Compsci 101
Problem Solving

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O is for ...

- Open Source
  - Copyright meets the Creative Commons
- Object Oriented
  - Using classes and more in programming
- Occam's Razor
  - Not just compsci. Simple is good
The Tech Twins

- Troy and Travis Nunnally
- Between them: 2 master’s and 1 doctorate from Georgia Tech
- Cofounders of Brain Rain Solutions
  - Augmented-reality
  - Internet-of-things
- Applied machine learning

Troy: “My advice would be to stay consistent. Always think persistently and consistently about learning a particular craft.”

Travis: “I think that you have to be passionate and find something that you simply love and enjoy. Not only find that thing — but actually be a lifelong learner around that.”

https://www.wired.com/story/what-atlanta-can-teach-tech-about-cultivating-black-talent/
Announcements

• Assign 4 GuessWord due Thursday, March 23
  • Sakai Assignment Quiz due TUESDAY, March 21

• APT-5 and Assign 5 out, March 23
  • Will talk about next Thursday

• No Lab Friday!

• APT Quiz 2 on March 30-Apr 3
PFTD

- Problem Solving
- Jotto game
Problem Solving – What to use

• Do you need to loop over anything?
  • Do you need the index of the item?
• Do you need to make a decision?
• Do you need unique elements?
• Are you working with two groups of things?
  • Are they parallel lists?
  • Are you comparing elements in some way with two groups of elements
Now let's look at an APT from APT-5
APT: SandwichBar Search

Problem Statement

It's time to get something to eat and I've come across a sandwich bar. Like most people, I prefer certain types of sandwiches. In fact, I keep a list of the types of sandwiches I like.

The sandwich bar has certain ingredients available. I will list the types of sandwiches I like in order of preference and buy the first sandwich the bar can make for me. In order for the bar to make a sandwich for me, it must include all of the ingredients I desire.

Given available, a list of Strings/ingredients the sandwich bar can use, and a orders, a list of Strings that represent the types of sandwiches I like, in order of preference (most preferred first), return the 0-based index of the sandwich I will buy. Each element of orders represents one type of sandwich I like as a space-separated list of ingredients in the sandwich. If the bar can make no sandwiches I like, return -1.

```python
filename: SandwichBar.py
def whichOrder(available, orders):
    ""
    return zero-based index of first sandwich in orders, list of strings that can be made from ingredients in available, list of strings ""
    
    # you write code here
```
Sandwich Bar Example

• available = [ "cheese", "cheese", "cheese", "tomato" ]

• orders = [ "ham ham ham", "water", "pork", "bread", "cheese tomato cheese", "beef" ]
Sandwich Bar Example

- available = [ "cheese", "cheese", "cheese", "tomato" ]
- orders = [ "ham ham ham", "water", "pork", "bread", "cheese tomato cheese", "beef" ]

- Returns 4
- Can make “cheese tomato cheese”

- Ignore any duplicates!
WOTO-1 SandwichBar
Given two lists A and B

• **Determine if all elements in A are also in B**
  • Examine each element in A
    • If not in B? False
    • After examining all elements? True

• **Think: Could we use sets instead?**
Given two sets A and B

• Determine if all elements in A are also in B
  • \( \text{if } \text{len}(A \cap B) == \text{len}(A) \)
  • \( \text{if } \text{len}(A - B) == 0 \)
Jotto: Game similar to GuessWord

- [http://jotto.augiehill.com/single.jsp](http://jotto.augiehill.com/single.jsp)
- No letters repeat – have to agree on this
- Shall we play a game?
Write program where Computer Guesses Your Word

• You give the computer a word to guess, called wordToGuess

• Computer does brute force, no thinking or eliminating letters
  • It picks a word at random
  • Calculates how many letters in common with wordToGuess, say x letters
  • Only keep words with x letters in common
  • Repeats until guesses the word
We will build useful functions to use to build the game
• What is needed?
• What order should the code do things?
SimpleJotto.py

• We have a file of five letter words: kwords5.txt
  • Would you like to play a game?

• Let's start! Simple version that sort of works 😊
Think about how to put the game together with all these pieces