Description & Diagram of File Reading Benchmark

- Gary Miller

Description

The file reading benchmark is a relatively simple program that is used to measure the throughput of reading a file. It takes the path to the file that is to be read as a command line argument, and this argument is saved into a string variable which is passed in a DataInputStream object that is used to read the file from memory. A DataInputStream object was chose instead of other file input object such as a bufferedReader, because it reads files by bytes and that is how throughput is measured (kilobytes per second). All the necessary varibles used to calculate number of bytes, start time, stop time, and throughput are initialized before any timing is done to avoid accoutning for time not associated with the read operation. After the file is ready to be read, the start time is saved into a variable immediately before the reading of the file begins, the only operation that occurs in between the start time and reading the file it initilizing the the while loop that is necessary to read the file. This while loop iterates until it returns -1, the value that designates there are no more bytes to read in the file. Immediately after the while loop terminates, the stop time is saved into a variable. The latency time of the entire file read is calulated by subtracting the stop time from the start time. It is important to note that the time is initially measured using the command `System.nanoTime();` because it more accurately measures processing time rather than clock time which is more accurately measured using `System.currentTimeMillis();`. Therefore, the benchmark must scale the time variable into seconds to compute a more readable value for throughput; bytes are also scaled to kilobytes. After the values used to calculate throughput are properly sclaed, the ratio is computed and the values for number of bytes, time to read the file, and the ratio that shows throughput are outputed. The flow of this program is visually depicted in Figure I.

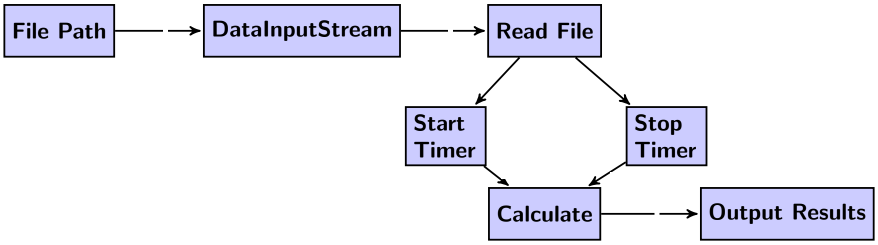

Figure 1: Figure I: Diagram of fileReadBenchmark.java