

Python Basics

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Avoid copy pasting code at all cost

“

- Make sure you understand the code you write as much as you can.
- When you copy code, you bypass the cognitive process entirely.
- Even if the code you copied does work as intended, you have not learned much from pasting it.

”

Just-in-time Learning

- We learn the very basic Python and other packages and introduce more concepts when we need them to solve specific problems in the rest of the semester.

Python Cheatsheet



tutorial

coding

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This Python Cheatsheet is revised based on [this one](#).

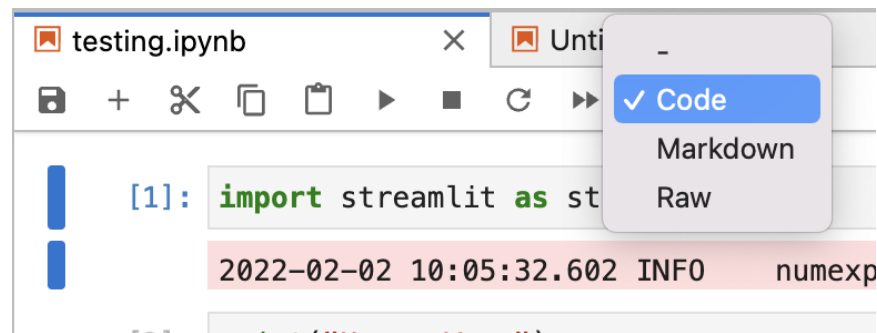
<https://harrywang.me/python>

Python Basics I

- Math operators
- Data types
 - integer, float, string
 - `type()` to check the data type
- Variables
 - Naming convention
 - Clarity over brevity, e.g., `fn` is a bad example for `first_name`
 - `str()`, `int()`, and `float()` for type conversion
- Comments
- Formatting strings using f-strings – preferred way for this course

Markdown

- “Markdown is a text-to-HTML conversion tool for web writers. Markdown allows you to write using an easy-to-read, easy-to-write plain text format, then convert it to structurally valid XHTML (or HTML).” - <https://daringfireball.net/projects/markdown/>
- Jupyter Notebook has Markdown cell, where you can write formatted documents using Markdown.



Markdown Syntax

- Headings: one to six # symbols
- Bold: ****bold text****
- Italic: **italic text**
- Quote: >
- Code: single backticks ``print('hello world')``
- Code block: triple backticks
- Unordered list: - (one dash)
- Ordered list: 1. 2. 3. etc.
- Nested list: use indentation
- Hyperlinks: [Google](<https://www.google.com/>)

```
```\ngit status\ngit add\ngit commit\n```
```

See more using the link below

<https://docs.github.com/en/get-started/writing-on-github/getting-started-with-writing-and-formatting-on-github/basic-writing-and-formatting-syntax>

# LaTeX

- LaTeX is used to write math symbols and formulas inside the Markdown cells.
- For inline mode, enclose the formula in  $\$...\$$
- For display mode (formulas will be centered and displayed in a separate line), enclose the formula in  $\displaystyle \$\$...\$\$$
- LaTeX cheatsheet: <https://harrywang.me/latex>

$y^x$

`y^{x}`

$y_x$

`y_{x}`

$\frac{x}{y}$

`\frac{x}{y}`

$\sum_{k=1}^n$

`\sum_{k=1}^n`

$\sqrt[n]{x}$

`\sqrt[n]{x}`

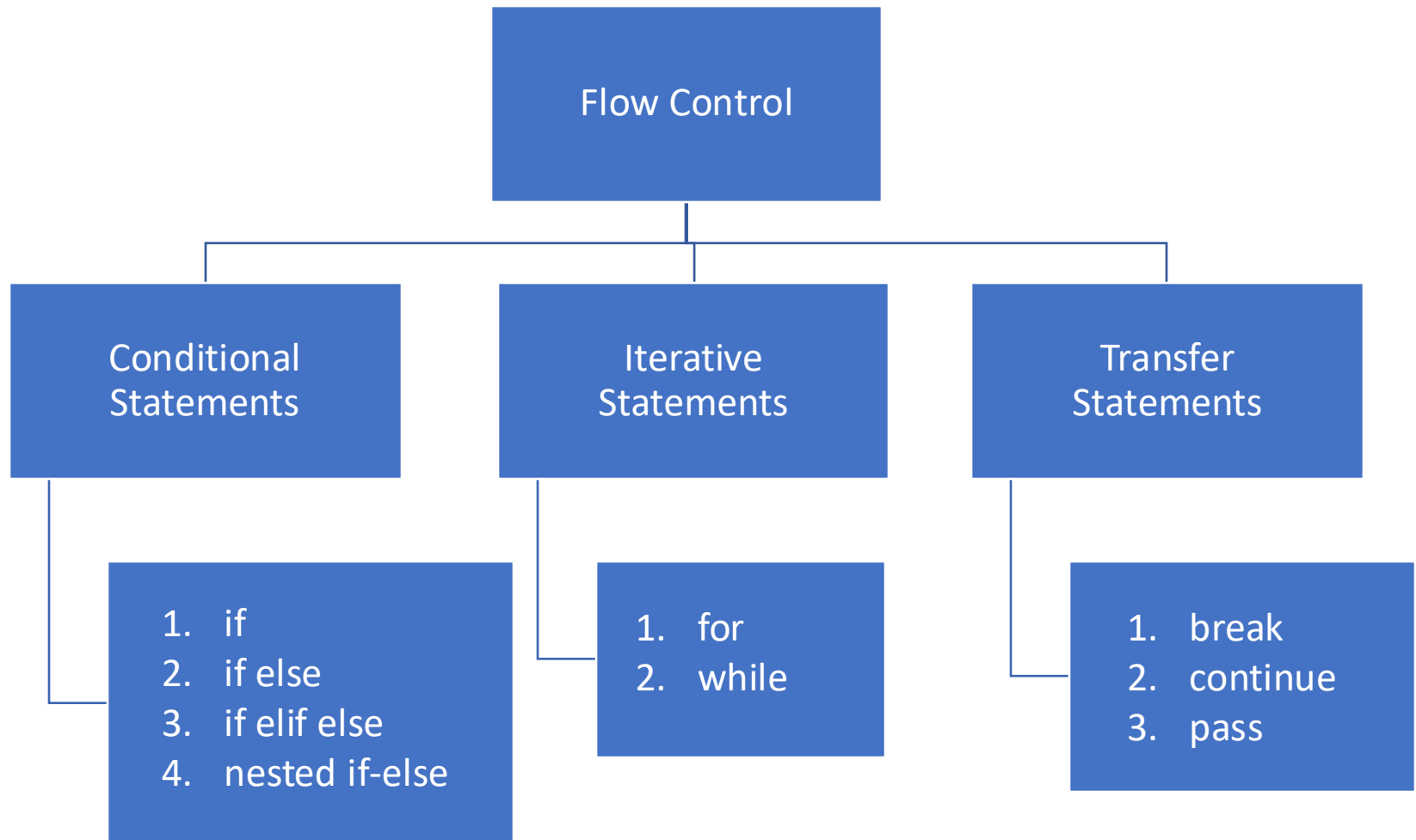
$\prod_{k=1}^n$

`\prod_{k=1}^n`

# Python Basics II

- Flow Control
- Lists, Dictionaries, and Sets
- List/Dict/Set comprehension
- Functions and Packages

# Python Flow Control



# List(Tuple)/Dictionary/Set

- List: **ordered** collection of values that can be changed (**mutable**)  
`[value1, value2, ...]`
- Tuple: a list that cannot be changed (**immutable**)  
`(value1, value2, ...)`
- Dictionary: **unordered** collection of key-value pairs with **unique** keys  
`{key1:value1, key2: value2,...}`
- Set: **unordered** collection of values with **unique (no duplicate)** elements.  
`{value1, value2, ...}`

# How to loop over list/dict

```
>>> animals = ['cat', 'dog', 'fish', 'elephant']
>>> for i, animal in enumerate(animals):
... print(f'Index {i} in animals list is: {animal}')
...
Index 0 in animals list is: cat
Index 1 in animals list is: dog
Index 2 in animals list is: fish
Index 3 in animals list is: elephant
```

```
>>> customer = {'name': 'John', 'gender': 'male', 'age': 25}
>>> for k, v in customer.items():
... print(f'Key is {k}, Value is {v}')
...
Key is name, Value is John
Key is gender, Value is male
Key is age, Value is 25
```