README FOR PA1

MANUAL

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This Assignment has four components implemented:

1. CPU
2. MEMORY
3. DISK
4. NETWORK

1. CPU BENCHMARK

- Benchmark measures the speed of the processor in terms of Giga FLOPS and Giga IOPS running multiple instructions concurrently.

- The code is inside the file threaddemo.c

- The code checks for 1, 2, 4 and 8 threads.

- RUN:

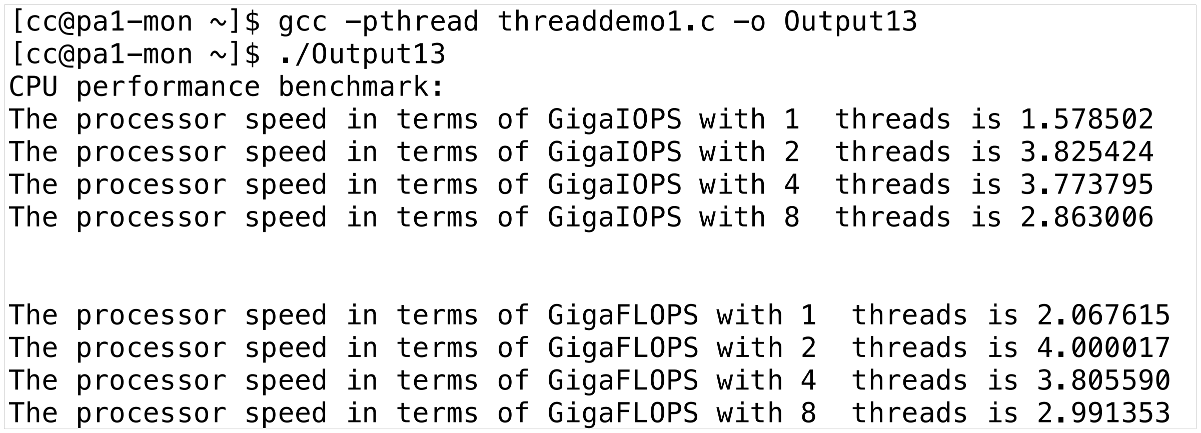
  a. Go to the file location [Inside the directory in which the C file is located]
  b. Run the below command to compile the C file.

  ```
  $ gcc –pthread threaddemo.c –o Output
  ```

  c. Run the below command to execute the code

  ```
  $ ./Output
  ```

- When you run the code by following the above steps you will get the output like the following:



```
[cc@pa1-mon ~]$ gcc -pthread threaddemo1.c -o Output13
[cc@pa1-mon ~]$ ./Output13
CPU performance benchmark:
The processor speed in terms of GigaIOPS with 1  threads is 1.578502
The processor speed in terms of GigaIOPS with 2  threads is 3.825424
The processor speed in terms of GigaIOPS with 4  threads is 3.773795
The processor speed in terms of GigaIOPS with 8  threads is 2.863006


The processor speed in terms of GigaFLOPS with 1  threads is 2.067615
The processor speed in terms of GigaFLOPS with 2  threads is 4.000017
The processor speed in terms of GigaFLOPS with 4  threads is 3.805590
The processor speed in terms of GigaFLOPS with 8  threads is 2.991353
```

2. MEMORY BENCHMARK

- Benchmark measures the memory speed of your host
- The code checks for 1, 2, 4 and 8 threads.
- The code asks the user inputs for the size of the block to check the speed. The block size to be selected are 8b, 80b, 8MB and 80MB.
- This benchmark code performs:

    a. Read and Write
    b. Sequential Write
    c. Random Write

- The code is inside the file memory.c
- The Result displayed calculates the latency for 8b for the different number of threads and throughput for 80b, 8MB and 80MB for the different number of threads.
- RUN:

    d. Go to the file location [Inside the directory in which the C file is located]
    e. Run the below command to compile the C file.

```
$ gcc –pthread memory.c –o Output_mem
```

    f. Run the below command to execute the code

```
$ ./Output_mem
```

    g. Enter the desired number when the below message is displayed in the console.

```
Memory benchmarking
Select the block size : Enter 1 for 8B,2 for 8KB, 3  for 8MB, 4 for 80MB
2
```

    h. After the execution of the program, you re-run to try the other block by typing the below command

```
$ ./Output_mem
```

- When you run the code by following the above steps you will get the output like the following:

```
[cc@pa1-mon ~]$ gcc -pthread memory1.c -o Output5
[cc@pa1-mon ~]$ ./Output5
Memory benchmarking
Select the block size : Enter 1 for 8B,2 for 8KB, 3  for 8MB, 4 for 80MB
2

sequential read+write memory access using different number of threads and
their latency and throughput
memory function for size 8192
Throughput of memory with 1 threads is 2745.236084
Throughput of memory with 2 threads is 6876.717773
Throughput of memory with 4 threads is 8135.304199
Throughput of memory with 8 threads is 6768.013184


sequential write memory access using different number of threads and their
latency and throughput


memory function for size 8192
Throughput of memory with 1 threads is 3940.436035
Throughput of memory with 2 threads is 9223.484375
Throughput of memory with 4 threads is 11397.903320
Throughput of memory with 8 threads is 13363.653320


random write memory access using different number of threads and their
latency and throughput


memory function for size 8192
Throughput of memory with 1 threads is 3015.912842
Throughput of memory with 2 threads is 7803.409180
Throughput of memory with 4 threads is 9363.463867
Throughput of memory with 8 threads is 8568.579102
```

3. DISK BENCHMARK

- Benchmark measures the disk speed.

- The code checks for 1, 2, 4 and 8 threads.
- The code asks the user inputs for the size of the block to check the speed. The block size to be selected are 8b, 80b, 8MB and 80MB.
- This benchmark code performs:

  a. Read and Write(Sequential)
  b. Sequential Read
  c. Random Read

- The code is placed in three files and they are
  - DiskTask_ReadnWrite.java for checking Read and Write(Sequential)
  - DiskTask_Sequential.java for checking Sequential Read
  - DiskTask_Random.java for checking Random Read

- The Result displayed calculates the latency for 8b for the different number of threads and throughput for 80b, 8MB and 80MB for the different number of threads.

- RUN:

  a. Go to the file location [Inside the directory in which the java files are located]
  b. Place the Large Text file name largeFile.txt under the same directory.
  c. Run the below command to compile all the three java file.

```
$ javac DiskTask_Random.java
$ javac DiskTask_ReadnWrite.java
$ javac DiskTask_Sequential.java
```

  d. Run the below command to execute the code

```
$ java DiskTask_Random
```

  e. Enter the desired number when the below message is displayed in the console.
  NOTE: Please enter the block size in bytes. For 8M – 8192b and 80MB – 81920b

```
Please enter the blocksize[8b, 80b, 8M , 80Mb and 0-quit]
```

f. After the execution of the program, you will get the below message on the console. You can enter the other block size else type 0 to quit.
NOTE: Please enter the block size in bytes. For 8M – 8192b and 80MB – 81920b

```
Please enter the blocksize[8b, 80b, 8M , 80Mb and 0-quit]
```

g. Run the below command to execute the code

```
$ java DiskTask_Sequential
```

h. Enter the desired number when the below message is displayed in the console.
NOTE: Please enter the block size in bytes. For 8M – 8192b and 80MB – 81920b

```
Please enter the blocksize[8b, 80b, 8M , 80Mb and 0-quit]
```

i. After the execution of the program, you will get the below message on the console. You can enter the other block size else type 0 to quit.
NOTE: Please enter the block size in bytes. For 8M – 8192b and 80MB – 81920b

```
Please enter the blocksize[8b, 80b, 8M , 80Mb and 0-quit]
```

j. Run the below command to execute the code

```
$ java DiskTask_ReadnWrite
```

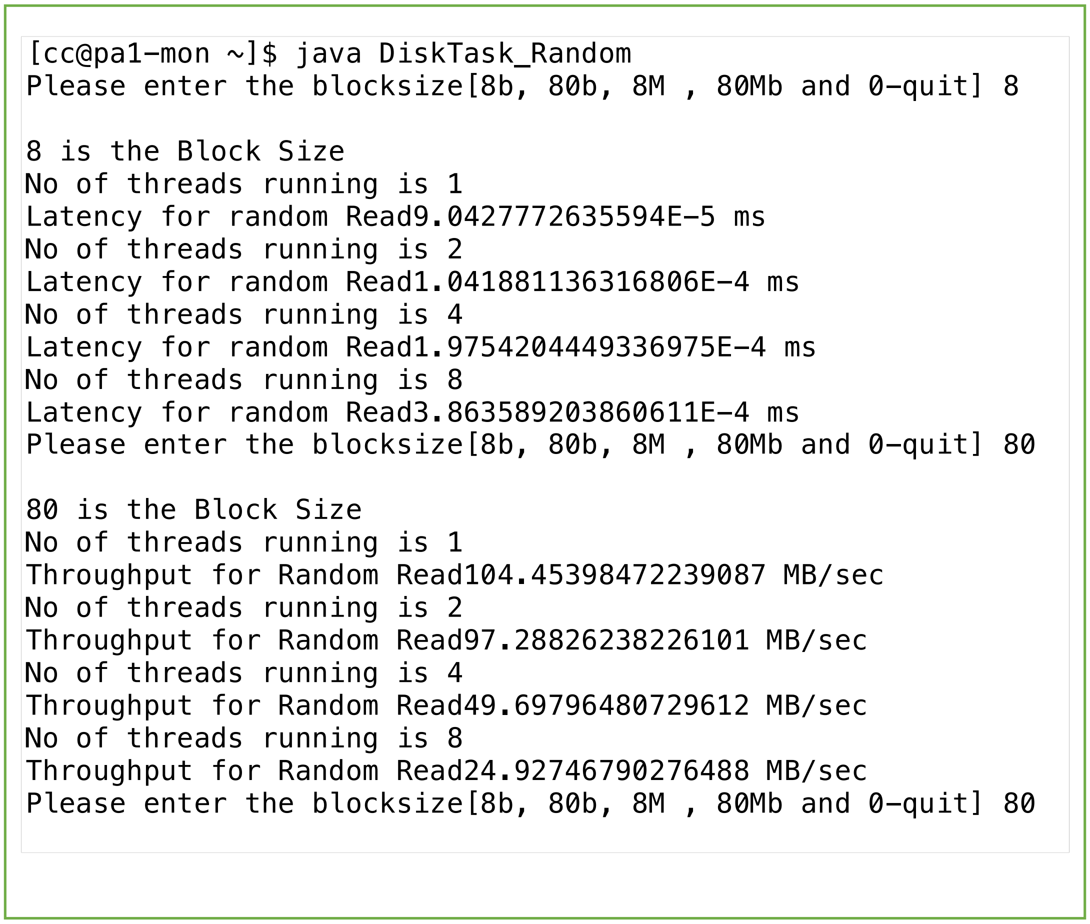
k. Enter the desired number when the below message is displayed in the console.
NOTE: Please enter the block size in bytes. For 8M – 8192b and 80MB – 81920b

```
Please enter the blocksize[8b, 80b, 8M , 80Mb and 0-quit]
```

l. After the execution of the program, you will get the below message on the console. You can enter the other block size else type 0 to quit.
NOTE: Please enter the block size in bytes. For 8M – 8192b and 80MB – 81920b

```
Please enter the blocksize[8b, 80b, 8M , 80Mb and 0-quit]
```

- When you run the code by following the above steps you will get the output like the following:



```
[cc@pa1-mon ~]$ java DiskTask_Random
Please enter the blocksize[8b, 80b, 8M , 80Mb and 0-quit] 8

8 is the Block Size
No of threads running is 1
Latency for random Read9.0427772635594E-5 ms
No of threads running is 2
Latency for random Read1.041881136316806E-4 ms
No of threads running is 4
Latency for random Read1.9754204449336975E-4 ms
No of threads running is 8
Latency for random Read3.863589203860611E-4 ms
Please enter the blocksize[8b, 80b, 8M , 80Mb and 0-quit] 80

80 is the Block Size
No of threads running is 1
Throughput for Random Read104.45398472239087 MB/sec
No of threads running is 2
Throughput for Random Read97.28826238226101 MB/sec
No of threads running is 4
Throughput for Random Read49.69796480729612 MB/sec
No of threads running is 8
Throughput for Random Read24.92746790276488 MB/sec
Please enter the blocksize[8b, 80b, 8M , 80Mb and 0-quit] 80
```

4.NETWORK BENCHMARK

Benchmark measures the network speed over the loopback interface card

· The code checks for 1, 2, 4 and 8 threads.

· This benchmark code performs:

TCP protocol stack, fixed packet/buffer size (64KB): transfers a file of size around 500MB from client to server using TCP protocol stack.

· The code is inside the file net_client.c and net_server.c

· One additional text file must pasted in the file location where C files will be placed and the file name is new.txt

· The Result displayed calculates the latency and throughput.

· RUN:

a. Go to the file location [Inside the directory in which the C file is located]

b. Run the below command to compile and run the C file.

```
$ gcc –pthread net_server.c –o server
$ ./server.c
```

c. Open one more terminal to compile and run the client.c file

```
$ gcc –pthread net_client.c –o client
 ./client.c
```

Terminal will prompt to enter the number of threads, please enter the number of threads between 1 or 2 or 4 or 8.

The ouput file will generate a text file in same location as C files as Downloadedfile.txt which will have same content as new file.