**AML 610 Fall 2014 Homework #6**

**Submit all files to** **smtowers@asu.edu****.**

**Due Mon Oct 20th, 2014 at noon.**

**Please submit with name format hwk6\_<first name>\_<initial of last name> Please provide your R and C++ files, and a Word file that gives the output to your screen, plots, etc.**

**All code must conform to good coding practices, as described in** [**http://sherrytowers.com/2012/12/14/good-programming-practices-in-any-language/**](http://sherrytowers.com/2012/12/14/good-programming-practices-in-any-language/) **and all plots must conform to good plotting practices, as described in** [**http://sherrytowers.com/2013/01/04/good-practices-in-producing-plots/**](http://sherrytowers.com/2013/01/04/good-practices-in-producing-plots/)

**Question 1**

a)

Go to the page that lists the prospectus documents for the term projects that students in the class have proposed: <http://sherrytowers.com/?p=2119> (I’ve emailed you the page password)

Read each prospectus, and fill in the score sheet below with the rubric provided. Your score on this homework assignment is based on how well your scores on the marking rubric match mine for the same project.

Note: you will also score your own project.

Scoring rubric:

* **Motivation:** how well did the student motivate the project proposal. Were citations and/or links to relevant literature provided? Score 1=poorly motivated to 5=well motivated.
* **Objective:** was the proposed model appropriate to the motivation? Did the student give the equations of the model? Did the model make sense? Did the student provide references related to the model? Is there any indication given as to whether or not the model is novel? Score 1=inappropriate or poorly described model to 5=appropriate and well described novel model (4 would be an appropriate and well described model that is not necessarily novel).
* **Description of sources of data:** are the sources of data well described? Can you use the citations and links provided to actually find the data the student mentions? (note: look the sources of data up for each prospectus! If you state that the data are well described, but I found that I couldn’t find them based on the information provided, you will get a poor grade on this part). Score 1=data not described to 5=data very well described and found to be available
* **Appropriateness of the data for fitting the model:** Was the proposed data appropriate for the model in that it described the time evolution of at least one compartment in the model? Note that the models we have been considering all involve rates of flow from one compartment to another (ie; variation in time). Thus, fitting the models requires time series data; data that have repeated measurements in time. One thing you need to watch out for is whether or not the data described are in fact time series data, or just data at one time point. Data at one time point cannot, by themselves, be used to fit the parameters of the models we examine. Score 1=data do not appear to be appropriate to model and/or cannot be used for fitting because the data are not time series measurements, to 5=data appear to be appropriate to the model and are time series measurements of some quantity related to the model.

b) After scoring the prospectus documents. Rank your top 5 favourite projects from 1=favourite to 5=5th most favourite (ie; the one you rank #1 is the project I am going to assume you want to participate in most). Note that you do not need to include your own project in the top five favourites ranking if you do not want to.

I cannot guarantee you will be assigned to one of your top ranked projects, but I will try my best to take your interests into account. However, if your proposal gets picked, you will be in that group.

After students grade the projects, I will return to you the grades given to your prospectus document, anonymized so you do not know who gave you which grade. **Keep in mind that this process is meant to be constructive.** If you universally get poor scores for instance on your description of the data, or your motivation, you know what you will have to pay more attention to the next time you write a prospectus. My hope is that by the end of this course you all will have gained some new knowledge and confidence about what to put (and what not to put) in a prospectus, thesis, or paper; it’s a learning process, and it is natural to make mistakes the first time you try.

Score Sheet: rubric scores between 1(worst) to 5(best), and rank your top five favourite projects from 1(most favourite) to 5(5th most favourite). Copy and paste this table into your Word document with your homework answers.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Project | Motivation | DescriptionOf Data | Objective | AppropriatenessOf Data | TotalScore | Rank |
| 1 Heroin |  |  |  |  |  |  |
| 2 Alcohol |  |  |  |  |  |  |
| 3 Gun Control |  |  |  |  |  |  |
| 4 Gangs |  |  |  |  |  |  |
| 5 Enterovius |  |  |  |  |  |  |
| 6 Dengue |  |  |  |  |  |  |
| 7 Foxes |  |  |  |  |  |  |
| 8 Ebola |  |  |  |  |  |  |
| 9 Video Games |  |  |  |  |  |  |
| 10 UFO’s |  |  |  |  |  |  |
| 11 Coffee |  |  |  |  |  |  |
| 12 Living alone |  |  |  |  |  |  |
| 13 Women in STEM |  |  |  |  |  |  |
| 14 Anti-vaccine |  |  |  |  |  |  |
| 15 |  |  |  |  |  |  |

**Question 2**

a) Write a C++ program that uses a loop to fill a vector with the numbers 1 through 21 in steps of 2, and then uses another loop to print the vector in a column to the screen.

b) Write a C++ program that uses a loop to fill a vector with the numbers 21 down to 1 in steps of 2, and then uses another loop to print the elements of the vector, and also print the running sum, in a column to the screen.

c) Google the C++ substr() method in the string library. Write a C++ program that uses the iostream library cin method to query the user to enter their name. Google the C++ size() method in the string library. Have your program print out the number of characters in the person’s name (include spaces as characters).

Google the C++ substr() method in the string library. Have your program also print out the first letter of the person’s name.

d) Write a C++ program called myprogram that randomly generates 10,000 integers uniformly distributed between 1 to 50. Hint: look at [www.sherrytowers.com/while\_example.cpp](http://www.sherrytowers.com/while_example.cpp)

Have the C+ program print the results out to the screen, but when running myprogram, direct the screen output to a file myout.txt by typing

 ./myprogram > myout.txt

e) write an R script to read in the random numbers in myout.txt, prints out the sample minimum value, maximum value, mean and std deviation, and also histograms them. You should get a plot that looks like this:

