Assignment 2

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Physics 2300

**Exercise 2.1**

*Files: Exercise 2.1.py*

TODO: COMPLETE THIS

**Exercise 2.2**

*Files: Exercise 2.2.py*

TODO: COMPLETE THIS

**Exercise 2.6**

*Files: Exercise 2.6.py*

TODO: COMPLETE THIS

**Exercise 2.7**

*See Exercise 2.7.py for program and output.*

**Exercise 2.8**

*Files: Exercise 2.8.py*

I initially used two test arrays (a=array[1,2] and b=array[3,4]) to verify array-math behavior before proceeding to parts A, B and C. Adding A+B yields [4,6], so I’m assuming that the array math is simply working on a one-to-one basis, A[i] to B[i].

Part A: (b/a+1)

Hand-worked:

2/1+1 = 3, 4/2+1=3, 6/3+1=3, 8/4+1=3 => [3,3,3,3]

Actual: [3,3,3,3]

Part B: (b/(a+1)]

I had a couple of simple things I had to watch out for after trying this by hand: order of operations and mathematical operations with integers and floating-point numbers in programming. When I first ran my program, I had some results that were way different from my hand-worked results until I recalled this issue.

Hand-worked:

2/(1+2)=1, 4/(2+1) = 4/3, 6/(3+1) = 3/2, 8/(4+1) = 8/5 => [1,4/3,3/2,8/5] = [1.0,1.333,1.333,1.6]

Actual: [1,1,1,1] – My hand-worked part did not initially consider the integer math, which truncates (not rounds) any decimal numbers. It is worth noting that I left my answers as integers, as the exercise in the book specifically marks the arrays as integer arrays, so I didn’t cast the numbers to floats.

Part C: (1/a)

Hand-worked: One divided by almost any number will result in a decimal value. Where the numbers are all whole integers, I'm expecting a lot of numerical truncations.

[1/1=1, 1/2=0 => 0, 1/3 = 0.333 => 0, 1/4 = 0.25 => 0] => [1, 0, 0, 0]

Actual: [1,0,0,0] (I was correct!)

**Exercise 2.12**

*Files: Exercise 2.12.py*

My program finds 1,229 prime numbers less than 10,000.

**Exercise 2.13**

*Files: 1) Exercise 2.13 – Part A.py 2) Exercise 2.13 – Part B.py*

Part A: My program finds C100 to be 5.09014835291e+46

Part B: My program finds the greatest common divisor of 108 and 192 to be 12.