

CS 150 Lab 4 Conditional Logic & Formatted Output

The main objective of today's lab is to solve a problem that uses conditional logic and formatted output. You are to continue using the Visual Studio debugger to help identify any logical errors that your program contains.

1. Be sure your output looks exactly like the specified output.
2. Submit your solutions folder with the completed project to **CS150-02 Drop** folder when you are done.
3. Use the program skeleton and add comments to your code
4. Write small pieces of code and test as you go

Show the instructor or TA the output of your menu only before moving on. And then finally, show the instructor or TA your final solution.

Lab 4.1

Add a project called **04_1_SpeedOfSound** to your **PUNetIDLabs** solution that solves the following problem.

The speed of sound traveling through a gas medium depends on the density of the medium. The less dense the medium, the faster the speed of the sound travels. The following table shows the speed of sound at 0 degrees celsius.

Consider the following table showing the speed of sound through a gas medium:

Medium	Speed (Meters/Second)
Carbon Dioxide	258.0
Air	331.5
Helium	972.0
Hydrogen	1,270.0

Write a program that displays a menu allowing the user the ability to select one of the four gases. The program is to ask the user to enter the time it took (in seconds) for the sound to travel from the source to the detection location. The program is to report how far away (in meters) the source of the sound is from the detection location.

- 1) Check to make sure the user has selected a valid menu choice. If an invalid choice is entered, output the message "Illegal Menu Choice" and terminate the program.

2) Optional Challenge: Do not accept any input times that are less than 0 or more than 60 seconds.

Here is how your program is to work:

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Speed of Sound in Gas

Medium          Speed (Meters Per Second)
[C]arbon Dioxide      258.0
[A]ir                 331.5
[H]elium              972.0
H[y]drogen           1,270.0

Enter Medium: C

Enter Seconds Sound Traveled: 10

Distance of Sound from Detection Device: 2580.00 meters
```

IMPORTANT: When outputting the menu, I do not want to see the following statement:

```
cout << "                [C]arbon Dioxide                258.0" << endl;
```

Instead, your program is to use constant variables with `setw`, `fixed`, and `setprecision` where necessary and be easily modifiable.

Remember, your program skeleton is now:

- 1) Program Documentation
- 2) Any `#include` libraries
- 3) `int main ()`
- 4) Any constant declarations where the variable names are all caps. Use an underscore as a separator for constant variable names only when a variable name contains multiple words.
- 5) Any variable declarations
- 6) Your program logic

Note1: Your program is to compile without any errors or warnings.

Note2: Do not use any magic constants in your program.

Once your project is complete, place your solution PUNetIDLabs into the **CS150-02 Drop** folder on Turing. Your solution is to have all previous projects completely working and correct.