



Signal Processing Term-3, 2021

INTRODUCTORY TUTORIAL ON GITHUB AND MATLAB

Topics to be covered

Git and GitHub

1) GitHub classrooms

2) MATLAB INSTALLATIONS

3) MATLAB BASICS

4) LAB-0

Prerequisite: GitHub account (Refer: [How to create a github account](#))

Git and GitHub

GIT

Version control system

Git tracks the changes you make to files in your project

You can revert to older versions, should you ever need to

Git makes collaboration easier, allowing changes by multiple people to all be merged into one source

Git was created by Linus Torvalds in 2005 for development of the Linux kernel, with other kernel developers contributing to its initial development

GitHub

GitHub is often confused with Git.

GitHub is an online hosting service that integrates version control using Git.

You will be using this tool for your assignments, labs and projects.

For Windows and Mac users, to avoid using the command line, a GUI version of GitHub, [GitHub Desktop](#), is available too.

GitHub was recently acquired by Microsoft.

Getting started

(Linux)

```
git clone <repository URL>
```

```
git add <file/directory name>
```

```
git commit -m "<commit message>"
```

```
git push origin <branch name>
```

```
git pull
```

```
git config --global user.name <github username>
```

```
git config --global user.email <github associated email>
```

Getting started (Windows)

Install the desktop version GitHub classroom

GitHub online might be better options

See the demo

Create a folder by entering the folder name

insert a '/', it will create a folder

Commit any temp file name and modify the folder

Before final commit, delete the temp file

Getting started with GitHub classroom

Opening the assignment for the first time will prompt you to link your GitHub username with your identifier (roll number).

Accept the assignment to get access to the questions and boilerplate code.

How to use



We will have access to the state of the repository at the time of deadline. Any later commits will not be considered.

MATLAB

MATLAB

- **Command Window :**
- **Editor Window :**

1) **Difference between functions.m and main_code.m**

2) **While naming the script, make sure it is different from the inbuilt functions within MATLAB library**

3) **Vectors and Matrix**

Eg : a = [1 2 3 4 5];

$$\mathbf{A} = [1\ 2\ 3; 4\ 5\ 6; 7\ 8\ 9]; \quad \mathbf{A} = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}, \quad \mathbf{A}' = \begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}$$

eye (m,n)	Returns an m-by-n matrix with 1 on the main diagonal
eye(n)	Returns an n-by-n square identity matrix
zeros(m,n)	Returns an m-by-n matrix of zeros
ones(m,n)	Returns an m-by-n matrix of ones
diag(A)	Extracts the diagonal of matrix A
rand(m,n)	Returns an m-by-n matrix of random numbers

MATLAB

Selecting a row/column of matrix $A(m,:)$ / $A(:,n)$

$A(1,:) = [1 \ 2 \ 3]$

$A(:,1) = [1 \ 4 \ 7]'$

4) Product (*) and elementwise multiplication (.*)

5) `linspace (1, 101, 10)` generates linearly equaled 10 points between 1 and 101 [1 , 11, 21...101]

6) `1:10` = natural numbers from 1 to 10 [1,2,3..10]

7) See the 'plot', 'stem' and 'disp' function

8) Using a function in command window : `sum(a,b)`

Command window : `sum(10,15)`

9) `[a, b] = min (a)`

MATLAB

10) Loops : indexing starts from 1

Eg: for i = 1:10
 a(i) = 1 + i;
end

11) if, else, elseif Let a = 20

Eg: if a > 5
 a = 5*a;
 elseif a <= 15
 a = 15;
 else
 a = 0;
 end

12) sum (a, b)

command window : sum(10,15)

13) [a,b] = min(a)

14) rand function

MATLAB

15) Writing functions : `function [a,b] = min_max (x, y)`

```
    if ( x >= y )
```

```
        a = x;
```

```
        b = y;
```

```
    else
```

```
        a = y;
```

```
        b = x;
```

```
    end
```

```
end
```

16) Calling functions : `p = 10;`

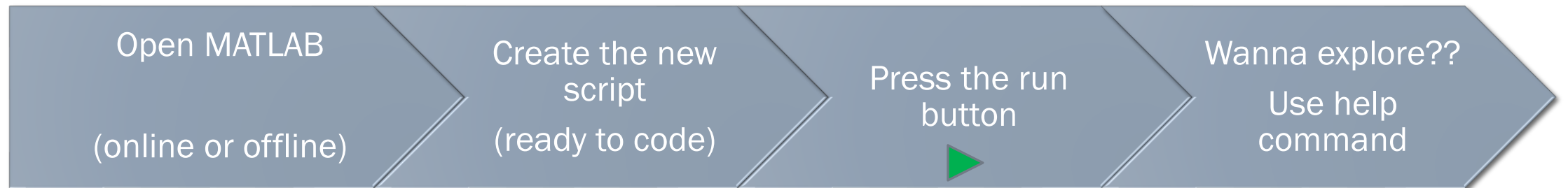
```
    q = 2;
```

```
    [max,min] = min_max ( p, q ) ;
```

```
    message_1 = ['Maximum is ', num2str(max)]; disp(message_1);
```

```
    message_2 = ['Minimum is ', num2str(min)]; disp(message_2);
```

MATLAB



Have any doubt ?? ---> Reach out the TA's

Thank you!
