

Assignment 1

DUE Monday, September 12, 2016 by 11:59.59.99PM (before MIDNIGHT)
Submit your files to your Canvas "Homework ASSIGNMENT 1" assignment

Preliminary Information:

You will be creating and submitting three (3) different files for this Assignment: **Aldeprec.c**, **Alprime.c**, and **Alharmonic.c**. **NOTE:** All three filenames use the number one "1", not a lower case el "l". **ALSO NOTE:** The filenames are **case sensitive**. Please be sure to use **ONLY** these files names.

Assignment 1 Program Descriptions:

There are 3 parts to this assignment, each solution will be submitted as a separate *.c file.

1. Depreciation. [30 points]

The simplest method of computing the annual depreciation of the value of any item, like a computer, is given by the equation:

$$\text{Annual Depreciation} = (\text{Purchase Price} - \text{Salvage Value}) / \text{Years of Service}$$

Write a program to determine the Salvage Value of any item when the Purchase Price, Years of Service, and Annual Depreciation are given.

Name your file: Aldeprec.c

Sample Output:

```
Enter the purchase price, years of service, annual depreciation:
```

```
5000 8 5.25
```

```
The salvage value of the item is 4958.000000
```

2. Am I Prime? [30 points]

A prime number is defined as: "A prime number (or a prime) is a natural number that has exactly two distinct natural number divisors: 1 and itself. The smallest twenty-five prime numbers (all the prime numbers under 100) are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97 [from Wikipedia].

Write a program that accepts an integer as user input and returns **[inside your program]** 1 if that number is a prime number and returns zero otherwise. **THEN use those return values [inside your program] to control your displayed output to match the sample. This means we are asking you to figure out something we have not addressed in class, namely, how to use a return value to control your final output.**

ADDITIONAL NOTE: While only the primes less than 100 are listed above, your program should be able to handle 3, 4, 5, and 6 digits primes.

ALSO NOTE: While it will keep you from applying the most elegant "algorithm" to this problem, since we have not introduced **math.h**, **PLEASE DO NOT USE math.h** (or any other "libraries" except **stdio.h**) in order to solve this problem.

Name your file: Alprime.c

Sample Output:

Enter a number to check if it is a prime number:

23

The number 23 is a prime number.

Enter a number to check if it is a prime number:

22

The number 22 is NOT a prime number.

3. Harmonics. [40 points]

A harmonic series is defined as: “an infinite series of numbers constructed by adding the numbers in a harmonic progression to one another.”

Write a program that takes user input for the value “n” and determines and prints the sum of the following harmonic series for a given value of n: $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{n}$

While your code is only required to calculate and print the sum of the harmonic series where **n** is a **positive number**, be sure your code can deal with the user entering a negative number for the initial value. In other words, your code must “catch” the **improper input** of a negative value. Carefully review the sample output below.

Name your file: Alharmonic.c

Sample Output:

Example #0:

Enter a value to calculate the value of this harmonic series:

-3

Please enter a POSITIVE Number: 5

The value for the series is: 2.283334.

Example #1:

Enter a value to calculate the value of this harmonic series:

3

The value for the series is: 1.833333.

Example #2:

Enter a value to calculate the value of this harmonic series:

99

The value for the series is: 5.177378.

Assignment 1 General Program Requirements:

Each of your three (3) program files for Assignment 1 **must** include the following features:

1. Proper Comment Block at the head of the file.
2. Proper and appropriate “in-line” or “in the code” comments.
3. Input and output as indicated in each example.
4. Your program compiles for testing.

Again, BE SURE you thoroughly comment your actual code and include the expected Heading Comment Block show in Meeting Guide 2 and in multiple class examples. These comments and comment block will represent 20% of your score for each file.

Scoring Rubric for each of the 3 Files submitted:

Proper Comments and Heading Comment Block: 20%

File compiles: 30%

File compiles and accepts proper input and generates proper output: 50%

Handing in your Assignment.

You will have to use some form of a “Secure FTP” program. This could be the one that comes with puTTY, or it could be WinSCP, or it could be some other tool you are already familiar. Just be sure you understand you cannot simply “drag-and-drop” a file from silo to your Canvas “Homework ASSIGNMENT 1” assignment. It will usually take two steps: 1: Move the file from silo to the computer you are using, 2. Upload the file from the computer you are using to Canvas with the usual method. If you have questions about this, ask them ASAP. BE SURE to submit all three files to the “Homework ASSIGNMENT 1” assignment in your Canvas account.