CSE1010–Fall 2014 – Homework assignment 3

Objective:

Upon completion of this assignment you will have demonstrated the ability to:

1. Write a debug (if necessary) a MATLAB program.
2. Manipulate matrices and do scalar-matrix and element by element matrix arithmetic.
3. Format and output computations results
4. Call built-in MATLAB functions

Problem Statement (variation of problems 8,9,10 in Chapter 3):

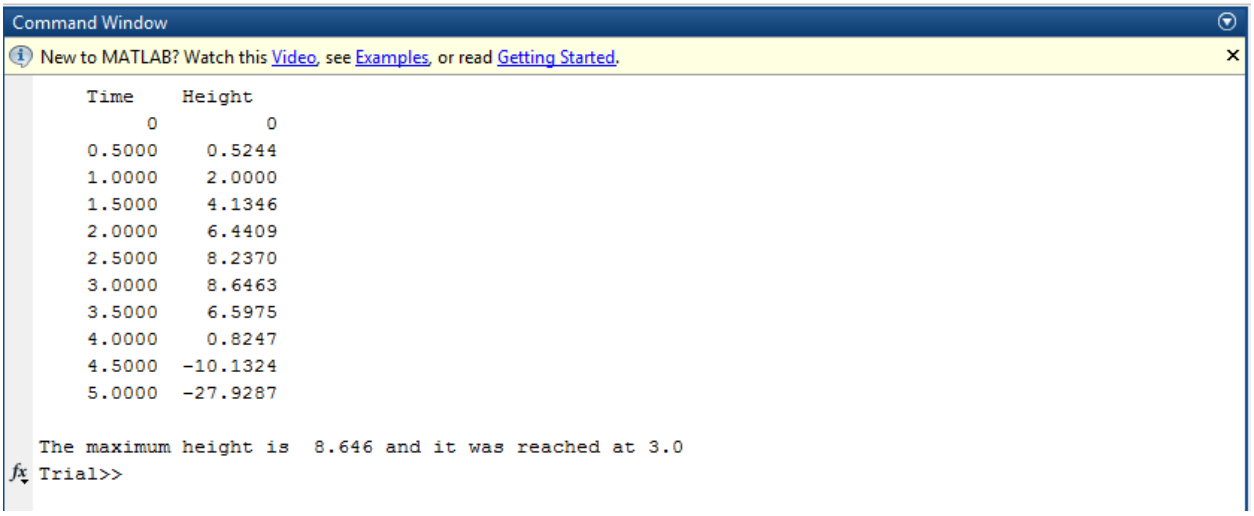
A small rocket is being designed to make wind shear measurements in the vicinity of the thunderstorms. Before testing begins, the designers are developing a simulation of the rockets trajectory. They have derived the following equation, which they believe will predict the performance of the test rocket, where t is the elapsed time in seconds:

$$\text{height} = 2.13t^2 - 0.13t^4 + 0.000034t^{4.752}$$

Write a MATLAB program that will

1. Compute and print a table of time versus height at 0.5 time intervals, up through 5 seconds.
   Note: The equation will actually predict negative heights. Obviously, the equation is no longer applicable once the rocket hits the ground.
2. Find and print the maximum height achieved by the rocket.
3. Find and print the time the maximum height is achieved.

This is how the program output should look like



Tips and notes:

1. You can use the ":" operator to generate the required time range.
2. After computing the required time vs. height table, as in the example output above, the easiest way to print it is to use the `disp` function.
3. An additional `disp` function call can be used to print the table header, and you can use spaces to nicely align the header with the values in the table.
4. USE meaningful variable names
5. USE comments and include a header of comments in your program to describe the functionality of the program, the name of the programmer, and the date.

Submission:

Submit the m-file containing your program through HuskyCT.

Grading criteria:

Creating the time range	2
Computing the height	2
Finding the maximum height	2
Finding the time for the maximum height	1
Formatting the output	1
Using meaningful variable names	1
Using comments	1
Total	10 points