Homework 3

Create a single MATLAB script with each problem below as a separate section (hint: %%).

1. Create a new script
2. Create a comment section at the top with your name, date, HW#, class, etc.
3. The first script commands should erase all the workspace data, command window output, and close all figures.
4. Create separate sections (%%) for each problem

Problem 1:

If C and F are Celsius and Fahrenheit temperatures, respectively, the formula for conversion from Celsius to Fahrenheit is $F = 9C/5 + 32$.

(a) Write a script that will ask you for the Celsius temperature and display the Fahrenheit equivalent with some sort of comment, such as:

```
The Fahrenheit temperature is:...
```

Try it out on the following Celsius temperatures (answers in parentheses): 0 (32), 100 (212), −40 (−40!), 37 (normal human temperature: 98.6).

(b) Change the script to use vectors and array operations to compute the Fahrenheit equivalents of Celsius temperatures ranging from 20° to 30° in steps of 1°, and display them in two columns with a heading, like this:

```
Celsius          Fahrenheit
20.00            68.00
21.00            69.80
...
30.00            86.00
```

Problem 2:

The electricity accounts of residents in a very small town are calculated as follows:

- If 500 units or fewer are\ used, the cost is 2 cents per unit.
- If more than 500 but not more than 1000 units are used, the cost is $10 for the first 500 units and 5 cents for every unit in excess of 500.
- If more than 1000 units are used, the cost is $35 for the first 1000 units plus 10 cents for every unit in excess of 1000.
- A basic service fee of $5 is charged, no matter how much electricity is used.Write a program that enters the following five consumptions into a vector and uses a `for` loop to calculate and display the total charge for each one: 200, 500, 700, 1000, 1500. (Answers: $9, $15, $25, $40, $90)

Problem 3.

It is useful to work out how the period of a bond repayment changes if you increase or decrease P. The formula for N is given by:

$$N = \frac{\ln\left(\frac{P}{P - rL/12}\right)}{12\ln(1 + r/12)}.$$

(a) Write a new program to compute this formula. Use the built-in function `log` for the natural logarithm ln. How long will it take to pay off a loan of \$50,000 at \$800 a month if the interest remains at 15%? (Answer: 10.2 years—nearly twice as fast as when paying \$658 a month.)

(b) Use your program to find out by trial and error the smallest monthly payment that will pay off the loan this side of eternity. Hint: recall that it is not possible to find the logarithm of a negative number, so P must not be less than $rL/12$.

Turn in the following:
1. A Word (.doc, .docx) document created using the MATLAB publish feature to publish your script.
2. Your .m script file(s) (these are separate files from the document above). Make sure you use plenty of comments. Before submitting, rename all *.m files to have a .txt extension. For example, rename MyHW6.m to MyHW6.txt before submitting.
Submit all files electronically on Blackboard. See syllabus for late assignment policy.

Late submissions will receive a 10% deduction!
No submissions will be accepted after one day!