ADVANCED SYSTEMS PROGRAMMING
ASSIGNMENT – 2

DETAILS:

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INTRODUCTION :

The assignment consists of a Cpp program. The program consists of 6 threads:
* Mapper Pool Updater(single)
* Mapper(Multiple)
* Reducer(Multiple)
* Summarizer(Multiple),
* Word Count Writer(single,
* Letter count writer(single)

Mapper Pool Updater:

Reads input from a text file(file.txt in this case) and writes to mapper pool.

Mapper:

Reads an entry from mapper pool and writes tuples of the form (word,1) into reducer pool.

Reducer:

Reads an entry from reducer pool and writes tuples of the form (word,count) into summarizer pool.

Summarizer:

Reads an entry from summarizer pool and writes tuples of the form (letter,count) into letter count table.

Word Count Writer:

Reads an entry from summarizer pool and writes it to an output text file(wordCount.txt in this case).

Letter Count Writer:

Reads an entry from s letter count table and writes it to an output text file(letterCount.txt in this case).

IMPLEMENTATION:

Mapper Pool Updater:

It runs in parallel with other threads and acquires lock only when it has to write to the mapper pool and after it makes a write to the mapper pool it sends a signal to mapper threads saying that there is data in

the mapper pool. Then mapper threads race for the lock and the one acquiring it will proceed with the read.

Mapper:

The mapper thread acquires lock and writes to the reducer pool buffer and after putting an entry into reducer pool buffer, it sends a signal to the reducer threads. Then reducer threads race for the lock and the one acquiring it will proceed with the read

Reducer:

The reducer thread acquires lock and writes to the summarizer pool buffer and after putting an entry into reducer pool buffer, it sends a signal to the summarizer threads and word count writer thread as it acts as producer to both of them .Then summarizer threads race for the lock and the one acquiring it will proceed with the read. Word count writer does its read without any race as it is a single thread.

Summarizer:

The summarizer thread acquires lock and writes to the letter count table buffer and after putting an entry into it, it sends a signal to the letter count writer thread and it will proceed with the read.

Word Count Writer:

It works like a consumer to the reducer threads and acquires lock and writes to output text file.

Letter Count Writer:

It works like a consumer to the summarizer threads and acquires lock and writes to output text file.

INPUT:

The input to the combiner program is given in the form of a text file(file.txt in this case).

OUTPUT:

* key value pairs (word,count) written to the output text file – wordCount.txt.
* key value pairs (letter, count) written to the output text file – letterCount.txt

HOW TO RUN:

1. Download the zip file containing all the required files.

2. Extract the files.

3. Copy the Assignment2 directory to a convenient location.

4. Change directory to Assignment2 In the command prompt:

> cd Assignment2

> make

> ./assignment2 file.txt No_of_mapper_threads No_of_reducer_threads No_of_consumer_threads

     Sample : ./assignment2 file.txt 7 5 6

<u>NOTE:</u>

If any another file is to be given as a test case, in the command prompt, while running the executable please give as follows in the last step:

>./assignment2 filename.txt No_of_mapper_threads No_of_reducer_threads No_of_consumer_threads