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CS 302

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PA2

Report for PA2

**Objective of program:** Finds the kth smallest value in a vector and returns it.

**Function Descriptions:**

main() - User input is recorded into kSmall\_pos for selected k value and then reads “data.txt” into the vector assuming that data.txt is all integers. It also checks if kSmall\_pos is out of range, if true, then return error. It deletes the old log file, if none exists, then does nothing. It then calls kSmall and records the output into kSmall\_val which should be the kth smallest value. Finally, it outputs kSmall\_val and ends the program.

Ksmall() - This function’s objective is to find the kth smallest value in the array. It picks a pivot value which is the first element and records that into an integer pivot and records the pivotIndex. It then partitions the vector into two different vectors , one that the values are smaller than the pivot and one that the values are bigger than pivot. It then builds the vector in the following order, smaller than pivot vector, the integer pivot, and then greater than pivot. After the partitioned vector is built, then a new pivotIndex is recorded to signify where the pivot is in the vector. After that, if kth smallest value is less than pivotIndex – first + 1, then it calls kSmall, only with a different last, which decreases the amount it has to look at and it can close in on the kth smallest value. If the kth smallest value is equal to this, then it returns the pivot. If neither, then the k is rechosen and the first variable increments by one to decrease the amount it has to look at.

LogFileOut() - This function’s objective is to create or append a log file. It first opens or creates a log file named “log.txt” and then sets an append flag to append if needed. It then records the pivot value and the vector elements in a neat fashion. Creating or appending a log file depends if the log file exists in the file directory.