CISC106 – Lab 09

This lab is due 08/10/2014 at 11:55 p.m. (submission via Sakai)

- **If you write your .m files in one of the University's servers, please remember that they will be there. They will only be in your machine if you copy them.**
- **Now you will probably need to submit multiple files to Sakai, depending on the problem's specifications.**
- **You need to provide at least 3 test cases for each new method you write, when applicable. Please keep in mind that those elements are worth at least half of the question, so you may not want to forget them!**
- **The problems are worth 90 points + 10 points for attending the lab session.**

Part 1: Inheritance (30 points)

a) (20 points) The store ComputersRus sells three different types of products: TVs, computers and digital cameras. For all of them, the store keeps its barcode, price, description and quantity in stock. For TVs, the store also keeps if it is LCD or plasma, and the size of the screen in inches. For computers the store keeps its RAM size, the type of the processor, processor's speed and hard drive capacity. For digital cameras the store keeps the number of pixels.
Design a class and its subclasses in order to accommodate the needs of the store to maintain this information. For safety reasons, all the attributes need to be private.

b) (5 points) Write a method called **update_stock** which receives the number of acquired products and updates its stock.

c) (5 points) Write a method **calculate_ inventory** which calculates how much money the store has in a given product's inventory

Part 2: Matlab (60 points)

For the following functions, write all of them in Matlab. You will need a different .m file created for each function. Please submit all of your files under ONE submission to Sakai.

1) (10 points) Follow the instructions on the end of this file to learn how to plot using Matlab. After following the instructions please save the plots in image files and submit them along with the .m file.
2) (10 points) Write a function that receives a temperature in Fahrenheit and converts it into Celsius and returns it.
3) (10 points) Write a function that takes as an input parameter an integer and returns the total sum of all the numbers from zero until the input number.
4) (10 points) Write a function that takes a list of numbers as an argument and returns the total sum of all the elements of the list.

5) (10 points) Write a function that takes a list of integers as an argument and, for each element on the list, calculates and prints its square.
6) (10 points) Write a recursive function which receives a number **x** and returns the sum of the first x Fibonacci numbers.

The following two examples of plotting were taken from a Matlab tutorial. Visit http://www.mathworks.com/help/matlab/examples/2-d-plots.html?prodcode=ML to get more information on other types of plots you can do using Matlab.

Line Plot of a Chirp

This example shows a basic line plot of a chirp signal. It also shows how to enter labels for the *x* and *y* axes using xlabel and ylabel as well as one method of initializing *x*-values. Type doc linspace at the command prompt for information on another method for initializing evenly spaced data sets. Here y-values are computed as a function of xand stored in the variable y, but you could also plot just the computed y-values in one command, for example, plot(sin((0:0.05:5).^2)).

```
x=0:0.05:5;

y=sin(x.^2);

plot(x,y);

xlabel('Time')

ylabel('Amplitude')
```

Bar Plot of a Bell Shaped Curve

As just suggested, you don't need a variable to hold *y*-values if you pass a function that generates them to plot as its y-argument.

```
x = -2.9:0.2:2.9;


bar(x,exp(-x.*x));
```