INFO5002: Intro to Python for Info Sys

Week 1

Northeastern University

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Week 1

I. Admin

II. Course Overview

III. Python Intro

IV. Basic Data Types

V. Variables

Admin

Hi, I’m Zachary

- B.Sc and M.Sc in Computer Science from McGill University.
- First time teaching at Northeastern University.

Absences

- According to MGEN policy, you are allowed a maximum of **2** absences.
- For specific festivities and personal events, please tell me.
- For extended absences, please contact your academic supervisor.

Absence Tracking

- Attendance will be taken manually at the start and end of class.
- Attendance will be saved to Qwickly and reminder emails will be sent on absence.

Disabilities

- If you are currently dealing w/ something that impacts your learning:
  - Do not tell me
  - Please contact *Disability Access Services*
  - *https://disabilityaccessservices.northeastern.edu/incomingandsunregisteredstudents/*

Health and Wellness

- If you have concerns around your health or wellness please contact Victoria Williams.
- v.williams@northeastern.edu
- https://we-care.studentlife.northeastern.edu/

Academic Advisor

- Say hello to your academic advisor.
- Most likely Antonio Fadda.
- Your one stop shop for everything academic and class related.

Academic Integrity

- You may have a lot going on and cheating may seem like an solution. It is not.
- You are here to learn. You are paying to learn. So learn.

Is this academically dishonest?

- Peeking at a peer's exam papers during an exam? **Yes**
- Working on an assignment with a peer where collaboration is not permitted? **Yes**
- Using online resources to find answers (e.g. Chegg)? **Yes**
- Using a chatbot to provide answers? **Yes**
- Using a chatbot to help you come up with the solution without explicitly citing this assistance? **Yes**

Is this academically dishonest (continued)?

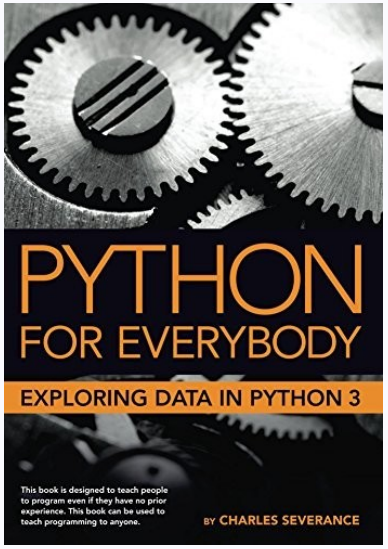
- Taking a direct quotation without surrounding by quotation marks nor reference? **Yes**
- Taking a direct quotation without referencing? **Yes**
- Taking a direct quotation with proper referencing? **No**
- Taking ideas from a source without citing? **Yes**
- Changing a few words, or rearranging words from another source without citing? **Yes**

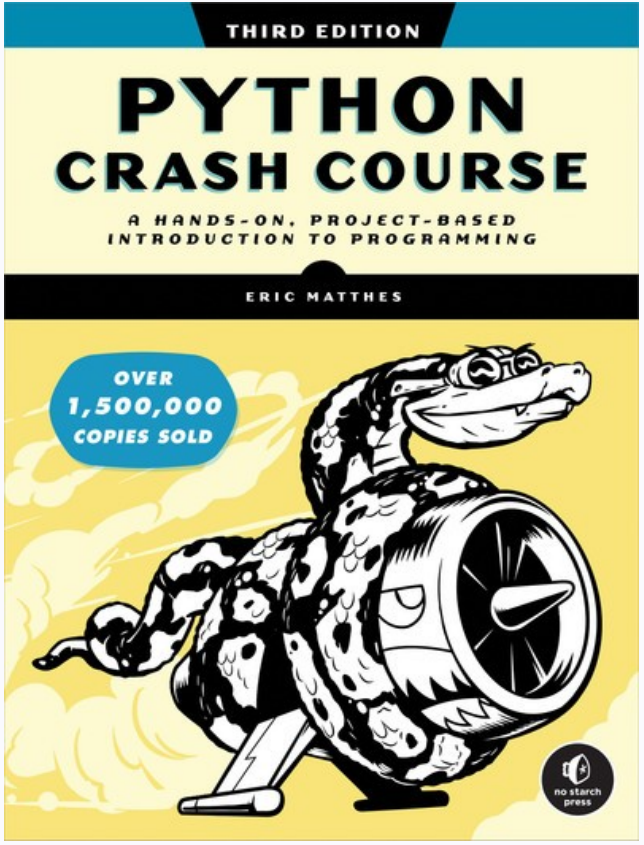
AI Chatbots

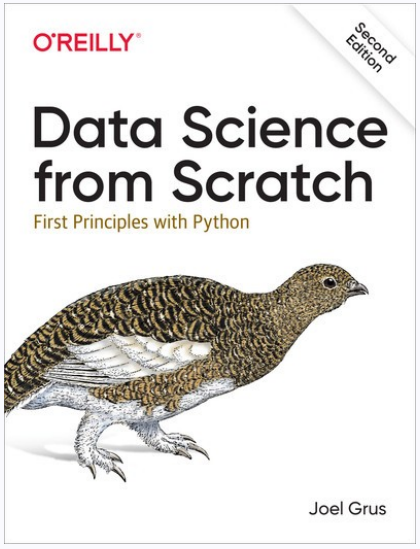
- As an introductory course you are **forbidden** to use any chatbots.
- Chatbots hamper learning and brain development. [1]
- Chatbots are trained on copyright infringed data and do not provide any citations to the original content.
  - They were trained on public repos on Github. So *your* python solution may have been taken from people's Github.

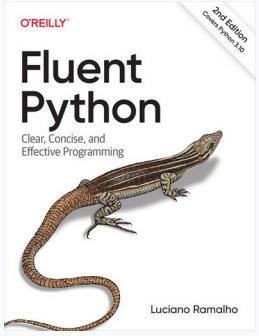
Course Overview

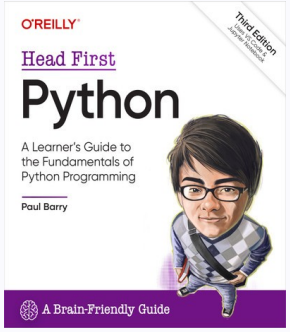
Textbooks











O'REILLY®

All images are taken from O'Reilly minus *Python for Everybody* which is taken from goodreads.

Breakdown

- Problem Sets: **40%** (Best 11 of 12)
- One-Pagers: **20%** (Best 5 of 6)
- Project: **20%**
- Final Exam: **20%**

Problem Sets (40%)

- Coding problems based on course content will be released weekly after class—due before the next class.
- To be submitted to Gradescope.

One-Pagers (20%)

- Bi-weekly will be assigned readings and a set of questions to answer based on the readings.
- Will have a maximum of 500 words to answer the questions.
- To be written and submitted directly into Canvas.

Project (20%)

- Open-ended where you take some dataset and perform an operation on it of your choice.
- E.g. environment Canada's weather data to predict average surface temperature at a city for a given year.
- Project topic is due Sep 26 with an optional "presentation" the 19th to get feedback.

Final Exam (20%)

- Format to be determined later.
- Will feature mix of theory and coding.

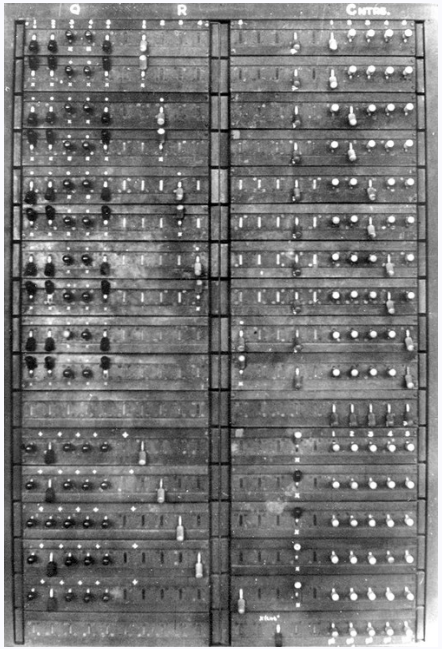
Late Policy

- All work must be submitted by the deadline.
- If you have any issues please inform me or contact your academic advisor.
- Late work will be given a 0.

Python Introduction

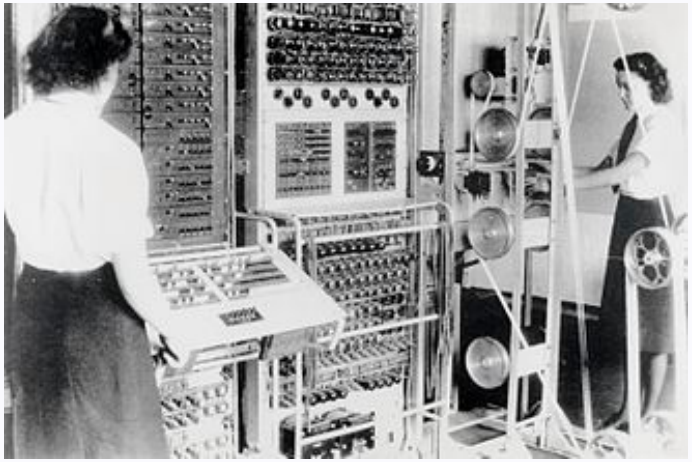
In the beginning

- First electronic digital programmable computer was Colossus (1944).



Source: Wikimedia

- Programmed using a set of switches.
- Data was passed in with a tape where the programmed algorithm was executed on.
- Results were outputed to a lamp panel.



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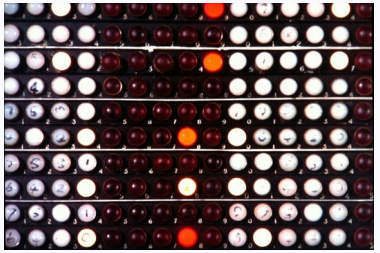
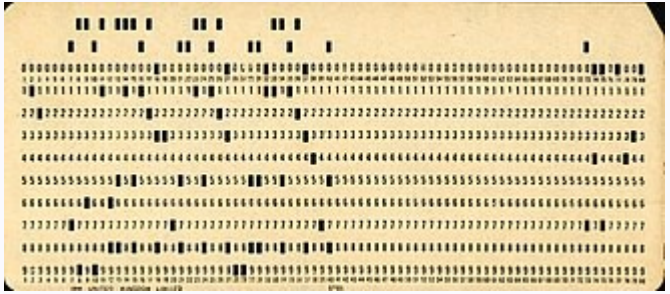


Source: Wikimedia

Punch Cards

- To avoid the annoyance of programming with switches and to allow for data to be saved, punch cards were invented.
- This came with the advent of assembly languages.
- Driven primarily with IBM's mainframe computers (1953).



Source: Wikimedia

Source: Wikimedia

Fortran

- To address the tediousness of programming assembly. Fortran was invented by John Backus as the first high-level programming language (1957).
- Programs were expressed through mathematical equations.
- Initially on punch cards and then through the terminal.

Source: Wikimedia

COBOL

- To enable programming with words rather than mathematical formulae, Rear Admiral Grace Hopper invented the compiler and co-created COBOL (1959).
- Initially on punch cards and then through the terminal.

Source: Britannica

Python

- Guido van Rossum wanted to create a language that is approachable by any human on earth.
- In 2000, Python was born.

Source: Wikimedia

Basic Data Types

PCC: 19-28

All is data and each have a type

- **Everything** around you can be represented as a piece of **data** and that piece of data can be described with a type.
- It is important to understand type, as computers store type differently.
  - Computers have only 1's and 0's and thus must *encode* different data type differently.

Integers

- Whole numbers that are positive or negative.
- 0
- 1
- 343
- -7542

Floating-points

- All numbers that are not whole.
- These are represented inaccurately. See IEEE 754.
- 12.3
- 1 / 3
- 0.876572

Characters

- Single symbol representation.
- Two popular encodings: ASCII and Unicode.
- A
- {
- 9

Strings

- Sequence of characters.
- Hello World.
- Welcome to INFO 5002.
- 99

Booleans

- True or False values (answers *yes* or *no*).
- Represented as a single bit: 1 (True), 0 (False).

Variables

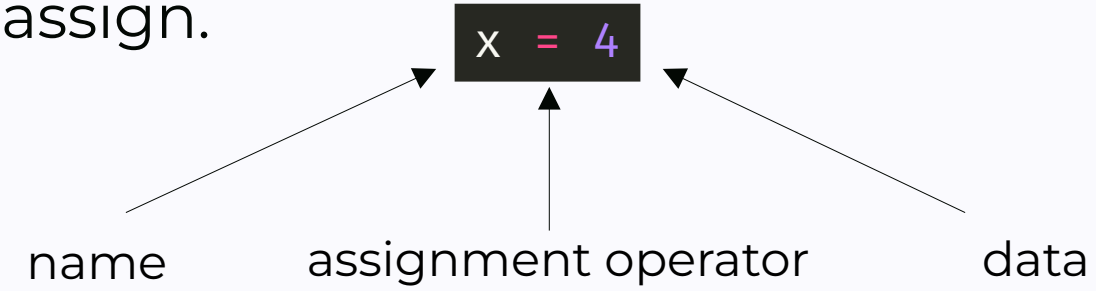
PCC: 15-19

We want to save data

- We may want to reference a piece of data later in our code; for this, we need variables.
- Variables can be thought of as a label you give to some data.
- You can give any data a label and when asking for the variable you get the data assigned to the label.

Creating variables in Python

- Variable defined by typing a label followed by = and then the data to assign.



- You can change the data of a variable at any time.

```
x = 4
x = 2.3
```

- You can multi-assign.

```
x, y, z = 1, 2, 3
```

Python keywords [2]

False	break	except	is	return
None	case	finally	lambda	try
True	class	for	match	type
and	continue	from	nonlocal	while
as	def	global	not	with
assert	del	if	or	yield
async	elif	import	pass	
await	else	in	raise	

Don’t name your variables any of these

Choose good variable names

- Only letters, numbers, and underscores.
- Can start with a letter or underscore.
- Spaces not allowed—underscores can separate words.
- Keep it descriptive.
- Avoid l, I, and O which look like 1 and 0 in some fonts.
- Avoid spelling mistakes.

Name Styles

- alllowercase: packages and modules
- lowerCamelCase: not used
- UpperCamelCase: classes
- snake_case: variables and functions
- SCREAMING_SNAKE_CASE: constants

See Python PEP 8 for more info [3]

Basic Data Types

- Integers: written as is `12` or `1_000_000_000`
- Floats: written as is `13.33`
- Characters: does not exist in Python `'hello world'` `"hello world"`
- Strings: everything inside double or single quotes
- Booleans `True` or `False`

Citations

[1] https://arxiv.org/pdf/2506.08872

[2] https://docs.python.org/3/reference/lexical_analysis.html#keywords

[3] https://peps.python.org/pep-0008/