FCS Assignment 1

Requirements

- Find the minimum and maximum temperature values from a given set of values
- The number of comparisons should be minimum
- The module should be scalable for a large set of temperature values
- The temperature values may be of different units

Assumptions

- The data is assumed to be in Celsius, Kelvin and Fahrenheit units
- Use of a file for input and output buffer

Design

- A divide and conquer approach has been used to split the problem into sub problems
- The input array is divided into sub arrays and the values of the sub arrays are compared
- Sub arrays with even number of elements, are split in powers of two to minimise comparisons, while sub arrays with odd number of elements are split at the midpoint
- A recursive function with two base cases is for sub array with one and two elements respectively is used
- No comparisons are made for single element arrays, and the value is assigned as maximum and minimum
- For two element arrays, one comparison is made
- For arrays with more than two elements, the problem is broken down till one of the base cases is reached
- The minimum and maximum values from all sub arrays are combined to solve the original problem
- Data is read from file, converted to Celsius format, and minimum and maximum values are written in Celsius format to the output file
- The input file may be modified to test new scenarios

Version Control

- Since this is a project with only one developer, the final code has been pushed to the git repository

- No branches were created

Testing

- The code has produced (3n-1)/2 comparisons for input sets with the number of elements as a power of two
- The code produces correct output while comparing temperature values of different units