PYTHON LAB

CALCULATING THE AVERAGE

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OVERVIEW & INTRODUCTION

- This lesson and Lab is to bring together the basic Python constructs, including:
  - Conditional IF statements
  - For loops
  - While Loops
- Using Top Down design flow to break a coding problem down

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RESOURCES & MATERIALS NEEDED

- Raspberry Pi or Laptop to with Python 3 installed and updateded

- Interactive Notebook or Google doc to create Top Down design flow diagram

WHAT YOU WILL KNOW...

- Prior Knowledge
  - How to open and run Python on a Raspberry Pi or other device
  - Familiarity with Python constructs like if, elif, else, while, for loops
  - Debugging skills to break down a python coding challenge

- What You Will Know & Be Able To Do
  - Use your Debugging skill to construct a top down flowchart to describe the python coding challenge
  - Impalement Python code to solve the coding challenge
  - Describe to classmates how you solved the coding challenge

HOW WILL YOU BE MEASURED

- Individual Students will submit working code
- Students teams will present diagram of Top Down design flow chart, and this will be graded
- Students teams will present orally how they solved the coding challenge, and depth of understanding will be graded

NEW WORDS…

- Average

- Mean

- Median

- Sum

INTRODUCTION – THE CODING TASK

- Calculate the Average of a set of numbers
  - Write a standalone program that will average the numbers in a list. Start with the following set of numbers 4,6,8,3,5,8,9,9,3,7
  - Identify the smaller tasks of this challenge, and create a modular flow diagram
  - Implement the code in a modular function based method that will allow for easy modification

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FIRST CHALLENGE – CALCULATING AVERAGE

- Challenge 1: - Write a standalone program that will average the numbers in a list. Start with the following set of numbers 4,6,8,3,5,8,9,9,3,7,14:

```
This AWESOME program will average of the following numbers
4,6,8,3,5,8,9,9,3,7,14
The SUM is 76 and the Average is 6.9090909090909
Done
```

- Before you run off to Google to find code, please take some time to solve this on your own.

Hint: - You will need a variable to hold the count of how many numbers are in the list. You will need to loop through and sum up the numbers. and then device by how many numbers there a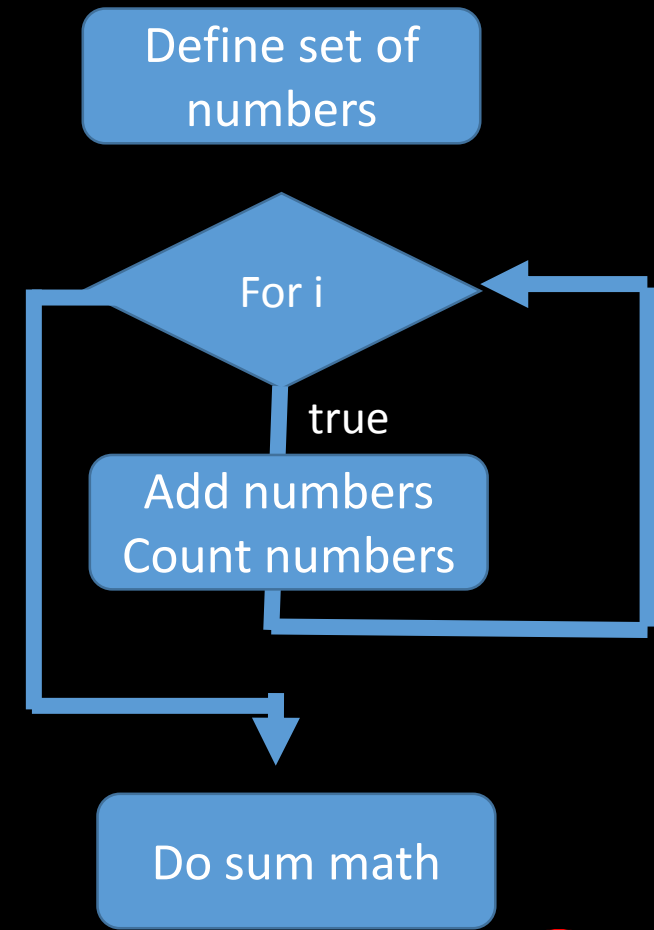re. Take a look at Calculator Soup site for an explanation http://www.calculatorsoup.com/calculators/statistics/average.php

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BREAK THE PROBLEM DOWN

- [list] is numbers – make a list set of the values to avarage

- Create a For Loop to count and add up the number

- Do sum math (ha, did you see that math joke) avargeValue = sumValue/numbers

```
Define set of
numbers
        ↓
     For i
        │ true
  Add numbers
  Count numbers
        ↓
   Do sum math
```

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CHALLENGE 2- NOW CALCULATE THE MEDIAN

- **Average is called Mean… now calculate the Median**
  - You can add to the calculated Median result to your program. In the comments add the definition of Mean, Median

```
This AWESOME program will average of the following numbers
4,6,8,3,5,8,9,9,3,7,14
The SUM is 76 and the Average is 6.9090909090909
3,3,4,5,6,7,8,8,9,9,14
The Median is 7
Done
```

  - Now use a different set… like 4,5,3,17,2,21

Hint: if you need help understanding the median see: https://www.khanacademy.org/

CHALLENGE 3 – ADD INPUT TO YOUR PROGRAM

- Add keyboard user input statement to your code, such that it will accept an integer input and loop until you enter "q".

- You will need to save the input numbers in a list and keep track of how many numbers you enter

ASSESSMENT

- Assessment Type(s):
  - ✓ Demonstrations
  - ✓ Rubrics

- C = working challenge 1 code

- B = working challenge 2 code

- A = working challenge 3 code

- +1 extra point = add odd random set of numbers rather than user input

Turn in
1. "new words" definitions
2. Link to Code (this can be github, google docs, or upload txt files

REFERENCE SLIDES

APPENDIX

APPENDIX A: LICENSE & ATTRIBUTION

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WHAT TO FIX FOR NEXT TIME