**Sort File Project – Runtime Complexity**

# **Serial**

1. Sort Chunks

For each chunk:

1. Merge Chunks

## **Total Time Complexity**

# Parallel Implementation

1. Sort Chunks

For each chunk:

1. Merge Chunks

## **Total Time Complexity**

# Problematic edge case

After sorting each chunk, we got N/M sorted chunks in size of M, in separate files:

M M M M

|  |  |  |  |
| --- | --- | --- | --- |
| Sorted Chunk #1 | Sorted Chunk #2 | Sorted Chunk #3 | Sorted Chunk #4 |

Then, we would like to take the k smallest elements from each sorted chunk, so we can fit them all in memory, therefore:

But, if K < 1 it means we cannot read even one record from each chunk, therefore we cannot merge the minimum from each chunk, that is the case when:

Which means my algorithm wouldn't work when memory size is smaller than the square root of the amount of records in file.