Problem Set 1

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1 Report

Multiple mathematical data structures were used in the program

- Scalar - Single number
- Vector - Multiple numbers represented in a linear form (array)
- Matrix - Is the equivalent of a 2d array in programming that has elements, x_{np} that correspond to n rows and p columns

1. For the average(x) method, it iterates through selected column , going row by row, and sums up every element in that column and then averages them out.
2. For the run1(x_j) method, it iterates through a column and subtracts the average from every element in the column and squares the difference. It adds that value to a sum and returns the sum once it's done iterating.
3. For the run2(X) method, it iterates through every column and takes the square root of the value of run1() where the run1() input is the current column in the iteration. That value is then added to a sum which is the returned value.

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$$\text{run2(X)} = \sum_{j=1}^{p} \sqrt{\sum_{i=0}^{n} \left[x_j^{(i)} - \frac{\sum_{i=0}^{n} x_i}{n} \right]^2}$$