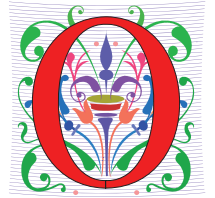


Compsci 101 Problem Solving

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

YOUR SECRET JOTTO WORD		OPPONENT'S SECRET JOTTO LETTERS	
MAPLE		WNGOR	
JOTTO™			
SCORE	OPPONENT'S TEST WORD	NO. OF JOTS	YOUR TEST WORD
100	FLOSK	2	WHALE
95	DULLS	1	SHAKE
90	PUMPS	3	FLING
85	SUMPS	3	FLUNG
80	LYMPH	3	SLANG
75	NYMPH	2	GROIN

Susan Rodger
March 9, 2023

3/9/23

Compsci 101, Spring 2023 1

10/25/22

Compsci 101, Fall 2022

2

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/>

3/9/23

Compsci 101, Spring 2023 3

3/9/23

Compsci 101, Spring 2023 4

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

Sandwich Bar

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`.

Class

```
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"]

3/9/23

Compsci 101, Spring 2023 12

WOTO-1 SandwichBar
<http://bit.ly/101s23-0309-1>

3/9/23

Compsci 101, Spring 2023 14

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!

3/9/23

Compsci 101, Spring 2023 13

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

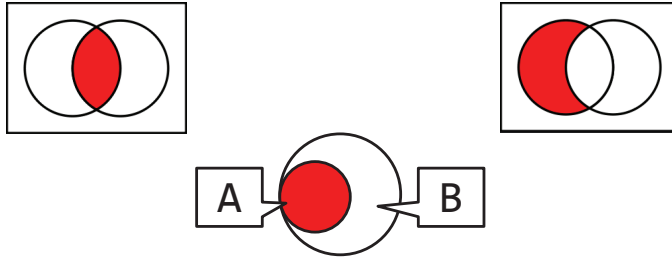
- **Think: Could we use sets instead?**

3/9/23

Compsci 101, Spring 2023 17

Given two sets A and B

- Determine if all elements in A are also in B
 - `if len(A & B) == len(A)`
 - `if len(A - B) == 0`



3/9/23

Compsci 101, Spring 2023 18

Jotto: Game similar to GuessWord

- <https://en.wikipedia.org/wiki/Jotto>
- <http://jotto.augiehill.com/single.jsp>
- No letters repeat – have to agree on this
- Shall we play a game?

YOUR SECRET JOTTO WORD		OPPONENT'S SECRET JOTTO LETTERS	
MAPLE		WNGOR	
JOTTO™			
SCORE	OPPONENT'S TEST WORD	NO. OF JOTS	YOUR TEST WORD
100	F O A S K	2	W H A L E
95	L U L L S	1	S H A K E
90	P O U M P	3	F L I N G
85	S O U M P	3	F L Y N G
80	L Y M P H	3	S L A N G
75	N Y M P H	2	G R O W N

3/9/23

Compsci 101, Spring 2023 19

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

3/9/23

Compsci 101, Spring 2023 20

3/9/23

Compsci 101, Spring 2023 21

WOTO-2 Approaching Implementation

<http://bit.ly/101s23-0309-2>

- **What is needed?**
- **What order should the code do things?**

3/9/23

Compsci 101, Spring 2023 22

WOTO-3 Jotto Two Functions

<http://bit.ly/101s23-0309-3>

3/9/23

Compsci 101, Spring 2023 29

SimpleJotto.py

- **We have a file of five letter words: `keywords5.txt`**
 - Would you like to play a game?
- **Let's start! Simple version that sort of works 😊**

3/9/23

Compsci 101, Spring 2023 25

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

3/9/23

Compsci 101, Spring 2023 34