

# Compsci 101

## Pancakes, While loops, Parallel Lists

### Live Lecture



Susan Rodger  
Nicki Washington  
February 25, 2021

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# Latanya Sweeney

PhD. Computer Science, MIT – first black woman  
Over 100 publications, Fellow ACMI



**"I am a computer scientist with a long history of weaving technology and policy together to remove stakeholder barriers to technology adoption. My focus is on "computational policy" and I term myself a "computer (cross) policy" scientist. I have enjoyed success at creating technology that weaves with policy to resolve real-world technology-privacy clashes.**



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<http://latanyasweeney.org/>

**Identify 87% of US population using (dob,zip,gender). Prof. Government and Technology @ Harvard, instrumental in HIPAA because of *de-identification* work. Former CTO of the Federal Trade Comm.**

One of her websites you can try:  
<https://aboutmyinfo.org/identity>

**How unique am I?**  
Find out how much different you are among the masses.

About Samples

Fill out the form below to see how unique you are, and therefore how easy it is to identify you from these values.  
*Please note that this service is still under development.*

**Date of Birth** Month Day Year


**Gender** ☒ Male ☐ Female

**ZIP Code**

ZIP code must be 5 digits long.

**Submit** →

**Your Profile**



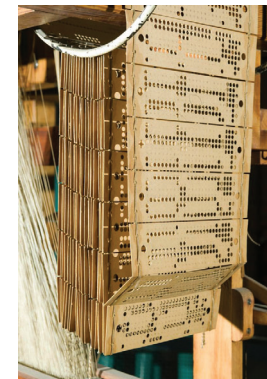
Results will appear here.

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**J** is for ...

- **JSON**
  - Format for data transmitted across the web
- **JPEG**
  - Image format based on lossy compression
- **Jacquard Loom**
  - 1804 "automated" loom



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# Announcements

- Nothing due today!
- APT-3 due Tuesday, March 2
- Assignment 2 due Thursday, March 4
- Lab 4 Friday – No Prelab
- APT Quiz 1 3/5-3/8

# PFTD

- Files and Data
- Pancake APT
- While loops and Collatz sequence
- Parallel lists
- Exam 1

## Exam 1 – Still grading, back soon

- Once graded, you will get an email from GradeScope
  - You will be able to see the full exam
  - We will post solutions
    - If you missed something, you should try to figure out what you did, then look at solutions
  - Regrades will be in Gradescope
- Here is feedback from the Exam 1 Survey

## APT Quiz 1 coming...

- APT Quiz 1 is 3/5 8AM -3/8 11PM – finish by 11pm
- There are two parts – each part is 1.5 hours
- Pick a start time for each part,
  - Once you start a part, You have 1.5 hours
  - If you get accommodations, you get those
- 4 APTs to solve (2 in each part)
  - Take parts 1 and 2 on same day or different days
- [Start APT Quiz on Sakai!](#)
- See old APT Quiz problems so you can practice
  - On APT page – NOT FOR CREDIT

# APT Quiz 1

- Is your own work!
  - No collaboration with others!
  - Use your notes, lecture notes, your code, textbook
  - DO NOT search for answers!
  - Do not talk to others about the quiz until grades are posted
- Post private questions on Piazza
  - We are not on between 10pm and 8am EDT!
  - We are not on all the time
  - Will try to answer questions between 8am – 10pm

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# Lists of Data

- String lists: `["ant", "fox", "cat", "dog"]`
- Lists of int/float numbers: `[5, 3.14159, -15]`
- What about lists of lists? Variable `plist =`  
`[["Washington", 1789, 57], ["Clinton", 1993, 46]]`
- What is `plist[0]`?
- What is `plist[0][2]`?
  - Can always use a variable:
- **First char. of "Washington"?**

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WOTO-1 Files  
<http://bit.ly/101s21-0225-1>

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# Pancakes!



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# APT Pancake

- How do you solve this (or any) problem?
  - 7 Steps!
- Some APTs are hard problems to solve (step 1-4)
  - Translating to code easy
- Some APTs have easy-to-see algorithms (step 5)
  - Translating to code is hard



## APT: Pancakes

### Problem Statement

You're a short-order cook in a pancake restaurant, so you need to cook pancakes as fast as possible. You have one pan that can fit `capacity` pancakes at a time. Using this pan you must cook `numCakes` pancakes. Each pancake must be cooked for five minutes on each side, and once a pancake starts cooking on a side it has to cook for five minutes on that side.

However, you can take a pancake out of the pan when you're ready to flip it after five minutes and put it back in the pan later to cook it on the other side.

Write the method, `minutesNeeded`, that returns the shortest time needed to cook `numCakes` pancakes in a pan that holds `capacity` pancakes at once. See the examples.

### Specification

```
filename: Pancakes.py

def minutesNeeded (numCakes, capacity):
    """
    return integer representing time to cook pancakes
    based on integer parameters as described below
    """
```

### Examples

```
1. numCakes = 0
   capacity = 4

   Returns: 0
```

It takes no time to cook 0 pancakes.

```
2. numCakes = 2
   capacity = 2

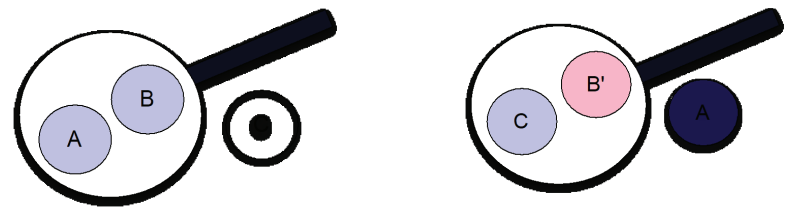
   Returns: 10
```

You cook both pancakes on one side for five minutes, then flip them over and cook each on the other side for another five minutes.

## Step 1: Solve an instance

### Three pancakes in a two-cake pan

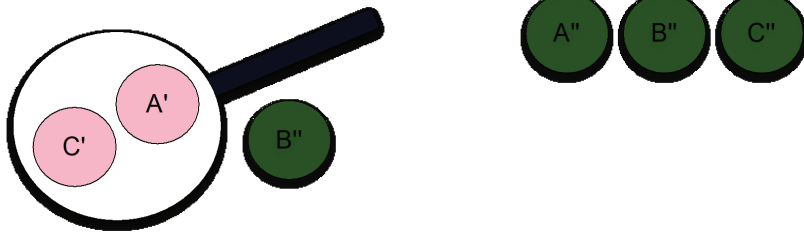
- First 5 minutes
  - 2 half cooking
  - 1 uncooked
- Second 5 minutes
  - 2 half cooking
  - 1 almost cooked



## Step 1: Solve an instance

### Three pancakes in a two-cake pan

- Third 5 minutes
  - 1 done
  - 2 almost cooked
- How many minutes to cook all three pancakes?



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## Step 1: Solve an instance

- What kind of instances? Simple cases that are quickly solved
  - What are these in Pancake problem?
- Don't solve for N, solve for 5 (generalize is step 3)
  - What do when there are two parameters?
    - Fix one, vary the other one
  - Helps identify cases



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WOTO-2 Pancakes  
<http://bit.ly/101s21-0225-2>

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Let's code it up!

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# How to teach pancake Flipping

- [http://www.youtube.com/watch?v=W\\_gxLKSsSIE](http://www.youtube.com/watch?v=W_gxLKSsSIE)
  - For longer, more complex robotic tasks
    - <http://www.youtube.com/watch?v=4usoE981e7I>



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# Review: While Loops

- Don't know: *how many times* loop executes
  - *a priori* knowledge, we'll know afterward
- Do know: condition that should be true after loop
  - Its negation is the expression for **BOOL\_CONDITION** (loop guard)

```
while BOOL_CONDITION:  
    LOOP_BODY  
    # modify variables, affect expression
```

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# WOTO-3 Collatz and While

<http://bit.ly/101s21-0225-3>

# Parallel Lists Review

- We will use parallel lists to track data
  - Each word is stored in a list named **words**
  - Word's count is stored in a list named **counts**
  - # occurrences of **words[k]** is in **counts[k]**

```
["apple", "fox", "vacuum", "lime"]  
[5, 2, 25, 15]
```

- What happens when we read a word?

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WOTO-4 File Frequency  
<http://bit.ly/101s21-0225-4>