

Data Processor

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Abstract

The data processor software that we coded in Mathcad bogs down for large data sets. Improve data processor in Mathcad to display fewer results and to process the data more rapidly. Use reverse engineering to figure out how Mathcad must be processing calculations and storing results to devise a more efficient method of processing large data sets. Provide a well documented data analysis software package and provide guidance to teams collecting data so that data processing is no longer time consuming.

- Skills: computer science, Mathcad

1 Challenge Description

The process control software saves a new data log and a new state log file every day. The state log contains information on which state the process controller program was in and what rule caused it to enter that state. The time stamps are also recorded for each change in state. The data log files contain all sensors and variables created within Process controller and saved at the frequency specified in Process Controller.

The data processor program reads one or more data log files covering one or more days of experimentation and extracts data corresponding to specific states as recorded in the state log files. Data sets can be quite large and this can result in very slow processing in Mathcad. We need to determine what is the most efficient method of extracting this data. The challenge is to determine how to handle the data while minimizing memory usage and processing time.

Assigning a large data set to a variable likely causes significant memory usage.

Using nested function calls that reprocess the data for each function call cause processing to be slow.

Test methods to reduce the computation time required and once we understand what causes slow computation rewrite the data processor code to be efficient.