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
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.
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!

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 $B$
  - $\text{if } \text{len}(A \cap B) = \text{len}(A)$
  - $\text{if } \text{len}(A - B) = 0$

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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?

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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

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We will build useful functions to use to build the game
WOTO-2 Approaching Implementation

• 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 😊

WOTO-3 Jotto Two Functions

Think about how to put the game together with all these pieces