CS 151L – Summer 2017
Programming Assignment 5

Due: Wednesday, July 12, 2017 @ 11:59 PM

You will need to submit your program on learn for grading. The names of the files are listed in the step-by-step instructions. Be sure to include your name and section number as comments in each m-file.

A small rocket is being designed to make wind shear measurements in the vicinity of thunderstorms. Before testing begins, the designers are developing a simulation of the rocket's 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:

$$h = 2.12589t^2 - 0.00130012t^4 + 0.0000339821t^{4.7498}$$

You must create four (4) files that include performing calculations, plotting the height function over a specific time interval and creating the main program. The three functions are defined in the first three steps and the assignment program is defined in the fourth step as follows:

1. Create a function called **height151** that has two input arguments: the number of values in the time matrix and the last value of time in the matrix. This function will create the time matrix using the input arguments, calculate the height values using the given equation and create a table of time values in the first column and height values in the second column. The table will be the only return variable for the function.

2. Create a function called **maximumt151** that only one input argument: the table that was created from the first function; and, two (2) return arguments: the maximum height and the time that the maximum height occurred. You will need to use the table to find the maximum height and location. Then determine the time associated with the maximum height using the table again.

3. Create a **printt151** function that also has only one input argument: the table of time and height values; and no return argument. This function will plot the time versus the height and set the axis for the domain to be 0 to 65 seconds (even if the last value is greater than 65) and the range to be -1000 to 2000 feet. Also, include x and y labels and a title of the plot (note that the sample does not have these).

4. Finally, you need to create a **cs151su17assn5.m** file that asks the user to input the value of the last time in the matrix and the number of values that are needed in the matrix (in this order). Then, you will call functions 1 through 3 to create the table of times and heights, find the maximum value and its associated time (print those values out in this program, and plot the values using the last function.

Once completed, submit all of your files (4) for grading.

Sample Output (NOTE: values are rounded off here but should not be in your program)

```
Please enter the value of the last time (in seconds): 80
Please enter number of values in the time matrix needed: 70
```

```
mh =
   940

mhtime =
    30
```

Sample Figure