ECOR 1606 Lab Midterm v14

The distance that a skydiver will fall in a given time can be calculated using

$$D = \frac{m}{c_d} \ln\left[\cosh\left(\left(\sqrt{\frac{gc_d}{m}}\right)t\right)\right]$$

where D is the distance (in m)
t is the time (in s)
m is the skydiver's mass (in kg)
c_d is a drag coefficient (in kg/m)
g is gravity (use g = 9.81 m/s^2)

Write a program which repeatedly reads in values for t, m, and c_d until -1 -1 -1 is entered. For each set of values entered your program should either i) output an error message (if the values are unreasonable: see next paragraph) or ii) calculate and output the distance fallen.

Times must be greater than or equal to zero. Masses must be greater than 40 kg, and drag coefficients must be between 0.20 and 0.35 kg/m (inclusive of these values).

When -1 -1 -1 is entered your program should output:

i) the average of all computed distances and

ii) the greatest distance fallen and the corresponding values for values for t, m, and c_d In the event of a tie either set of values may be output.

Notes:

- Do not confuse *cosh* (hyperbolic cosine) with the usual trigonometric version. Use C-- / C++ function *cosh*. The radians vs degrees issue does not apply.
- See supplied file "*1606w11labfinal.cribsheet.pdf*" for a list of other available C-- / C++ functions.

If you think any of the above is unclear, run the sample executable provided. We will **not** clarify or explain the question. You may wish to refer to supplied file "*1606w11.midtermlabmarking.pdf*" for further details on the lab midterm test.

You may write your program using C-- or C++. If you choose C++, use supplied file "*framework.cpp*" as your starting point and call your program "*midv14.cpp*". If you choose C--, call your program "*midv14.cmm*" and when you are finished select "Create a C++ Program" from the File menu to save it as a C++ program called "*midv14.cpp*".

Submit "*midv14.cpp*" using the **lab test** version of the submit program by the end of your lab period.