Task for lecture 2

Pontius.dat provides a data set from a NIST study involving the calibration of load cells. In the data set, a response variable(y) and a predictor variable(x) are given. The model is $y = a_0 + a_1 \cdot x + a_2 \cdot x^2$. Your goal is to determine the 'best' values of a_0, a_1, and a_2 using the least square problem.

1. First create A where $A_{ij} = \frac{X_j(x_i)}{1}$ and $\mathbf{b}$ where $b_i = \frac{y_i}{1}$. For the given model it means that

$$\mathbf{A} = \begin{bmatrix} 1 & x_1 & x_1^2 \\ 1 & x_2 & x_2^2 \\ \dots & \dots & \dots \end{bmatrix} \tag{1}$$

2. Solve the problem by writing it as a system of equations as seen in class and solve by using LU and Cholesky. (Hint: use normal equations)
3. Print the Solutions and relevant information from the calculations.
4. Reapeat the process for Filip data. The model is differnet and given in Filip.dat.

The supplied Lecture2.cpp file contains a small piece of code to load the data into your program (be aware of the include path). Please note that you will have to add additional header files to use the LU and Cholesky method.

For validation, the solved parameters can be found in the Pontius.dat and Filip.dat files.

The raw data for y and x can be found in PontiusData.dat and FilipData.dat

Problem Source:
Pontius: `http://www.itl.nist.gov/div898/strd/lls/data/Pontius.shtml`
Filip: `http://www.itl.nist.gov/div898/strd/lls/data/Filip.shtml`