

Compsci 101: Running Python

- What does it mean to run a program?
 - What does clicking on app/program do?
 - How do you run/test APT code, other Python code
 - Where does program start to execute/run?
- Control flow in Python
 - Changing order in which Python statements execute
 - Loops and if statements
 - Essential for writing *real* programs
 - Everyone with high BMI in 101?



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4.1

How to solve an APT

- Two very, very, very important steps
 1. How to solve the problem with Paper, Pencil, (Calculator)
 2. How to translate problem-solving to Python
- Both steps can be hard, vocabulary and language are initially a real barrier
 - The more experience you have with Python, the easier step 2 will get
 - The more you understand the idioms and power of the language the more you can let step 2 influence step 1
- Step 1 is key, without it you won't get anywhere

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4.2

APT Pancake

- How do you solve this problem?
 - First steps: are there simple cases that can be solved immediately?
 - What are these for the pancake problem?
 - How will you identify with Python?
 - Sometimes it helps to know if you are on track, use Python to check your paper and pencil work
- Get specific, solve for 5, not N
 - Fix one parameter, vary the other
 - Identify the cases and continue

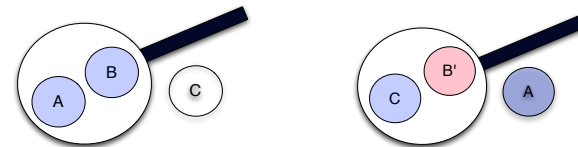


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4.3

Three pancakes in a two-cake pan...

- Number of cakes in the system
 - First 5 minutes
- Number of cakes in the system
 - Second 5 minutes

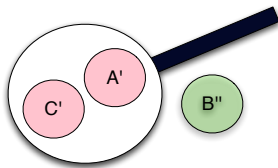


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4.4

Three pancakes in a two-cake pan...

- Number of cakes in the system
 - Third 5 minutes
- How many minutes to cook all three pancakes?



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4.5

How to teach pancake flipping

- http://www.youtube.com/watch?v=W_gxLKSsSIE
 - Is this computer science? <http://bit.ly/zykOrh>
 - For longer, more complex robotic tasks
 - <http://www.youtube.com/watch?v=4usoE981e7I>

Back to specifics:

- Capacity = 5
- Numcakes = 1,2,...5?
- Numcakes = 6,7,8,9,10?
- Numcakes = 11,12,13,14,15?

Is five special? 4? 3? 2?

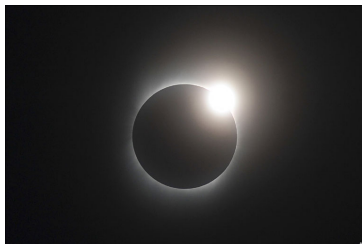


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4.6

Eclipse Interlude

- Finishing the Pancake problem
 - Translating problem-solving ideas to code
 - Control with if/elif: arithmetic with / and %



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4.7

Lessons: special cases, abstractions

- There are special cases in many, many problems
 - Identifying them is important
 - Abstracting them away when possible is important
 - Example: Pancake APT
 - What happens when everything fits in the pan?
 - Can there be a pan with no capacity?
- Translating ideas into (Python) code
 - How do we create interesting "heads", "totem poles" ?
 - How do create software for identikit?
 - How do we create Facebook, Foursquare, ...

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4.8

How do you solve a problem like ...?

- **Translating English to Piglatin**
 - Why is this fascinating?
 - <http://www.google.com/webhp?hl=xx-piglatin>
 - Is this like translating English to German?
 - Is it like translating Python to bytecode?
- **“downplay their unique quiet strength”**
 - “ownplay-day eir-thay unique-way iet-quay ength-stray”
 - What are the rules for pig-latin?



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4.9

Three versions of is_vowel

```
def is_vowel(ch):  
    if ch == 'e':  
        return True  
    if ch == 'a':  
        return True  
    if ch == 'i':  
        return True  
    if ch == 'o':  
        return True  
    if ch == 'u':  
        return True  
    return False
```

```
def is_vowel(ch):  
    c = "aeiou".count(ch)  
    if c > 0:  
        return True  
    else:  
        return False
```

```
def is_vowel(ch):  
    return "aeiou".count(ch) > 0
```

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4.10

Grace Murray Hopper (1906-1992)

- **“third programmer on world's first large-scale digital computer”**
 - US Navy: Admiral
- **“It's better to show that something can be done and apologize for not asking permission, than to try to persuade the powers that be at the beginning”**
- **ACM Hopper award given for contributions before 35**
 - 2004: Jennifer Rexford
 - 2010: Craig Gentry: <http://www.youtube.com/watch?v=qe-zmHoPW30>
 - 2011: Luis von Ahn



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4.11