

Name: (as it would appear on official course roster)	
UCSB email address:	@ucsb.edu
Lab Section Time:	
Optional: name you wish to be called if different from above	
Optional: name of "homework buddy" (leaving this blank signifies "I worked alone")	

Homework 04: Arrays and Functions, etc...

Assigned: Tuesday, October 27th, 2020

Due: Monday, November 2nd, 2020 by 11:59 PM

Points: 70 (normalized to 100)

- You may collaborate on this homework with AT MOST one person, an optional "homework buddy".
- MAY ONLY BE TURNED IN ON **GRADESCOPE as a PDF file**. Instructions on How to Submit (applicable to ALL homework assignments in this class) are on Piazza.
- There is NO MAKEUP for missed assignments.
- We are strict about enforcing the LATE POLICY for all assignments (see syllabus).
- **IMPORTANT:** If you use code techniques we have NOT covered in class, you will **get a zero grade** on that problem. If you cheat, or have someone else do your work, you will **get an F in the class**.
Only use the space provided for answers. Use clear and clean handwriting (or typing).

Reading: Chapters 5 and 7.

1. (2 pts) What happens if you forget the return statement in a void-function?
2. (2 pts) Can you define a function in the body of another function? And can you call a function in the body of another function?
3. (2 pts) What is the difference between a call-by-reference function and a call-by-value function? As a programmer, when might you decide to use one over the other?
4. (4 pts) Write a void-function definition for a function called "**zero_both**" with 2 parameters, both which are variables of type int, and sets the value of both variables to 0. Describe if you picked this function to be a call-by-reference or a call-by-value AND WHY?

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5. (8 pts) Assume that I wanted to add all the numbers inside of an int 3-dimensional array that is declared as: `int R[3][2][3] = {1};`.
- a. (2 pt) How many loops would I need to use?
 - b. (2 pts) Which would be better to use: for-loops or while-loops and **why**?
 - c. (2 pt) What is the total number of elements in this array?
 - d. (2 pt) What **values** do the array elements have when the above declaration is executed?
6. (6 pts) The book and lecture mention variable tracing and stubbing. Describe what they are and how they are best used.

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7. (10 pts) Write out the contents of a makefile, based on the examples from lecture, for a project that compiles a program called **CIA.cpp** that also “includes” a file called “**secrets.h**”. The compilation must adhere to C++ ver. 14 standards and should show all warnings. You should also add a “clean” section (again, as per the examples I’ve shown you). Make sure you use the correct syntax!

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8. (6 pts) One way to force a “one time” data type conversion is to use the **static_cast** conversion. Take for example the following programming snippet that also shows you the correct syntax use of this technique:

```
int number = 7;
int denom = 5;
double var1 = number/denom;
double var2 = static_cast<double>(number) /denom;
int var3 = static_cast<double>(number) /denom;
```

- a. (3 pts) Would you expect **var1** and **var2** and **var3** to be equal to each other? Why or why not?
- b. (3pts) Write a function definition (with header) for a function that takes one argument of type **int** and one argument of type **double**, and returns a value of type **double** that is the *real-number* average of the two arguments.

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9. (30 pts.) Complete the following function definition for the function **find()** that returns *how many times a value appears in an array*. The function takes three arguments: 1) list: an integer array, 2) asize: an integer that is greater than or equal to 0 and indicates the size of the array, and 3) target: an integer value that is being searched. All the function should do is return an integer number that indicates how many times the target integer that is being searched appears in the input array. It should return 0 if the value that is being searched is not in the array. The header and main curly braces are already there for you:

```
int find(int list[], int asize, int target)
{
```

```
}
```