

Week 1:

Learning Outcomes:

- Learn how to use MATLAB's desktop interface
- Learn the difference between scripts and live scripts
- Gain a better understanding of when you should use a live script and when you should use a script

Desktop Environment:

The image shows the MATLAB R2019b desktop environment. The top menu bar includes HOME, PLOTS, APPS, LIVE EDITOR, INSERT, and VIEW. The current folder is /Users/snowdend/Google Drive/Classes/PHYS 361 Winter 2020/Introduction to MATLAB. The Live Editor shows a script with the following code:

```
26 help sind
27 doc sind
```

A note in the Live Editor states: "Note that we are using parentheses and lower case names now. See what happens when you make a mistake. Type 'Sind(1)' and 'sind[1]' in the command window." The Command Window shows the following commands:

```
>> a=3;
>> b=4;
>> c=a+b;
fx>> |
```

A green arrow points to the third line of the Command Window with the text "Try typing this stuff". The Workspace shows the following variables:

Name	Value
a	3
b	4
c	7

The Command History shows the following commands:

```
%-- 1/2/20, 2:45 P...
3*5
%-- 1/7/20, 3:17 P...
a=3;
b=4;
c=a+b;
```

Annotations in red text are placed over the image:

- Current Folder
- Workspace
- Command Window
- Command history

Other visible text includes "Select a file to view details" in the Details panel and "MATLAB R2019b - academic use" in the title bar.

Desktop Environment Notes:

Current folder:

- All programs or data files you want to import into your program should be in this folder OR you have to provide the full path to those files on your computer (I'll show you how to do this later)
- All images or data files you export from your program will be saved in this folder
- MATLAB will usually ask you to make the folder you are saving your program to the current folder. You usually want to do this.

Desktop Environment Notes:

Workspace:

- Shows the variables you have created in a program or in the command window
- Double clicking on arrays or matrices allows you to see and change the content

Command History:

- Can be useful for remembering or rerunning commands
- Double click to run a command

Desktop Environment Notes:

Command Window:

- This is helpful for using MATLAB like a calculator or using MATLAB to make a quick plot
- I always use the command window to test code or syntax before putting it in a script
- All of the variables in the workspace are available in the command window

Useful commands:

- `close all`: close all figures
- `clear all`: clear the workspace (all variables), can also use `clear` to just clear one or more variables
- `clc`: just clear the command window without clearing the workspace
- `doc command`: produce the help documentation for a command you want to use
- `help command`: produce a shorter help file in the window

Keyboard shortcuts:

- Up and down arrow scrolls through previous commands
- Tab will give you options to complete the command you are typing
- Semi-colon (or lack of) determines whether the output is displayed

Home Toolbar:

Change the layout of the environment.

The image shows the MATLAB R2019b - academic use interface. The Home toolbar is highlighted with red boxes around the 'New Script', 'New Live Script', 'Open', and 'Save Workspace' buttons. The 'Layout' button in the 'VIEW' tab is also highlighted. The Command Window shows the following code:

```
>> a=3;  
>> b=4;  
>> c=a+b;  
fx >>
```

The Command History shows the following commands:

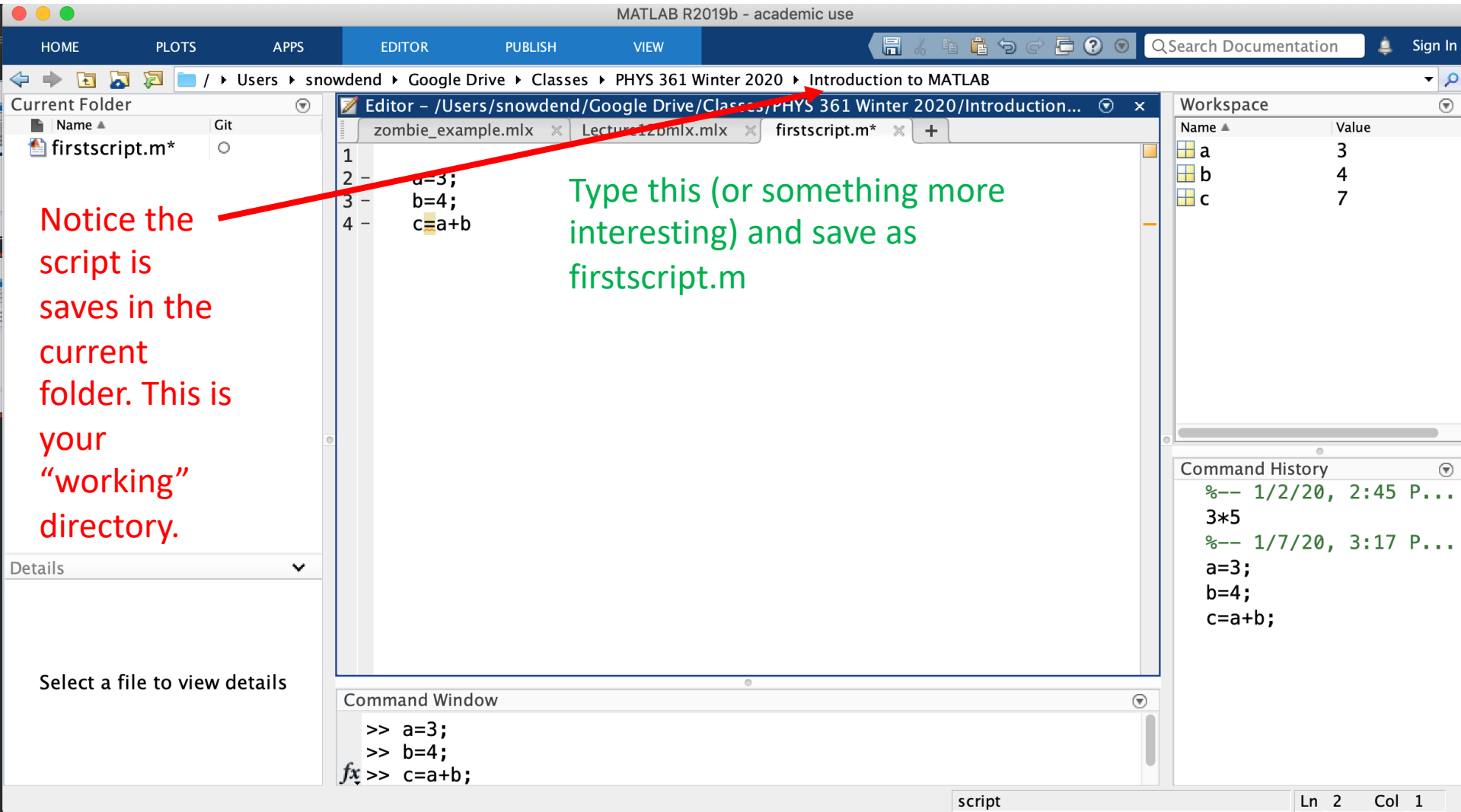
```
%-- 1/2/20, 2:45 P...  
3*5  
%-- 1/7/20, 3:17 P...  
a=3;  
b=4;  
c=a+b;
```

The 'Details' panel on the left shows the text 'Select a file to view details'.

Annotations in red text are placed over the interface:

- 'Open old or create new programs.' is placed over the 'New Script', 'New Live Script', and 'Open' buttons.
- 'Save all the variables in your workspace.' is placed over the 'Save Workspace' button.
- 'Change the layout of the environment.' is placed over the 'Layout' button.

Your first script:



The image shows the MATLAB R2019b interface. The top menu bar includes HOME, PLOTS, APPS, EDITOR, PUBLISH, and VIEW. The current folder is `/Users/snowdend/Google Drive/Classes/PHYS 361 Winter 2020/Introduction to MATLAB`. The editor window shows a script named `firstscript.m` with the following code:

```
1  
2 - a=3;  
3 - b=4;  
4 - c=a+b
```

A red arrow points from the text "Notice the script is saved in the current folder. This is your 'working' directory." to the `firstscript.m` file in the Current Folder pane. Another red arrow points from the text "Type this (or something more interesting) and save as firstscript.m" to the code in the editor.

The Workspace pane on the right shows the following variables:

Name	Value
a	3
b	4
c	7

The Command History pane shows the following commands:

```
%-- 1/2/20, 2:45 P...  
3*5  
%-- 1/7/20, 3:17 P...  
a=3;  
b=4;  
c=a+b;
```

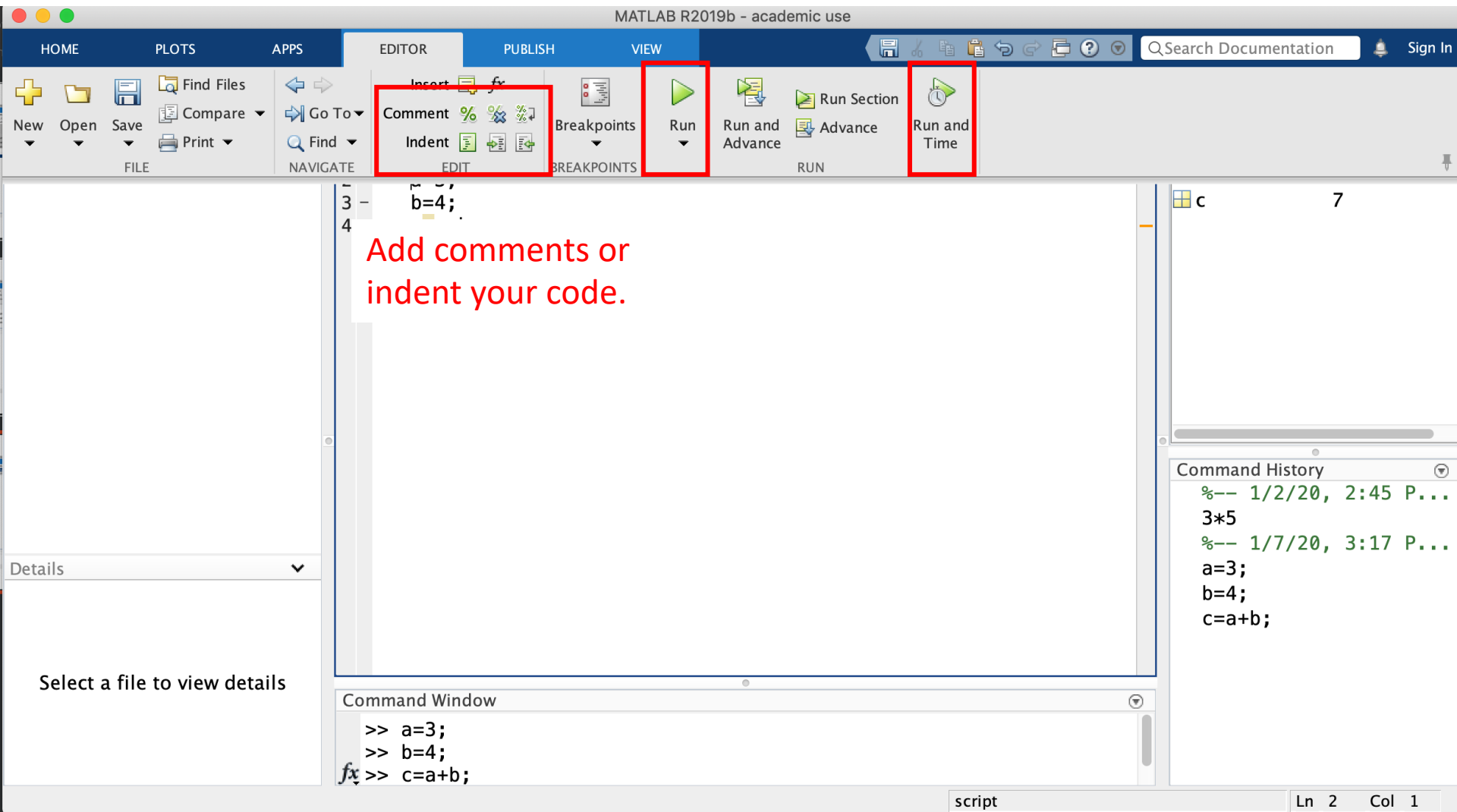
The Command Window at the bottom shows the following commands:

```
>> a=3;  
>> b=4;  
fx >> c=a+b;
```

The status bar at the bottom right shows "script" and "Ln 2 Col 1".

Editor Toolbar:

Run or, for optimization,
run and time.



Your first live script:

Run smaller portions of live script

Add code

Add text (not code).

Define a section break

Run the whole live script from beginning to end

The image shows the MATLAB Live Editor interface. The top toolbar has several buttons highlighted with red boxes: 'Text' (for adding text), 'Code' (for adding code), 'Section Break' (for defining a section break), 'Run Section' (for running smaller portions of the script), and 'Run' (for running the whole script from beginning to end). The main editor area shows a live script with a text block containing '1' and a code block containing 'a=3;' and 'b=4;'. The Command Window at the bottom shows the execution of these commands. The Command History on the right shows the previous commands and their execution times. The bottom status bar indicates '2 usages of "a" found'.

HOME PLOTS APPS LIVE EDITOR INSERT VIEW

Normal B I U M

Task Control Refactor

Section Break Run Section Run and Advance Run to End

Run Step Stop

Search Documentation Sign In

Current Folder

Name

firstlivescript....

firstscript.m

Details

Select a file to view details

Command Window

```
>> a=3;  
fx >> b=4;
```

Command History

```
%-- 1/2/20, 2:45 P...  
3*5  
%-- 1/7/20, 3:17 P...  
a=3;  
b=4;  
c=a+b;
```

Value

3
4
7

2 usages of "a" found

script

Ln 1 Col 1

Which type of “script” do I use:

Scripts:

- Most commonly used
- Better for longer or more complex programs
- Better for programs with a lot of functions, especially if you want to import functions from another file
- Better for quick programs or programs you do not plan to share with others

Live Scripts:

- Based on a popular Python “notebook” format (Jupyter notebook)
- Becoming more popular for many applications
- Better for short calculations and lab-notebook style data analysis and plotting
- Excellent for mixing code with clear explanation of theory and/or application
- Best for clear code that will be distributed to others