Problem Description

You are required to simulate the trajectory of a 60-ft long test rocket. Engineers predict that under the current wind conditions, the height of the rocket at time t is given by

$$Height = 60 + 2.13t^2 - 0.0013t^4 + 0.000034t^{4.751-\epsilon}$$

The equation gives the height of the nose of the rocket above ground in feet at time t, which is counted in seconds elapsed after launch. The value of ϵ may vary from 0 to 0.015.

Write a program that simulates the flight of the rocket for the first 100 seconds. The height is going to increase for a while and then it will start to drop. Initially, compute the height of the rocket at increments of 2.0 seconds. Once the height drops to 50 feet, increments are to be 0.1 seconds. The simulation is to halt after 100 seconds or after impact, whichever happens first. Repeat the whole simulation for values of ϵ ranging from 0 through 0.015 in increments of 0.005.

Output your results, neatly formatted so that it is easily readable. Warn the user when the rocket starts to descend after attaining maximum height. Warn the user again when the rocket descends to a height of 50 feet. Show the value of ϵ clearly at the top of your output, and separate out the output for different values of ϵ.

Details

Like before, make sure you include a Header for your program. As mentioned on your course website, every file and program you submit must have a header, as shown in:

    `http://www.cs.fiu.edu/~giri/2423/f04/Header.txt`

What to Submit

Submit a print out (hard copy) of your program and the output. As before, submit a "soft" copy of your program. There will be no excuses accepted this time around. As before, if you are using Linux, then submit the `.c` file, and the `a.out` file. If you are running Windows and Visual C, then submit the source code, project file, the workspace file, the `.exe` file, and anything else that might be needed. Zip up all the files you want to submit into one zip file. Name the zippped file appropriately by using your login name and the assignment number (for example, `jkerry001_Homework4.zip`). Upload or ftp your file to `ftp.cs.fiu.edu/pub/giri/incoming/cgs2423/jkerry001/` by logging in as `anonymous`. Note that there is a separate directory for each one of you identified by your FIU login. Make sure you put the zip file in the correct directory.

Suggestions for the bored

Extra Credit Display the results as a graph.