Introduction to Python

Day 1

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Intros

Logistics

Please stop me at any time if you ever have any questions!

Logistics

Office Hours

- One hour before each meeting or anytime I am in the office
- Email me if you'd rather set up a time
- Email me clarifying questions, but questions about code are better in-person

Logistics

Homeworks

- 5 assignments
- Complete on GitHub, commit often w/comments
- Due Fridays and Mondays before class starts (final commit)
- Can work together but "each keystroke should be your own"
- Direct all grading, due date, etc. questions to Ryden

Logistics

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Poster session TBD (Friday 9/7?)

Logistics

- Schedule is up
- Files will be up before each class
- Are we all comfortable forking, syncing, commiting, etc.?
  - You can edit, commit, and sync the files with own notes & answers with conflicts
  - I'll sync my solutions later in separate files

Course Goals

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Learn Python!

- Python is especially useful for scraping, APIs, text, etc.
- Transferable skills $\rightarrow$ better programmer overall
- Sends a signal

Today

- Inconsequential quiz
- Make sure we're good to go with GitHub
- Go through syntax script & exercise
- Lunch 12-1ish
- Lab

Quiz

https://www.onlineexambuilder.com/python2015/exam-33067

Number Bases

- Think of each digit or "places" as a "column" in the number.
- For base 10, these columns come from

...	10^4	10^3	10^2	10^1	10^0
...	10000	1000	100	10	1

- How many of each?
  - "10" means "1 tens-place and 0 ones-place"
  - "201" means "2 in hundreds-place, 0 in tens-place, 1 in ones-place"

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  - "10" means "1 tens-place and 0 ones-place"
  - "201" means "2 in hundreds-place, 0 in tens-place, 1 in ones-place"
- For base 2, these columns come from power of two.

...	2^4	2^3	2^2	2^1	2^0
...	16	8	4	2	1

- Think of it as "ones-place", "twos-place", "fours-place", etc...

decimal (base 10)	binary (base 2)	expansion
0	0	0 ones
1	1	1 one
2	10	1 two and zero ones
3	11	1 two and 1 one
4	100	1 four, 0 twos, and 0 ones
5	101	1 four, 0 twos, and 1 one
6	110	1 four, 1 two, and 0 ones
7	111	1 four, 1 two, and 1 one
8	1000	1 eight, 0 fours, 0 twos, and 0 ones
9	1001	1 eight, 0 fours, 0 twos, and 1 ones
10	1010	1 eight, 0 fours, 1 two, and 0 ones
11	1011	1 eight, 0 fours, 1 two, and 1 one
12	1100	1 eight, 1 four, 0 twos, and 0 ones
13	1101	1 eight, 1 four, 0 twos, and 1 one
14	1110	1 eight, 1 four, 1 two, and 0 ones
15	1111	1 eight, 1 four, 1 two, and 1 one
16	10000	1 sixteen, 0 eights, 0 fours, 0 twos, and 0 ones

Table from `http://www.purplemath.com/modules/numbbase.htm`.

The conversion trick

$50/2 = 25\ \mathbf{R0}$

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$50/2 = 25$ **R0**

$25/2 = 12$ **R1**

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The conversion trick

50/2 = 25 **R0**

25/2 = 12 **R1**

12/2 = 6 **R0**

6/2 = 3 **R0**

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6/2 = 3 **R0**

3/2 = 1 **R1**

The conversion trick

50/2 = 25 **R0**

25/2 = 12 **R1**

12/2 = 6 **R0**

6/2 = 3 **R0**

3/2 = 1 **R1**

1/2 = 0 **R1**

The conversion trick

$50/2 = 25$ **R0**

$25/2 = 12$ **R1**

$12/2 = 6$ **R0**

$6/2 = 3$ **R0**

$3/2 = 1$ **R1**

$1/2 = 0$ **R1**

Writing it from the bottom... 110010_2

2^5	2^4	2^3	2^2	2^1	2^0
32	16	8	4	2	1
1	1	0	0	1	0

Explanation: `http://www.purplemath.com/modules/base_why.htm`

Converting to base 10.... go backwards!

$1 \cdot 2^5 + 1 \cdot 2^4 + 0 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 + 0 \cdot 2^0 = 50_{10}$