

Lecture 2: Python Basics

April 1, 2021

Python Files

- You can write and edit code in files, which allows you to

Python Style



(a stylish python)

Comments

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```
# A single-line comment in Python is denoted with the hash symbol.
```

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```

```
"""  
Multi-line comments  
Lie between quotation marks  
This is a haiku  
"""
```

PEP 8

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Spacing

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Use blank lines to separate functions from each other and logical sections within a function.

Use spaces around operators and after commas, but not directly inside delimiters.

```
a = f ( 1 , 2 ) + g ( 3 , 4 ) # good
a = f ( 1 , 2 ) + g ( 3 , 4 ) # bad
```

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Add header comments at the top of files before any imports.

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Describe parameters (value / expected type) and return (value / expected type).

As usual: list pre/post conditions if any.

Add header comments at the top of files before any imports.

If possible, put comments on a line of their own.


```
def my_function():  
    """  
    Summary line: do nothing, but document it.  
  
    Longer description: No, really, it doesn't do anything.  
  
    Returns: Gosh, for the last time... nothing (None)!  
    """  
    pass
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    Returns: Gosh, for the last time... nothing (None)!  
    """  
    pass
```

```
print(my_function.__doc__)  
#     Summary line: do nothing, but document it.  
#  
#     Longer description: No, really, it doesn't do anything.  
#  
#     Returns: Gosh, for the last time... nothing (None)!
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Use `snake_case` for variables/functions; `CamelCase` for classes;
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Same as 106A/B/X. Simple is better than complex!

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Automated Code Style Checking

Use [PEP8 Online](#) for mechanical violations (naming, spacing) and more advanced suggestions.

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Use `snake_case` for variables/functions; `CamelCase` for classes; `CAPS_CASE` for constants.

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Automated Code Style Checking

Use [PEP8 Online](#) for mechanical violations (naming, spacing) and more advanced suggestions.

Use `pycodestyle` as a command line tool. Install with `pip install pycodestyle` (you'll do this in the installation instructions).

Reading Files

```
f = open(filename, method)
```

Read

Function	Action
<code>next(f)</code>	Returns the next line in the file
<code>f.read()</code>	Returns the entire file as a string
<code>for line in f:</code>	Loops over the file, line by line
<code>f.readlines()</code>	Returns the lines of the file as a list of strings

Write

Function	Action
<code>f.write(new_line)</code>	Writes <code>new_line</code> to the file
<code>f.writelines([collection of new lines])</code>	Writes the collection of lines to the file
<i>* Writing appends or overwrites, depending on the method</i>	

```
f.close()
```

```
f = open(filename, method)
```

- r - Read
- w - Write
- a - Append
- b - Bytes Mode

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Function	Action
<code>f.write (new_line)</code>	Writes new_line to the file

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f.writelines ([collection of lines to the file  
                , of, new, lines])
```

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- If it isn't closed, the file could remain locked so other programs can't open it or become corrupted.

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- If it isn't closed, the file could remain locked so other programs can't open it or become corrupted.
- The safe option: use a **context manager**!

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with open("words.txt", "r") as f:
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Roughly equivalent to:

```
f = open("words.txt", "r")
try:
    ...
finally:
    f.close()
```



Strings, Revisited

Useful String Methods

Method	Action
<code>.lower()</code>	Converts the string to lowercase
<code>.upper()</code>	Converts the string to uppercase
<code>.title()</code>	Converts the string to title case (every word capitalized)
<code>.strip([chars])</code>	Removes the characters from the ends of the string (or whitespace if chars is omitted)

Method	Action
<code>.find(substr)</code>	Finds the first occurrence of <code>substr</code> and returns the index (or -1 if not found)
<code>.replace(old, new)</code>	Replaces every instance of <code>old</code> with <code>new</code> and returns the new string
<code>.startswith(substr)</code> <code>.endswith(substr)</code>	Returns whether the string starts/ends with <code>substr</code>

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Splitting and Joining

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"3-14-2015".split('-')
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"Michael Jamiroquai Cooper".split()
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"3-14-2015".split('-') # => ['3', '14', '2015']
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"Michael Jamiroquai Cooper".split()  
# => ['Michael', 'Jamiroquai', 'Cooper']
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", ".join(["Minerva", "Albus", "Severus"])
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", ".join(["Minerva", "Albus", "Severus"])  
# => 'Minerva, Albus, Severus'
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Virtual Environments

Math

Law

Econ

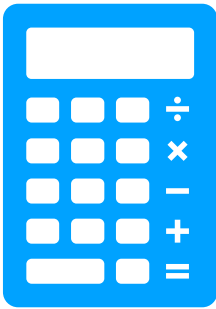
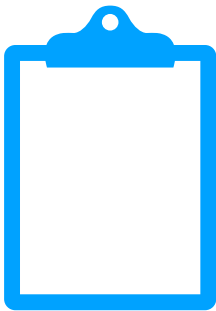
CSRE

Math

Law

Econ

CSRE



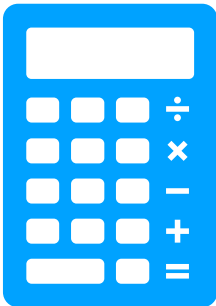
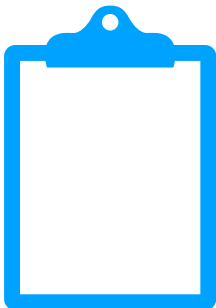
TI-84

Math

Law

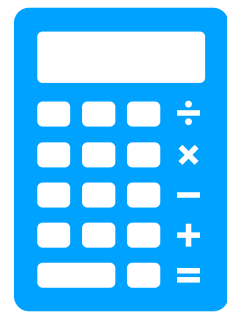
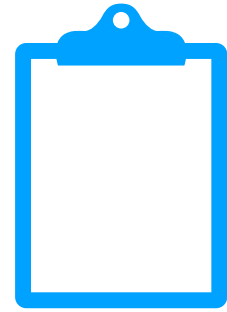
Econ

CSRE



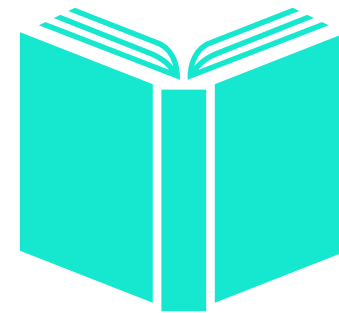
TI-84

Math



TI-84

Law



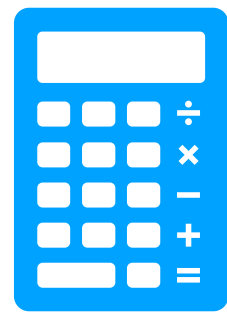
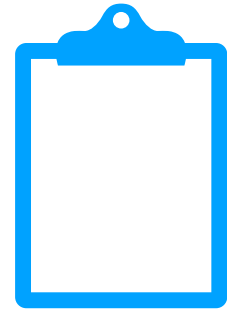
Econ



TI-Nspire

CSRE

Math



TI-84

Law

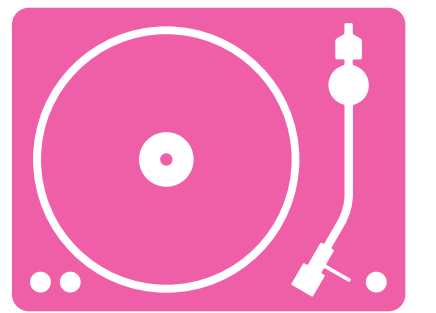


Econ

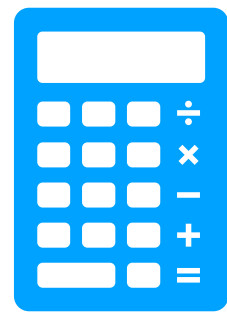
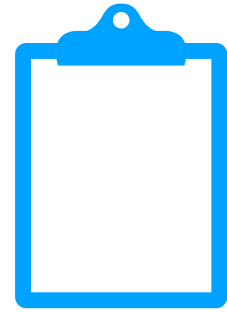


TI-Nspire

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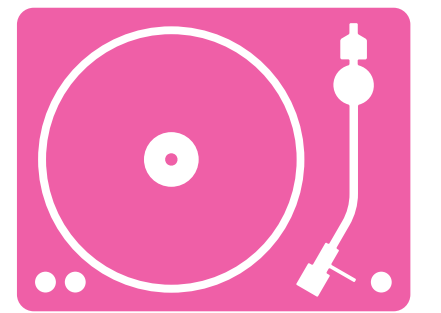


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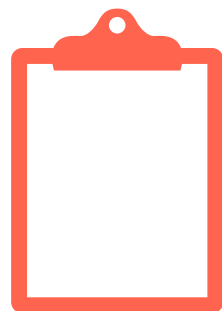


(Parth, on the way to lecture)

Law

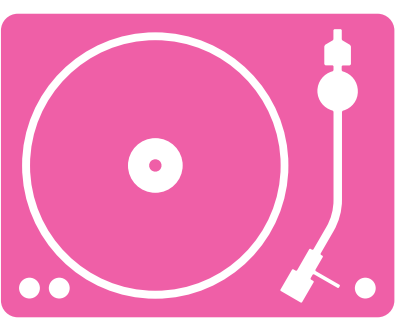


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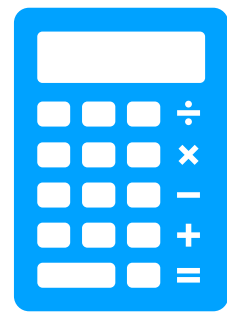
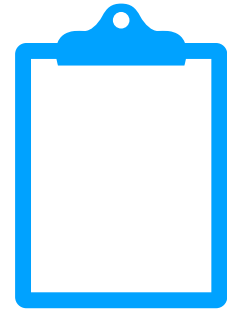


Math



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TI-84

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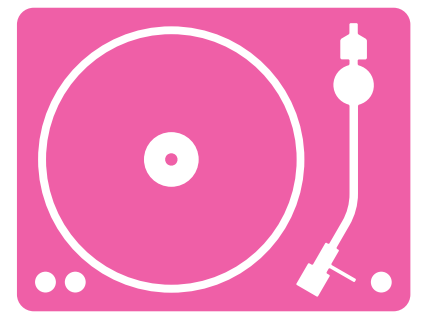


Econ



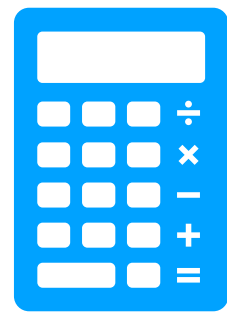
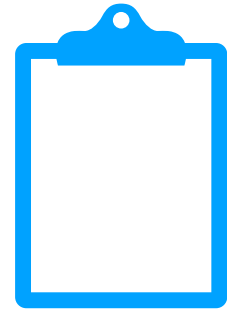
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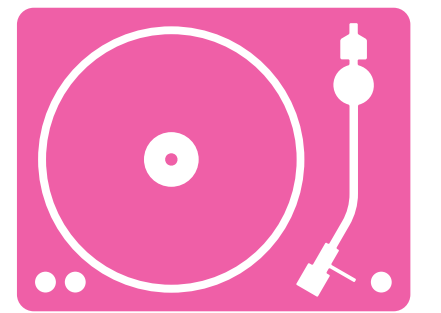


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TI-Nspire

CSRE



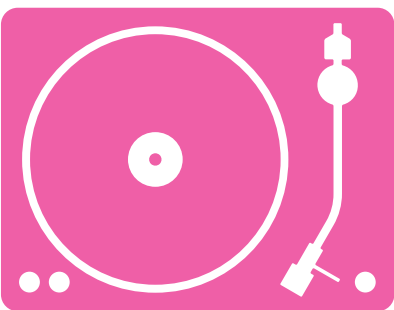
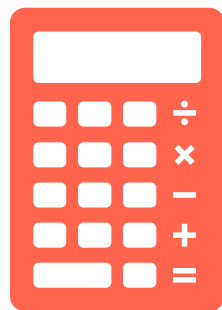
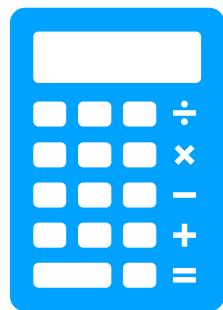
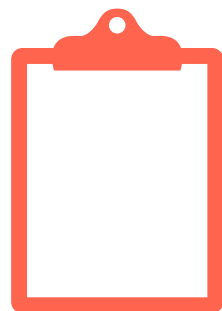
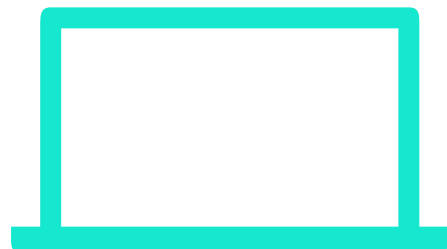
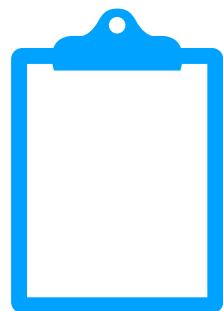
(Parth, on the way to lecture)

Project 1

Project 2

Project 3

Project 4



TI-84

TI-Nspire



(Parth, on the way to lecture)

Project 1

Python Imaging
Library

requests v2.3

Project 2

SciPy

pdfreader

Project 3

Python Imaging
Library

requests v2.25

Project 4

SciPy

pyglet



(Parth, on the way to lecture)

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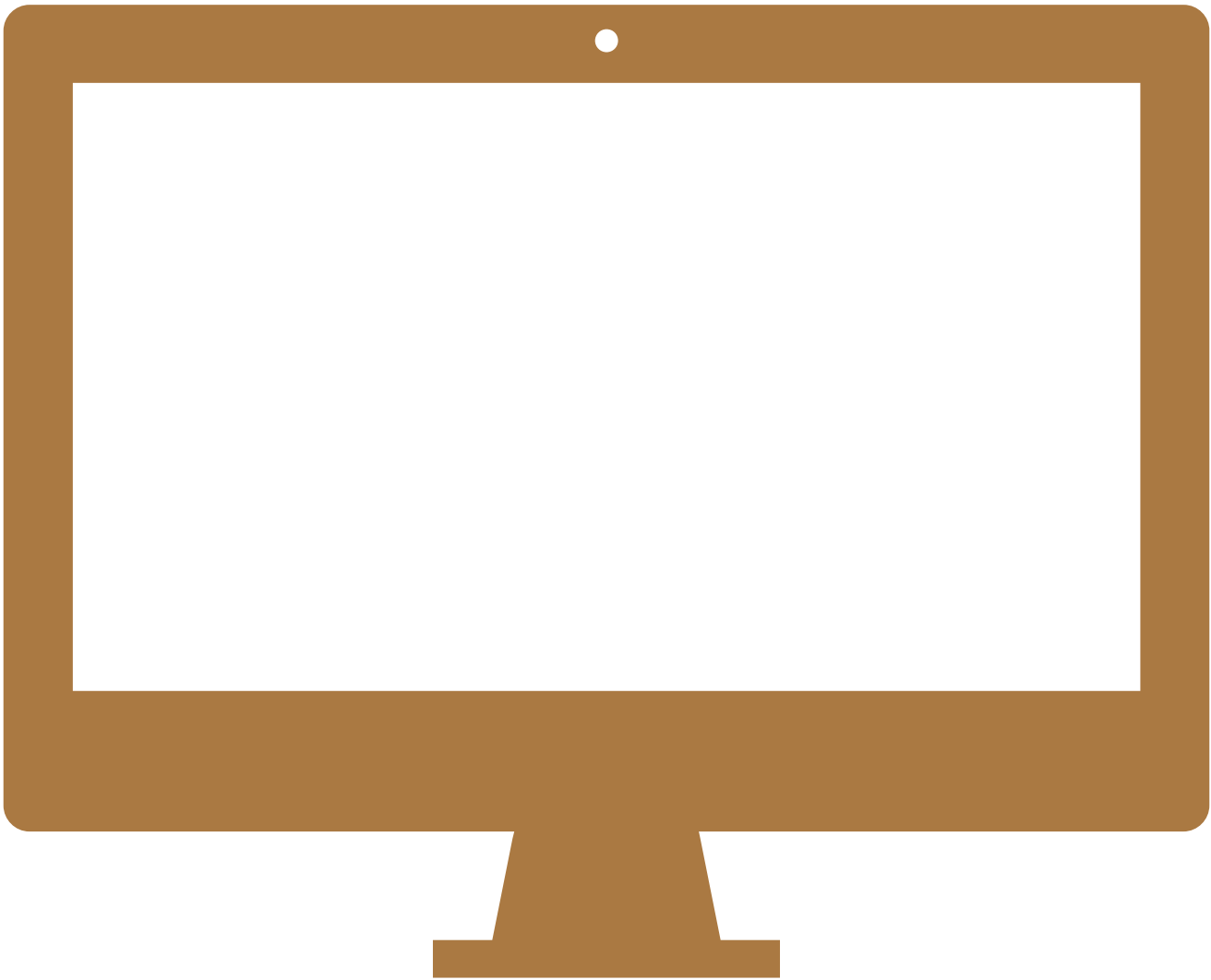
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Things to Know*

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- When you're working in a virtual environment, use `pip` to install packages. They'll only be installed into the active environment.

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- `deactivate` deactivates the virtual environment.
- When you're working in a virtual environment, use `pip` to install packages. They'll only be installed into the active environment.
- All of this is explained in the Installing Python handout!

* if you frequently work on multiple Python projects

Console Input

`input` (prompt)

Shows the user `prompt` and allows the user to type at the cursor.

Returns the user's input (as a string) when they press Enter.

`print` (msg)

Sends `msg` (as a string) to the terminal, where it is displayed to the user.

Console Input

`input(prompt)`

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name = input("What's your name? ")  
print(f"Hi {name}!")
```


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What's your name? **Michael Jingleheimer Cooper**

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name = "Michael Jingleheimer Cooper"
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What's your name? **Michael Jingleheimer Cooper**

Hi Michael Jingleheimer Cooper!