

Homework 1: I/O and expressions**Due Date:** 7/28/21

Acceleration is the rate at which an object changes its velocity. It is typically represented by symbol **a** and measured in m/s² (meters per second squared).

Write the algorithm (steps in pseudocode) and the corresponding program to calculate the acceleration of a vehicle given the speed in **miles per hour** and the time in **seconds**. Use the formula provided below to calculate the acceleration in meters per second squared.

The program must prompt the user to enter a velocity in miles per hour and a time in seconds (**real** numbers) and then display the resulting acceleration as a **real** number. The acceleration must be **rounded off** to **one decimal digit** but displayed with **two decimal** digits.

Acceleration formula:

$$a = \frac{1609}{3600} \times \frac{v}{t}$$

a: acceleration in meters per second squared

v: velocity in miles per hour

t: time in seconds

Mandatory:

1. Use a constant **MPH2MPS** = 1609/3600 for converting from miles per hour to meters per second.
2. Use the function learned in class to round off the acceleration.
3. Use appropriate data types for variables and constants.
4. Display the output formatted as in the example shown below.

Review the examples discussed in class, the lab assignments done so far, and the Programming Examples in the tutorial to get an idea of what you need to do. The **algorithm** must be written in **pseudocode** and should look like my lab handouts. **Include your algorithm in the source code as comments.**

Sample run of the program***Acceleration calculator***

Please enter the velocity in miles per hour: 60

Please enter the time in seconds: 6

***The acceleration required by a vehicle to reach
a velocity of 60.00 miles per hour in 6.00 seconds
is 4.50 meters per second squared***

IMPORTANT:

For your reference on how the program should interact with the user I am providing sample runs of my solution. Run your program with the same values I use in

them and make sure your program behaves similarly to mine (pay attention to the values calculated).

Your program must be well commented, use meaningful identifiers, use the constant.

Do not hesitate to use the corresponding forum in Discussions to post your questions/doubts about this assignment. I will reply as soon as I can.

Your program must have the following comments at the top:

```

*****
CSCI 1380          Summer II 2021          Homework # 1

Your full name
Partner's full name (ONLY if you worked with a partner)
(Brief description of what the program does)
*****

```

This is in principle **INDIVIDUAL** work but you can work as a team if you prefer.

If you submit **individually** please name your source code file **hw1FML** (where F, M, and L are your first, middle, and last name initials).

If you submit as a **team**, name your source code file **hw1TXX** (where XX are the two digits corresponding to your team number). **WARNING: both members of the team must submit the same solution through their individual accounts.**

When done, upload and submit your program solution on. Do Not email it.
Include the link to your onlineGDB solution in the Comments box.

The following is the basic criteria to be used to grade your submission:

You start with 100 points and then lose points as you do not do something that is required.

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-5    : Too few/no comments.
-5    : Didn't use the constant.
-5    : Data type is not correct.
-5    : Incorrect input format.
-5    : Incorrect output format.
-5    : Didn't round off.
-3    : Incorrect rounding.
-20   : Missing/incomplete algorithm.
-50   : Incorrect/Incomplete program.
-10   : Late submission.
-100  : No submission.

```

You may lose more points for other reasons not stated in the above list.

WARNING!: Each homework is worth around 11% of your final grade so make sure you submit ALL of them.

See sample runs on next page.

Sample runs of my solution

Acceleration calculator

Please enter the velocity in miles per hours: **60**

Please enter the time in seconds: **4.5**

The acceleration required by a vehicle to reach
a velocity of 60.00 miles per hour in 4.50 seconds
is **6.00** meters per second squared

Acceleration calculator

Please enter the velocity in miles per hours: **73.2**

Please enter the time in seconds: **5.23**

The acceleration required by a vehicle to reach
a velocity of 73.20 miles per hour in 5.23 seconds
is **6.30** meters per second squared

Acceleration calculator

Please enter the velocity in miles per hours: **55**

Please enter the time in seconds: **6**

The acceleration required by a vehicle to reach
a velocity of 55.00 miles per hour in 6.00 seconds
is **4.10** meters per second squared

Acceleration calculator

Please enter the velocity in miles per hours: **60**

Please enter the time in seconds: **6**

The acceleration required by a vehicle to reach
a velocity of 60.00 miles per hour in 6.00 seconds
is **4.50** meters per second squared

Note: I bolded the values just to make it easier for you to see them.