

CSI 31 LECTURE NOTES (Ojakian)

Topic 7: Functions

OUTLINE

(References: Sweigart ch 3 and Goldwasser/Letscher 5.2)

1. Functions
 2. Call by value
 3. Program Structure
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1. Functions

- (a) With no arguments
- (b) With parameters/arguments
- (c) Returning values - Note: Difference between PRINTING and RETURNING value!
Write a function which takes 2 inputs and returns the MIN (Max in HW)
- (d) Calling/Invoking a function
- (e) Examples

2. Scope of Variables

- (a) Any variable initialized and changed inside a function is INVISIBLE outside the function.
- (b) Variables initialized outside the function are seen inside the function. But this is usually bad form!

3. How Functions Modify Variable Contents

More on this later, but for now note this ...

- (a) Function changes to int, float, str, bool: NOT affect outside values
- (b) Function changes to elements of list: DO affect outside values.
- (c) Example: 2 typical ways to change data values

PROBLEM 1. Write a function that changes the values of a list to cube each entry. Do it two ways:

- i. Input Parameter Modified: By allowing function to change internal data of the list.*
- ii. Input Parameter UN-Modified: By **not** allowing function to modify internal data of the list (return value).*

4. Program Structure

- (a) Make repeated code into a single function
- (b) Make a related block of code into a function

5. Examples

PROBLEM 2. Write a function to count the number of perfect squares less than the given input: Use a for loop that goes from 1 to $h - 1$, calling a function to check which values are perfect squares.

***PROBLEM* 3.** Write a function `CountPrimes` to count the number of prime numbers less than the given input, using the following steps:

- (a) First write the `CountPrimes` function assuming you have a function `prime`. The function `prime` takes a number as input and returns `True` if the given number is prime and returns `False` if the given number is not prime.
- (b) Then write the `prime` function.
- (c) Use the `prime` function to complete the `CountPrimes` function.