

MATLAB

An introduction

Tuesday, 1 October 13

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What is programming?

- A program is a list of steps required to do something.
- The lists of instructions are the computer programs
- The stuff the instructions manipulate can be numbers words, graphics, etc...

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Programming languages

- There are many different programming languages.
- Here, we will use **MATLAB**.
- Other languages include python, C, C++, Java, Pearl, Fortran, LISP. These are other languages.

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Syntax

- The *format of the instructions* is called syntax.
- Syntax is very important!
- If commands don't follow the syntax of the language you're using, the computer won't understand what you're asking it to do.

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A simple function

- Programming in a high-level language:
`>> disp('Hello world!')`
- DISP is a function in MATLAB. When it is evaluated (i.e. when MATLAB carries out your instructions), DISP takes whatever is inside the parentheses () and displays it.

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Other uses of disp

- **DISP** can also take numbers as inputs, and will output the number to the screen.
`>> disp(10)`
- Note: The `>>` is called the command prompt and is where you type commands. You do not type "`>>`"

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A second function

- RAND is another function which, when used without inputs, produces a scalar value between 0 and 1.
`>> rand`

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An operator

- In addition to commands, MATLAB has operators that output some sort of result.
- The operator `*` multiplies whatever precedes it (numeric class) by whatever follows it, and outputs the result.
`>> 10 * 3`

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Order of operations

- Matlab arithmetic follows order of operations:
`>> 2+3*4`
14
`>> (2+3)*4`
20
- Note: In American English (which Matlab uses) parentheses are (while brackets are [

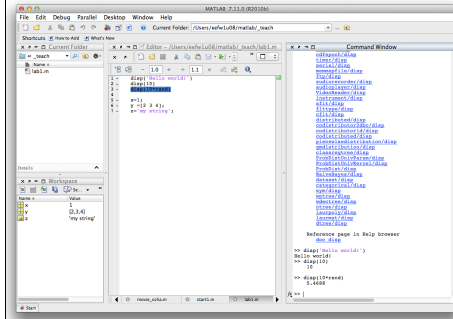
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Putting it together

- Using order of operations, the operator * and the functions DISP and RAND,
>> disp(10*rand)

Matlab interface



Trying it out...

Command Window

```
>> disp('Hello world!')
Hello world!
>> disp(10)
10
>> disp(10*rand)
5.4688
```

Errors (1)!

Command Window

```
>> disp(10*rand)
5.4688
>> disp('Hello world!')
??? disp('Hello world!')
Error: A MATLAB string constant is not terminated properly.
```

Errors (2)!

Command Window

```
>> disp('Hello world!')
??? disp('Hello world!')
Error: A MATLAB string constant is not terminated properly.
>> disp('Hello world!')
??? disp('Hello world!')
Error: Expression or statement is incorrect--possibly unbalanced ( , {, or [.
```

Errors (3)!

Command Window

```
>> disp('Hello world!')
??? disp('Hello world!')
Error: Expression or statement is incorrect--possibly unbalanced ( , {, or [ .
>> dip('Hello world!')
??? Undefined function or method 'dip' for arguments of type 'char'.
```

RAND errors

Command Window

```
>> rand
ans =
0.7431
>> rand(2)
ans =
0.3922 0.1712
0.6555 0.7060
>> rand('hi')
??? Error using ==> rand
Unknown command option.
```

Review

- A computer program is a list of steps required to do something.
- A function is a command that takes inputs inside parentheses, and operator acts on the quantities to either side of it.
- Errors are what you get when Matlab can't interpret what you've told it to do.