

# **CLE ASSIGNMENT 1**

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# General Concept (Main Thread)

- Reads parameters (files, worker count)
- Generates shared memory content, including a FIFO task queue and a result storage area
- Initializes Workers
- Waits for workers to finish and prints results

# General Concept (Worker Threads)

- Workers can do IO work or process file chunks
- If an IO worker cannot queue up further chunk processing they handle chunk themselves
- IO workers eventually degrade into normal workers
- All workers do IO while there are enough available files

## Word Count

- Processable chunks are char arrays.
- After reading 450 bytes IO worker stops reading at end of next word and publishes a chunk.

## Determinant Calculus

- Processable chunks are matrices

# Results (average times)

## Word Count:

- 1 worker: 0.00377s
- 2 workers: 0.00320s
- 4 workers: 0.00356s
- 8 workers: 0.00388s

## Determinant Calculus (short dataset):

- 1 worker: 3.447s
- 2 workers: 3.453s
- 4 workers: 3.600s
- 8 workers: 4.094s

## Results (discussion)

As could be seen in the previous slide, while increasing workers can improve run times, it can also worsen them.

This likely happens because file IO parallelism in the same physical disk can be slower due to random disk access being slower than sequential access, and because worker coexistence has overhead due to thread state management. Limiting workers that read files to 1 or allowing the user to set maximum parallel reads could be a solution to the file IO parallelism problem.