ENG-101 Section VIII
Intro Computing Engineers Homework 2

DUE: 6 September 2017

Question 1 (10 points)

Write a documented MATLAB program (bloodpressure.m) to illustrate blood pressure in the heart that is modeled with the following equation:

$$y(t) = e^{-8t}\sin\left(9.7t + \frac{\pi}{2}\right)$$

Plot the function for $0 \leq t \leq 0.5$ seconds. Label the graph using the label *Normalized Pressure Difference vs Time*. *Also label the x-axis 'Time", and y axis 'Normalized Pressure'*.

Question 2 (10 points)

Newton's laws of motion are used to derive the following formula for the maximum height h achieved by an object thrown with a speed v at and angle θ to the horizontal:

$$h = \frac{v^2 \sin\theta}{2\,g},$$

where $g = 9.8\ m/sec^2$.

Create a documented MATLAB program (maximumheight.m) with a table showing the maximum height for each of the following values of speed and angle. Use the command `array2table` in your program. Hint: form outer product.

$$v = 10{,}12\ 14\ 16\ 18\ , 20\ m/s$$

$$\theta = 50^o, 60^o, 70^o, 80^o$$

Question 3 (10 points)

Provide the MATLAB commands needed to determine the solution to the following system of equations in a MATLAB program (linearequation.m). Use MATLAB to check the solution by multiplying coefficient matrix A with the solution vector x, to produce b. That is, $A\vec{x} = \vec{b}$.

$$w + 3x + 4y = 31$$

$$2w + x + 3y + z = 27$$

$$9x + 7y + 2z = 72$$

$$4w + 3x + 2y + 2z = 27.$$