A Programming Assignment

A best L1 straight line fit to m data points (t_i, d_i) can be found by minimizing

$$\sum_{i=1}^{m} \left| b_i - \sum_{j=1}^{n} x_j a_{i,j} \right|$$

where n = 2, and then for i = 1,2,...,m, put $b_i = d_i$, $a_{i,1} = 1$, and $a_{i,2} = t_i$.

Using just the known theorem that at least one best L1 line must interpolate two of the data points, write a program to calculate a best L1 line fit to the first 6, 10, 14, and 18 data points shown below, which represent the annual Consumer Price Index (CPI) for Canada, starting at 1995 (t = 1). For t = 18, note that there are 153 possible pairs to check (or can this be streamlined?).

You can check your calculated values for the minimum Sum of Absolute Residuals (SAR) with those provided in the first column of the lower Figure on page 8 of my report available at http://hdl.handle.net/1828/11460 . Please provide your computed values for the line's intercept and slope for each of the four cases (6,10,14,18 data points). For your second task please download from the bottom page 16 of my report the 3,652-point data set, and then calculate the best L1 straight line fit to the 365-point daily segment for 2002, and then repeat for the complete 3,652 daily measurements for 2001-2010.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
87.6	88.9	90.4	91.3	92.9	95.4	97.8	100	102.8	104.7	107	109.1	111.5	114.1	114.4	116.5	119.9	121.7