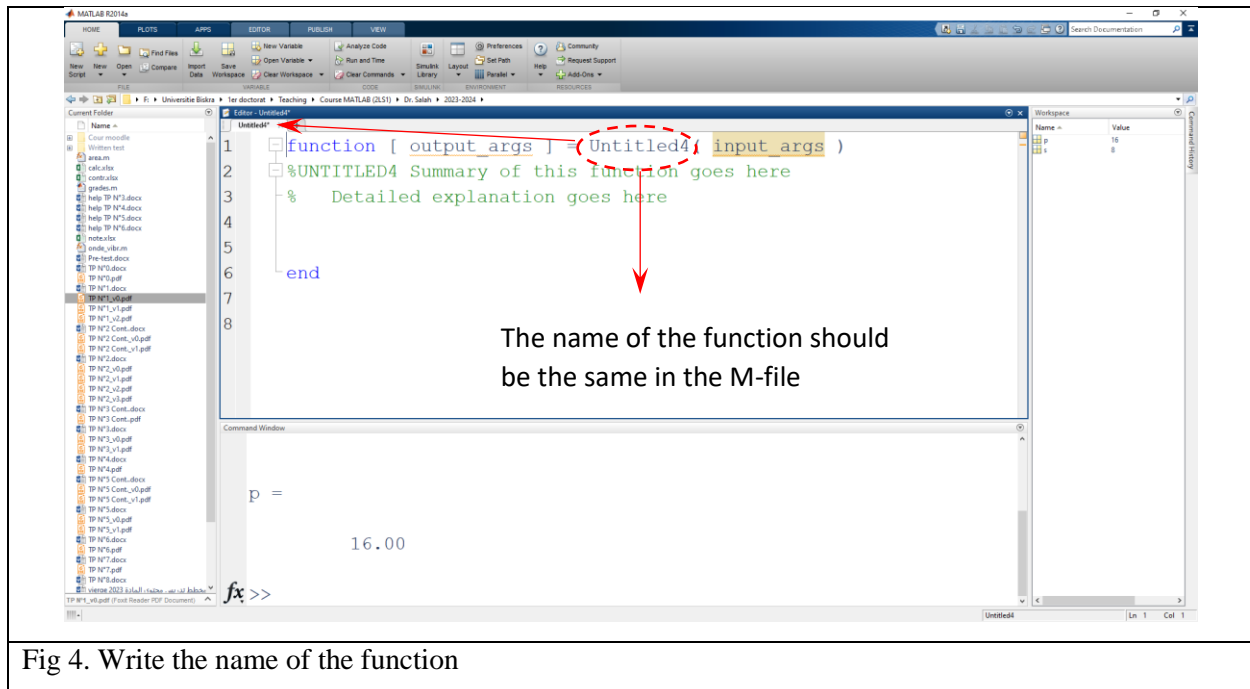


Fig 4. Write the name of the function

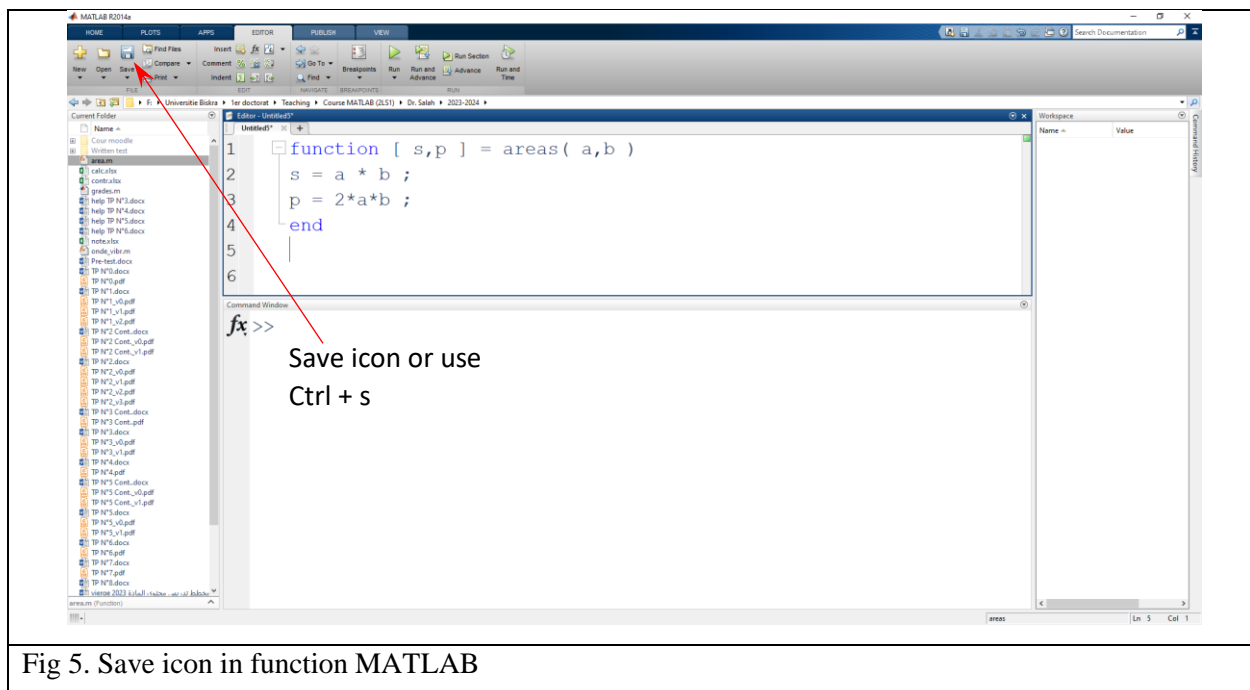


Fig 5. Save icon in function MATLAB

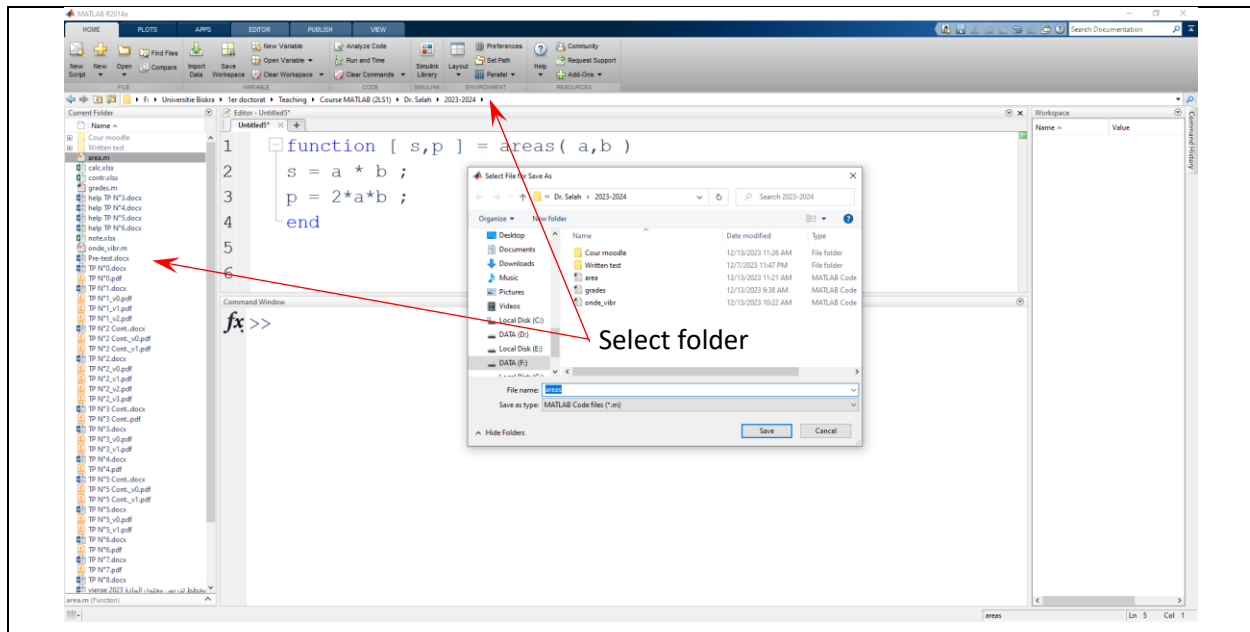


Fig 6. Select folder of the function in MATLAB

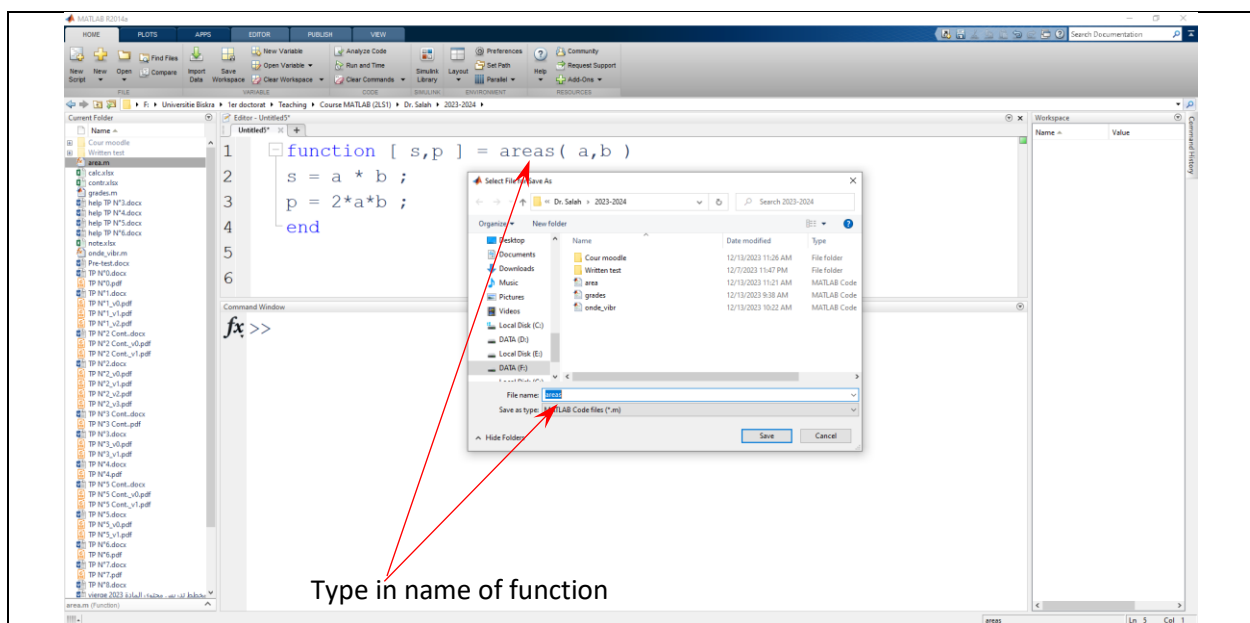
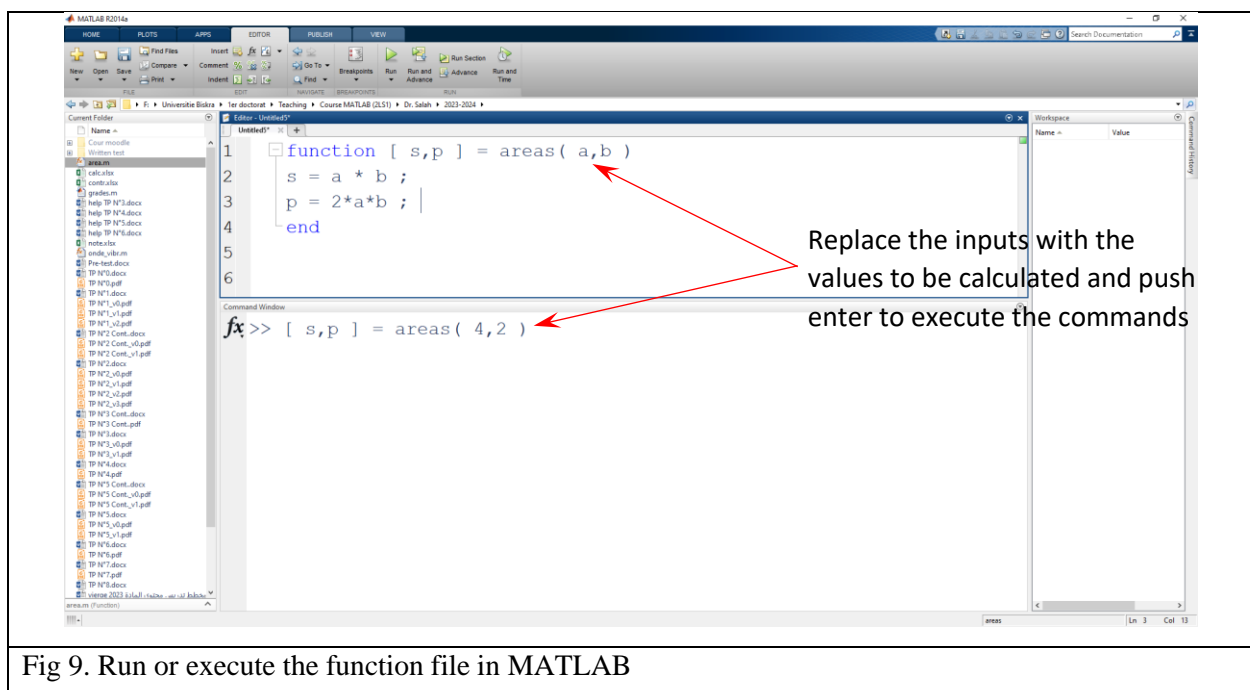
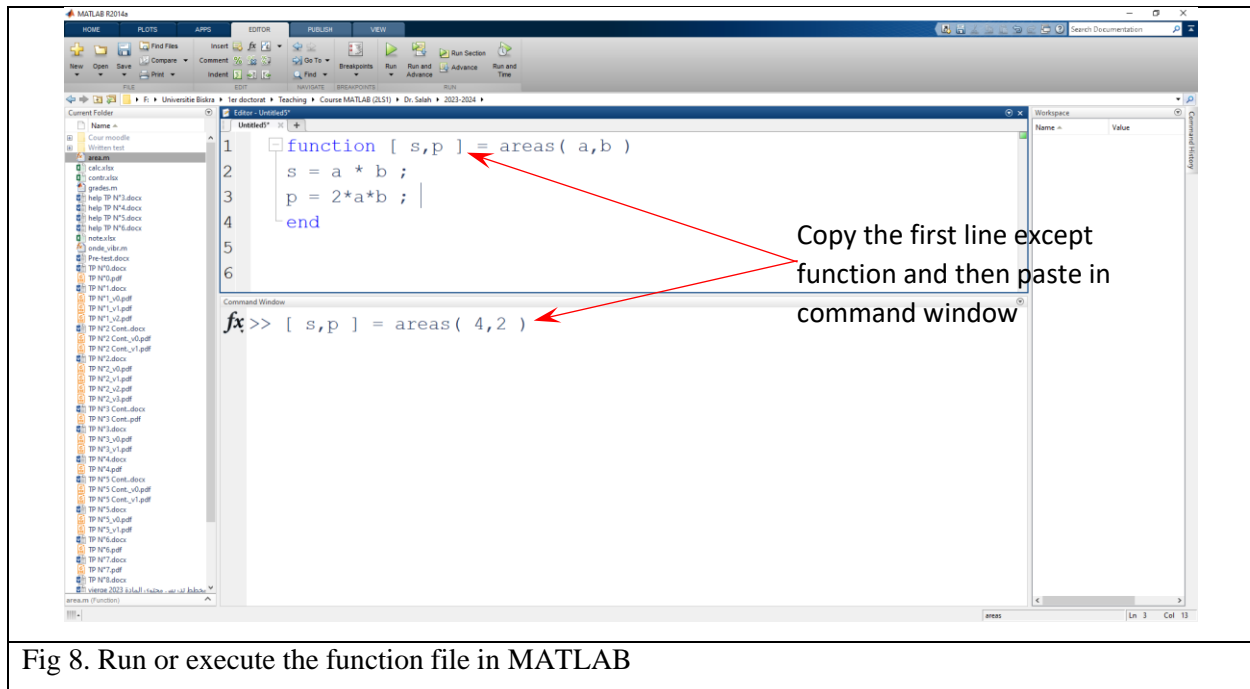


Fig 7. Type in the name of the function in the file name of dialog box



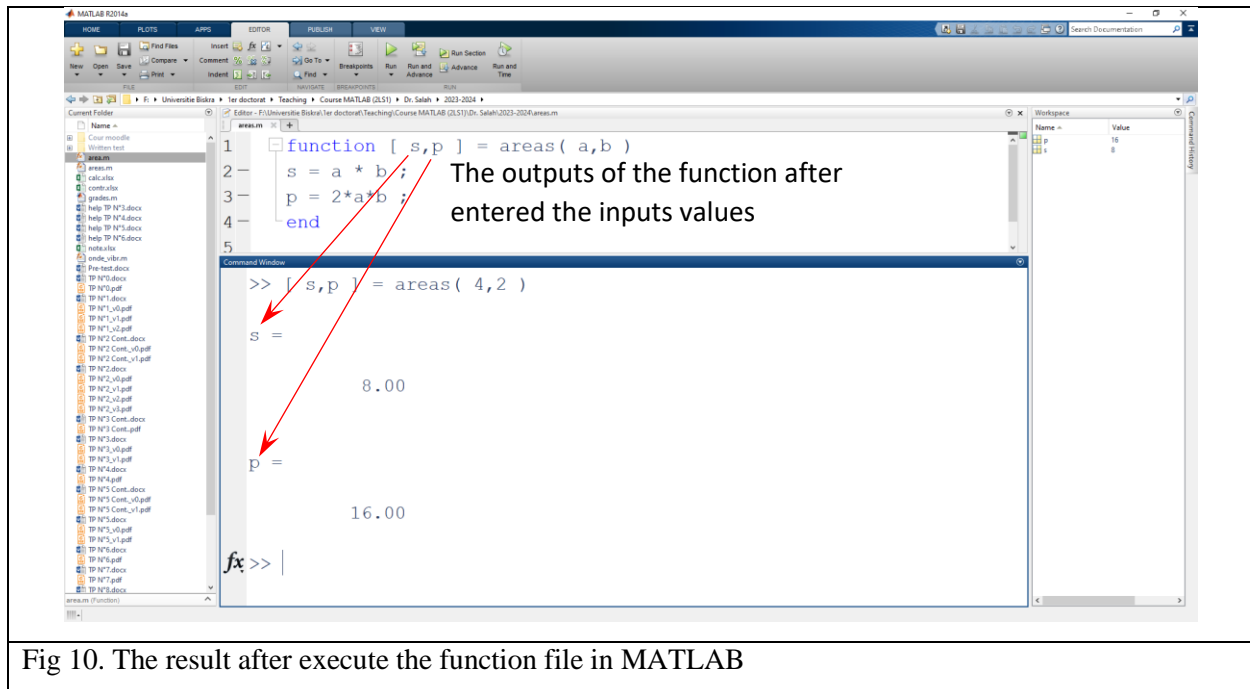


Fig 10. The result after execute the function file in MATLAB

Note.

- ❖ MATLAB has a **template** for writing a **function M-file**.
- ❖ The first **executable statement** in the **function file** must **start** with the word **function**.
- ❖ If the function has more **than one output value**, then the **output variables** must be in **brackets**.
- ❖ If there is **only one output value**, then **no brackets** are **necessary**.
- ❖ If there are **no output values**, use **empty brackets**.
- ❖ The **input** and **output** arguments in the function may be **either scalar, vectors, and matrices**.

4.List of References

Kattan, Peter Issa. *Matlab for Beginners: A gentle approach*. Petra books, 2008.

Etter, Delores M., David C. Kuncicky, and Douglas W. Hull. *Introduction to MATLAB. Vol.4*. Hoboken, NJ, USA: Prentice Hall, 2002.

Attaway, Stormy. *Matlab: a practical introduction to programming and problem solving*. Butterworth-Heinemann, 2013.

Driscoll, Tobin A. *Learning Matlab*. Society for Industrial and Applied Mathematics, 2009.



Butt, Rizwan. Introduction to numerical analysis using MATLAB. Laxmi Publications, Ltd., 2008.

Sigmon, Kermit. Matlab: aide-mémoire. Springer Science & Business Media, 1999.

Chapman, Stephen J. Essentials of MATLAB programming. Cengage Learning, 2016.