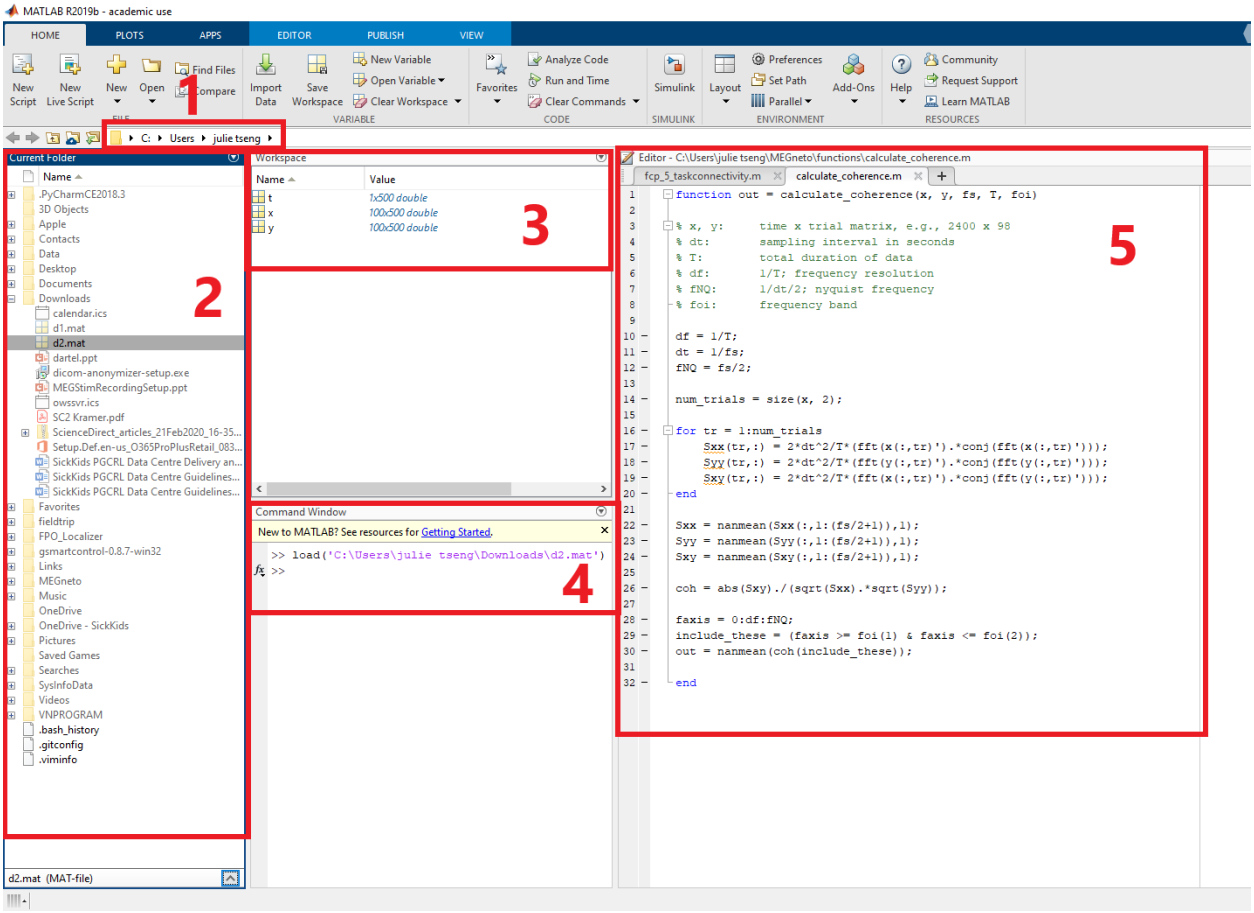
Week 1: What even is MATLAB?

The following questions are designed to test your basic understanding of the MATLAB GUI, variables, data types, and basic functions.

1. Label the following figure and identify what you would use each component for:



2. What file type is MATLAB code saved as? (For example, the file type of a Microsoft Word document is “*.docx”. What is the “extension” of a saved MATLAB code?)

3. What does it mean for a folder to be “in MATLAB’s path”?

4. Scripts:
    a. How do you create a new one?
    b. How do you open an existing one?

5. What are the similarities and differences between the following four variables? Classify the *y, z, w* variables as one of the following: matrix, column vector, or row vector.

```
x = 1;
y = [1, 2, 3, 4];
z = [1, 2, 3, 4; 5, 6, 7, 8];
w = [1; 2; 3; 4];
```

6. What's the difference between the following two commands?
   mean(z, 1)
   mean(z, 2)
   What does the second argument indicate?

7. What are the similarities and differences between the following two variables?
   String1 = 'Hello World!'
   String2 = "Hello World!"

8. With the string variables you created in the previous question, run the following commands and explain the results:
   size(String1)
   size(String2)

9. Complete the following sentence:

   The variable *y* from question 5 is an array of _____ whereas the variable *String1* from question 6 is an array of _____.

10. True or False: You can have a matrix of characters.

11. What's the difference between numeric 0 and logical 0? If A = 15 and B = 25, what are the results of the following logical operators?
   A == B
   A ~= B
   A > B
   A >= B
   A < B
   A <= B

12. Let A = [15, 10] and B = [25, 30]. Describe what the following operations calculate:
   A-B
   A.*B
   A+B
   A.^2
   A./B

13. Making arrays: (spoiler: you shouldn't be writing every one of these values out…)
   a. Create a variable C that is an array of consecutive values from -5 to 5.
   b. Create a variable D that is an array of values from -10 to 10 in increments of 2 (i.e., [-10, -8, -6, …, 0, 2, 4, …, 8, 10]).

14. Indexing arrays: using the variable D that you created in the question 12, how would you do the following?:
   a. Return the value in the 6^{th} position of array D.
   b. Return the values in positions 4, 5, and 6 of array D.
   c. Return the values in positions 1, 3, 4, and 7 of array D.

d. Return all values in D that are negative. (Hint: logical operators are your friend)

15. Create the following array of strings:
    participant_resp = [“yes”, “yes”, “no”, “yes”, “no”, “yes”];
    What’s the difference between:
    participant_resp == “yes”, and
    find(participant_resp == “yes”)

    Based on this behaviour, what does the find() function do?

16. Loading data
    a. You have a file called d2.mat that holds data you want to load into the workspace. You try to do this by running:
       load(d2.mat)
       but this gives you an error that says “Unable to resolve the name d2.mat.” What’s the mistake here?
    b. Once you have figured out why, you may encounter another issue:
       “Error using load
       Unable to read file [filename]. No such file or directory.
       Why might this error occur? Think back to #1.

17. Define the following data structures and discuss their similarities and differences:
    a. Table
    b. Cell and cell array
    c. Structure or “struct”