Lab I CS 120-01 September 15,2000 Name

You may recall the following equations which tell us about the motion of an object thrown upward with initial velocity v_0 (m/s) and position p_0 (m). v(t) is the object's velocity as a function of time and p(t) is its position.

$v(t) = v_0 - 9.8\ t$ $p(t) = p_0 + v_0 t - (9.8\ t^2)/2$

We will write a program to compute these.

A.(8 min) Lets first suppose v_0 and p_0 are constants with values 10 m/s and 1.5 m. Since we might want to convert from m/s to feet/sec let's also have a constant called GRAV that is set equal to 9.8.

i) Write 3 C code lines using # define to set these constants equal to their appropriate values.

a)

Do these lines come before or after main() ? Must they be on three separate lines?

_____ _____

ii) Suppose we will have the user input the time and the computer calculate and print out the velocity and position for that time. How many variables will you need to do this?

_____

Write type declarations for your variables

b)

c) Write 2 C statements using your variable and constant names that give the velocity and position in terms of time.

iii) Which variable does the user have to input? _____ Write two C statements (one a prompt) to accomplish this.

d)

iv) Write three statements to output the time and the velocity and the position.

e)

v) What order should the code you wrote in a) - e) be in? _____

B. (12 min) Use your answers from A. to write a program for the problem in A.Store this in your project folder. Sample input and output: input (time): 0.2 output:
time: 0.2 sec
velocity: 8.04 meters/sec
position: 3.304 meters

C.(5 min) Now suppose we want to convert to feet per sec where GRAV becomes 32.1 feet/sec^2 . Make a copy of your program for B and modify it to handle problems in feet by changing GRAV and your other two constants to realistic numbers. Store this program in your project folder.

D.(12 min) Now suppose we want to allow the user to input the initial velocity and position so they can see what their effects are also.
i) What new variables will you need in your program in B? _____
How will your declaration statement be changed? _____
Since these are no longer constants what part of your code will needed to be deleted? _____
How many new pieces of information will have to be input?_____
Write code to accomplish this.
If you have different variable names that replace your constant names you will also have to change your formula statements.
Now copy your code file from B. and change it for this new problem

E (4) Turn in a copy of your project folder with the three code files for B,C, and D. Make sure you also include the .mcp file. Name your folder copy yournames.lab1.10
eg. drush.dunn.lab1.10