Evaluation III (Centralized and Distributed System comparison)

Evaluation II Comparison of Centralized and Distributed System. (From page no 4)

Evaluation I Comparison of Centralized and Distributed System.

Below evaluation is performed by executing

1 peer

2 peer concurrently

4 peer concurrently

8 peer concurrently

10,000 files processed by each peer of 1kb.

Below is the analysis of evaluation performed:-

File size used for this evaluation is 1KB.

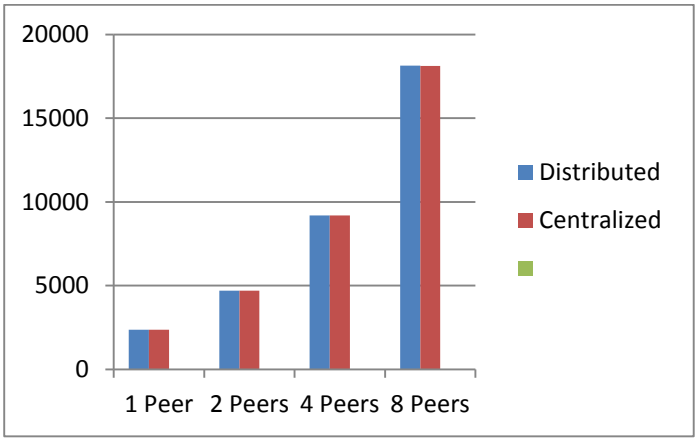
Centralized System

Number of concurrent peers	Register (operations/second)	Search (operations/second)	Obtain (operations/second)
1 Peer	2359	2240	460
2 Peers	4689	4222	777
4 Peers	9186	8449	1280
8 Peers	18120	16866	1481

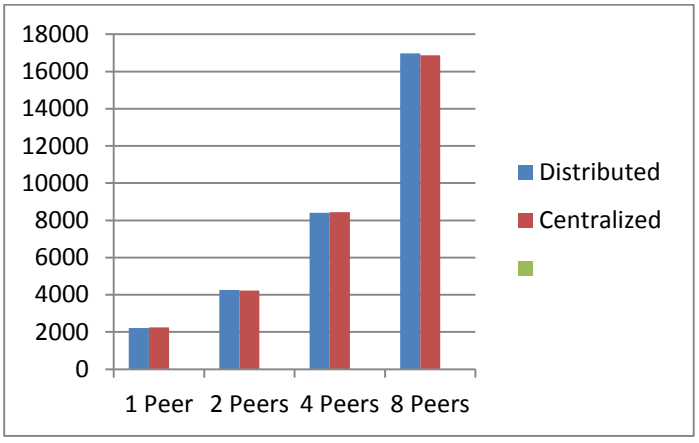
Distributed System

Number of concurrent peers	Register (operations/second)	Search(operations/second)	Obtain(operations/second)
1 Peer	2361	2208	454
2 Peers	4697	4266	1193
4 Peers	9195	8403	1301
8 Peers	18140	16980	1529

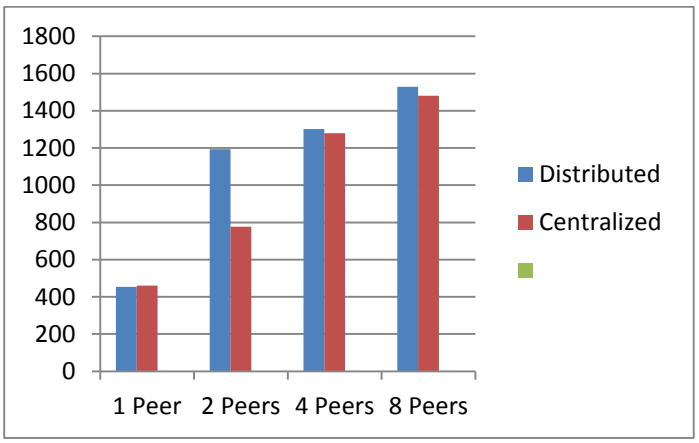
Comparison of Register operation:-



Comparison of Search operation:-



Comparison of Search operation:-

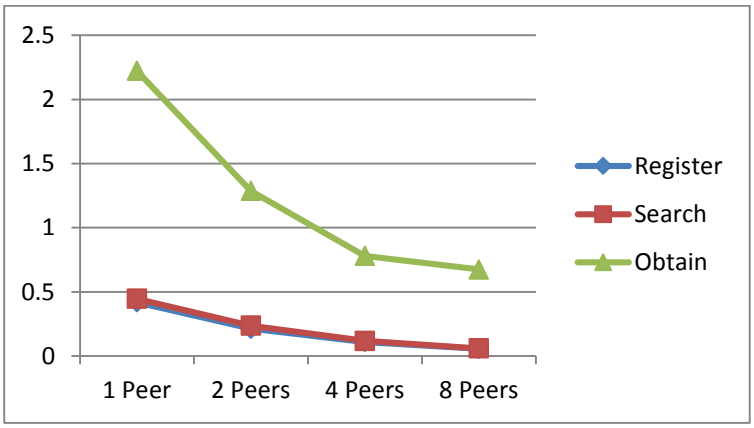


Analysis of comparison between centralized and Distributed systems:-

By looking at the graph of register, search and obtain operations we can say that Distributed system is slightly faster than centralized system. This is because in centralized system only single server is responsible for handling the entire clients concurrent requests. While in Distributed load balancing is done all work is equally divided on all concurrent servers.

Centralized system Response Time

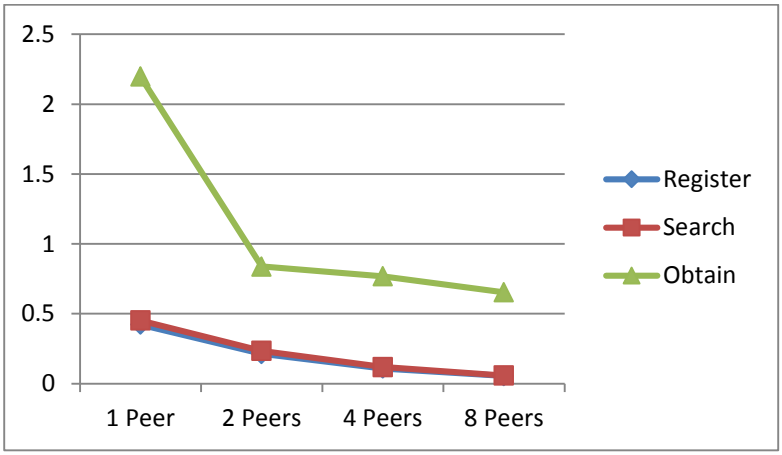
	Register	Search	Obtain
1 Peer	0.4192	0.4463	2.2234
2 Peers	0.2132	0.2368	1.287
4 Peers	0.1088	0.1183	0.7811
8 Peers	0.055	0.059	0.674



Distributed System response time:-

Response Time:-

	Register (per operation)	Search(per operation)	Obtain(per operation)
1 Peer	0.423	0.4527	2.198
2 Peers	0.2129	0.2344	0.8381
4 Peers	0.1087	0.119	0.7686
8 Peers	0.0551	0.0588	0.654



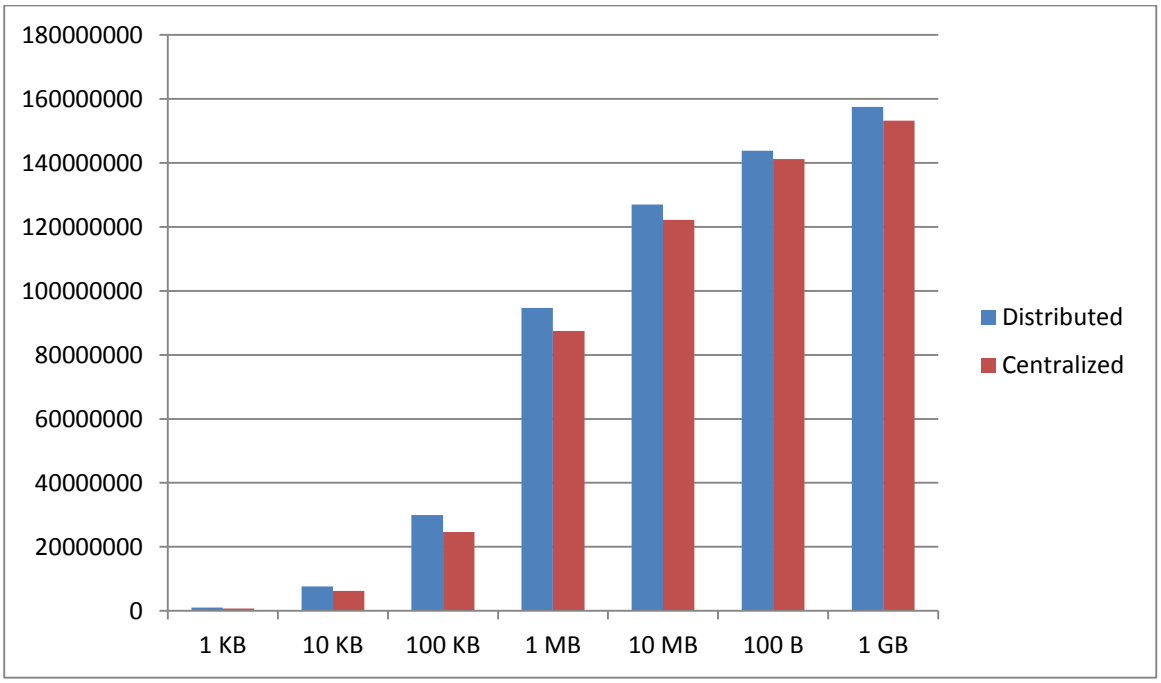
Evaluation II Comparison of Centralized and Distributed System.

Following is the result of evaluation performed on different file sizes.

8 Servers are running concurrently.

Files of different sizes getting transferred. Files sizes are 1KB, 10KB,100KB, 1MB, 10MB, 100MB and 1GB

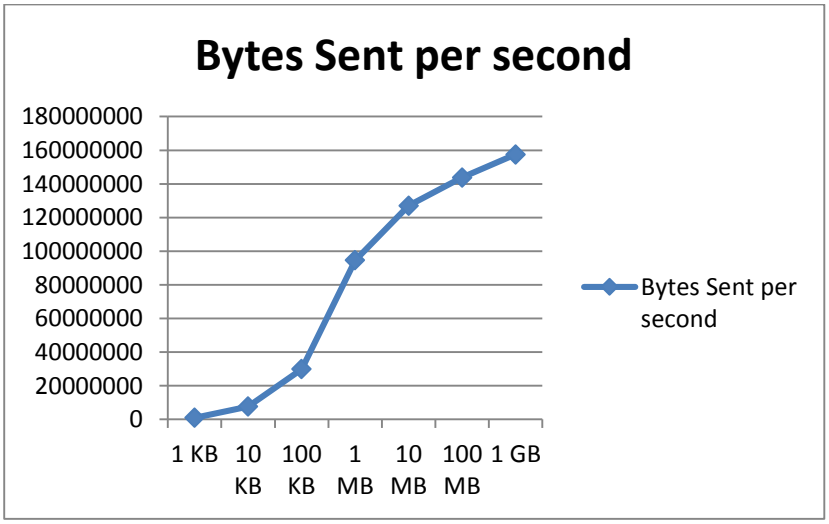
Centralized and distributed performance on bytes sent per second



By looking at the above graph we can say that performance of Distributed slightly better than centralized system.

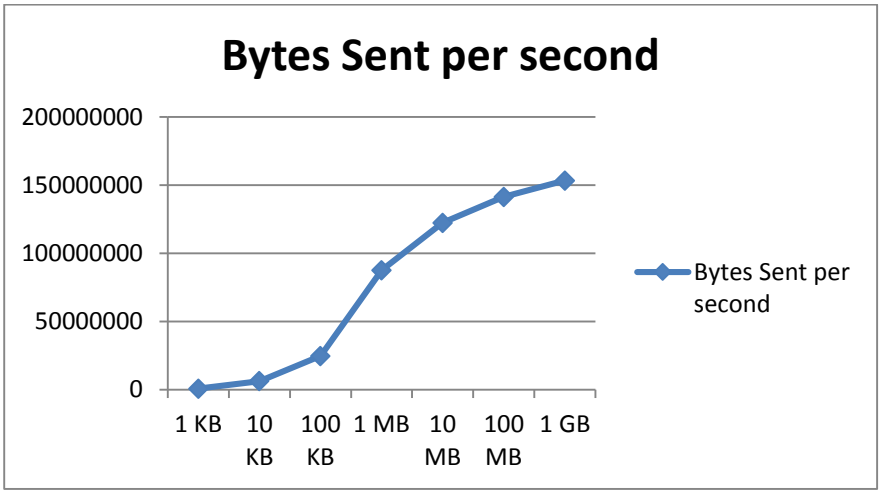
File Size	Number Of Files	Total File Size	Time required(Seconds)	Number of bytes sent per second
1KB	10000*8	80 MB	77.319	1034674.5
10KB	1000*8	80 MB	10.520	7604562.7
100KB	1000*8	800 MB	26.762	29893132.0
1MB	100*8	800 MB	8.4532	94638716.6
10MB	100*8	8000 MB	62.969	127046641.9
100MB	10*8	8000 MB	55.636	143791789.4
1GB	1*8	8000 MB	50.798	157486515.21

Distributed System performance:-



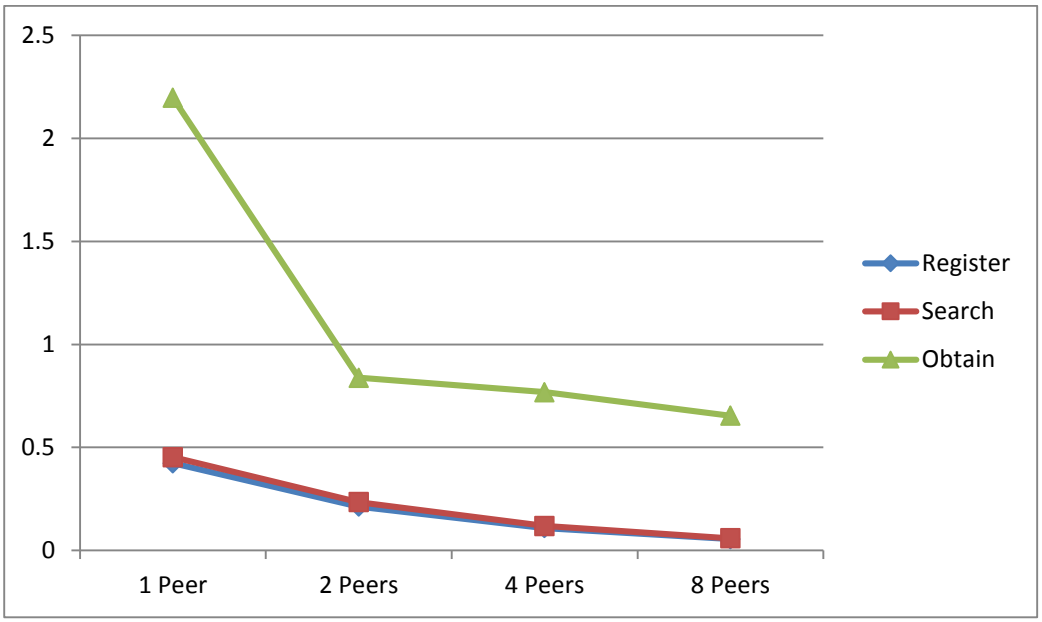
File Size	Number Of Files	Total File Size	Time required(Seconds)	Number of bytes sent per second
1KB	10000*8	80 MB	110.780	722152.012
10KB	1000*8	80 MB	12.879	6211662.39
100KB	1000*8	800 MB	32.410	24683739.58
1MB	100*8	800 MB	9.14	87527352.29
10MB	100*8	8000 MB	65.439	122251256.89
100MB	10*8	8000 MB	56.636	141252913.34
1GB	1*8	8000 MB	52.205	153242026.62

Centralized System performance:-



Response Time:-

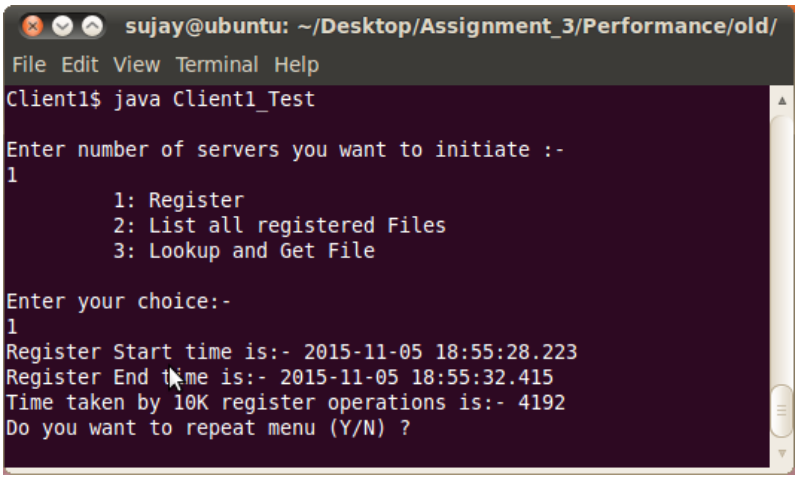
	Register (per operation)	Search(per operation)	Obtain(per operation)
1 Peer	0.423	0.4527	2.198
2 Peers	0.2129	0.2344	0.8381
4 Peers	0.1087	0.119	0.7686
8 Peers	0.0551	0.0588	0.654



Centralized System performance Screenshots:-

With single client

Register Operation:-

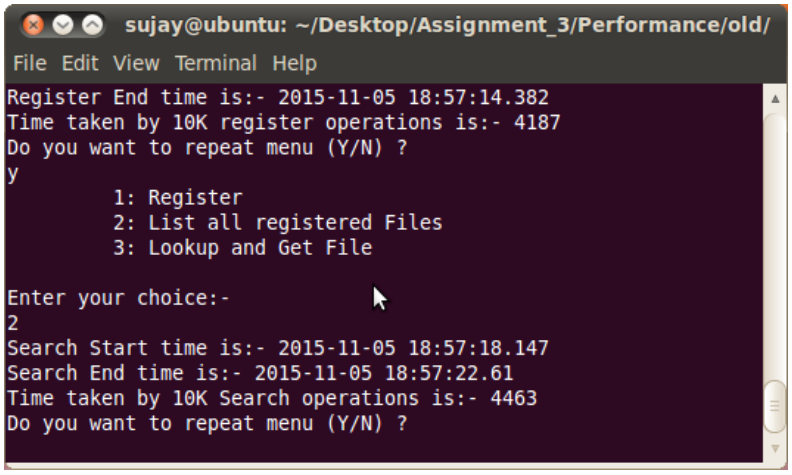


Time :- 4192

Throughput 2385.49 operations/second

Response time- 0.4192 milliseconds/ request

Search Operation:-

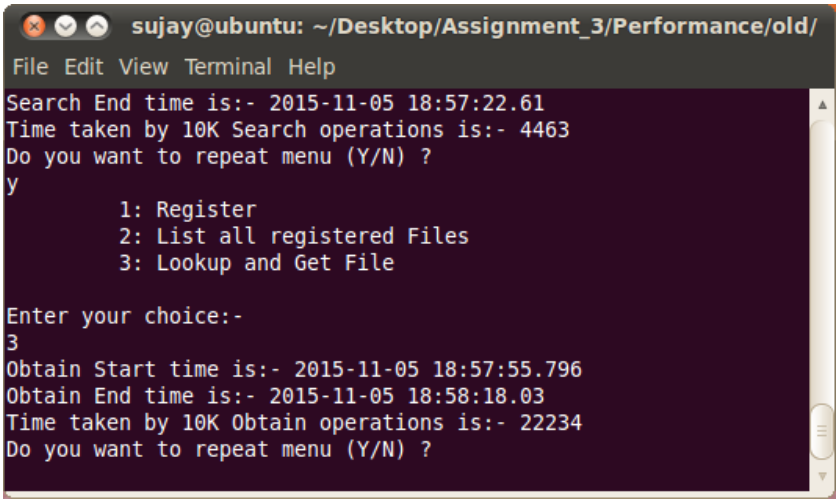


Time :- 4463

Throughput 2240.64 operations/second

Response time- 0.4463 milliseconds/ request

Obtain Operation:-



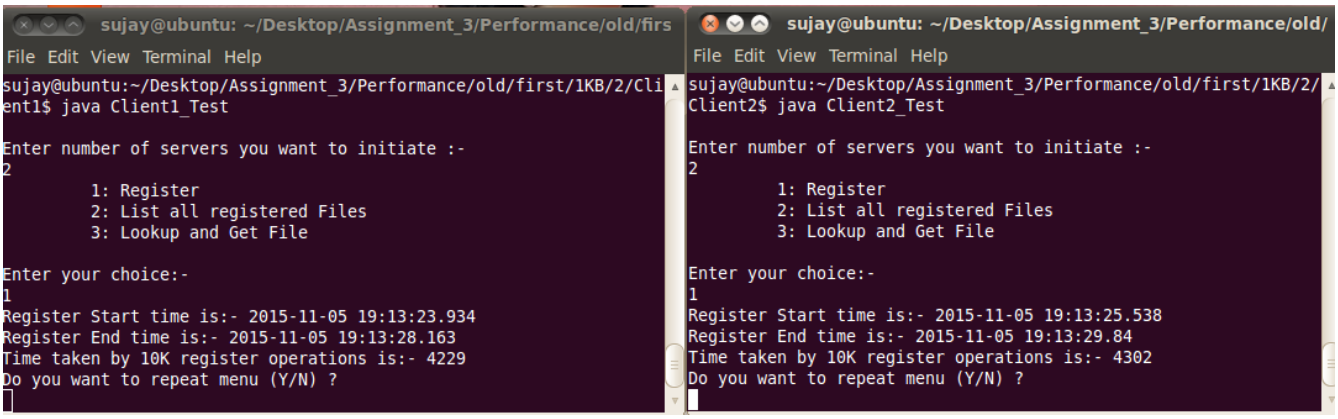
Time :- 22234

Throughput 449.7 operations/second

Response time- 2.2234 milliseconds/ request

With two clients

Register Opartaion:-



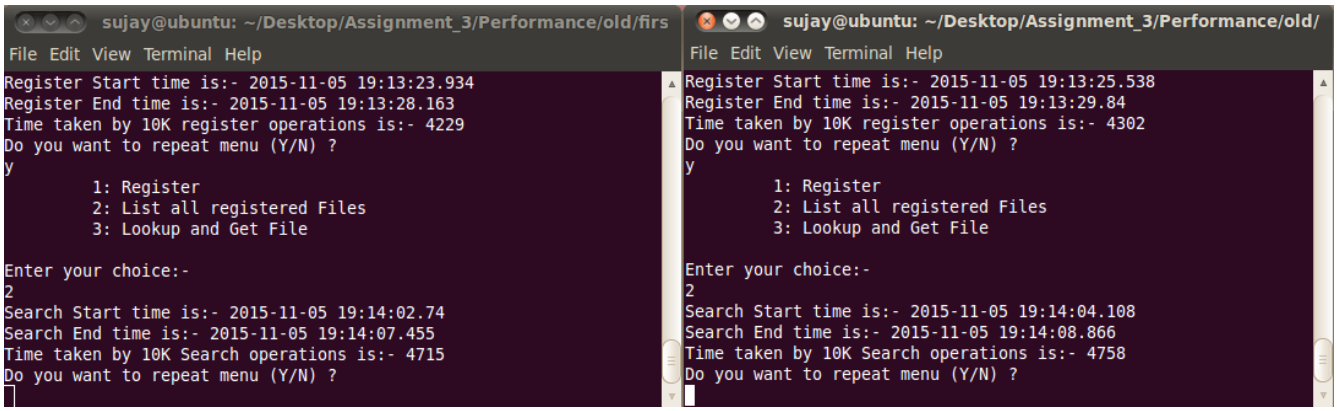
Time :- 4265

Throughput 4689 operations/second

Response time- 0.2132 milliseconds/ request

Search Operation:-

Time :- 4736



Throughput 4222 operations/second

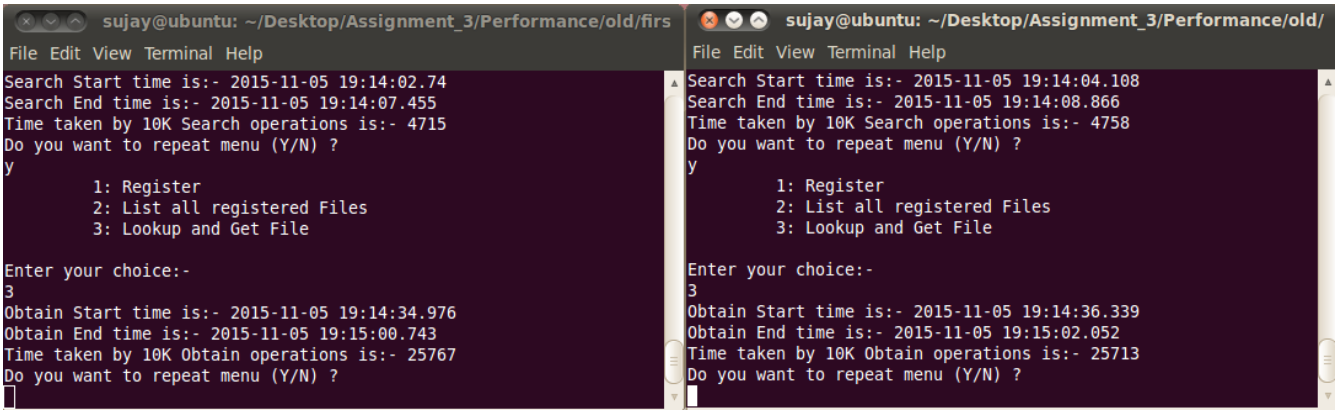
Response time- 0.2368 milliseconds/ request

Obtain Operation:-

Time :- 25740

Throughput 777 operations/second

Response time- 1.287 milliseconds/ request



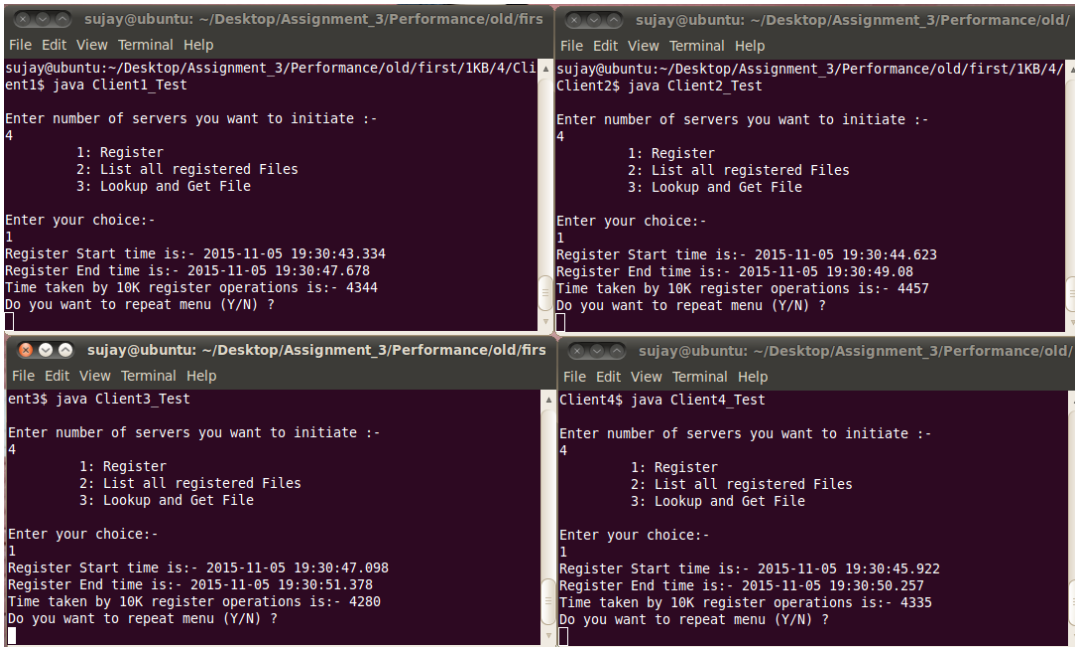
With four Clients:-

Register Operation:-

Time :- 4354

Throughput 9186 operations/second

Response time- 0.1088 milliseconds/ request

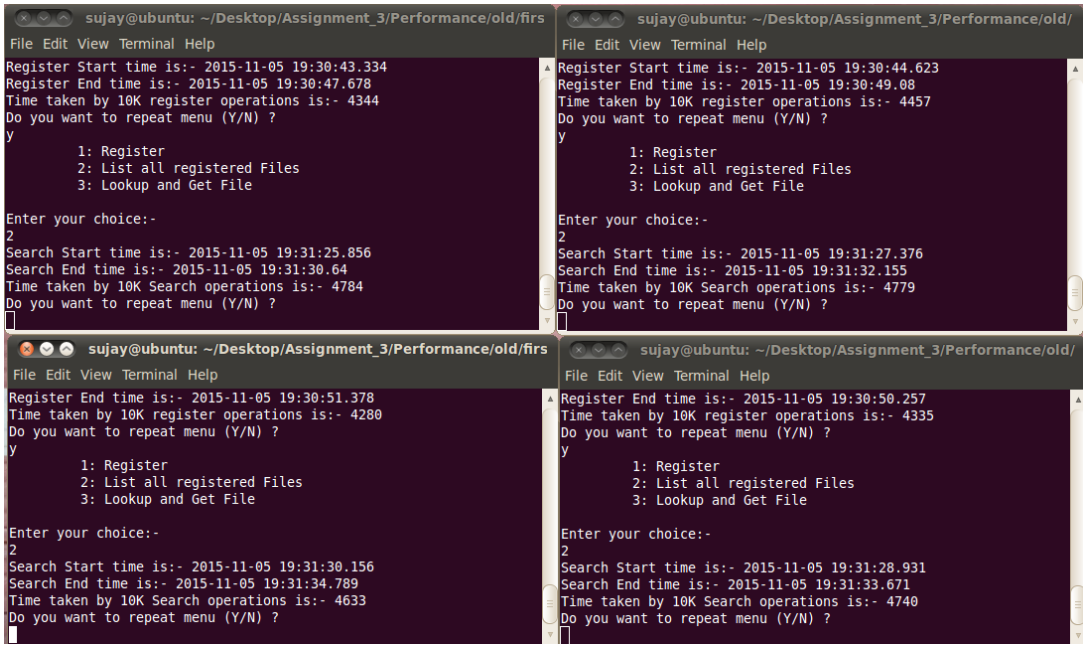


Search Operation:-

Time :- 4734

Throughput 8449 operations/second

Response time- 0.1183 milliseconds/ request

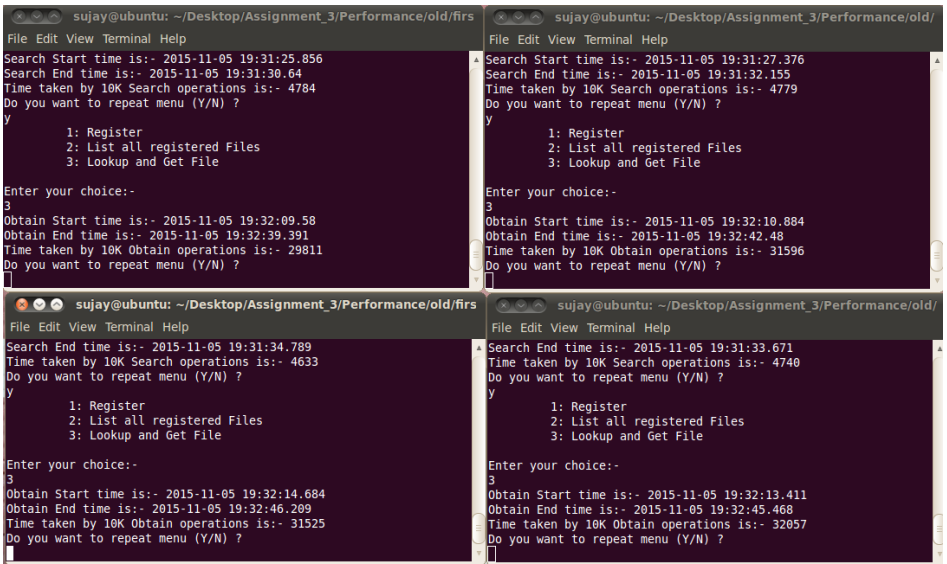


Obtain Operation:-

Time :- 31247

Throughput 1280 operations/second

Response time- 0.7811 milliseconds/ request



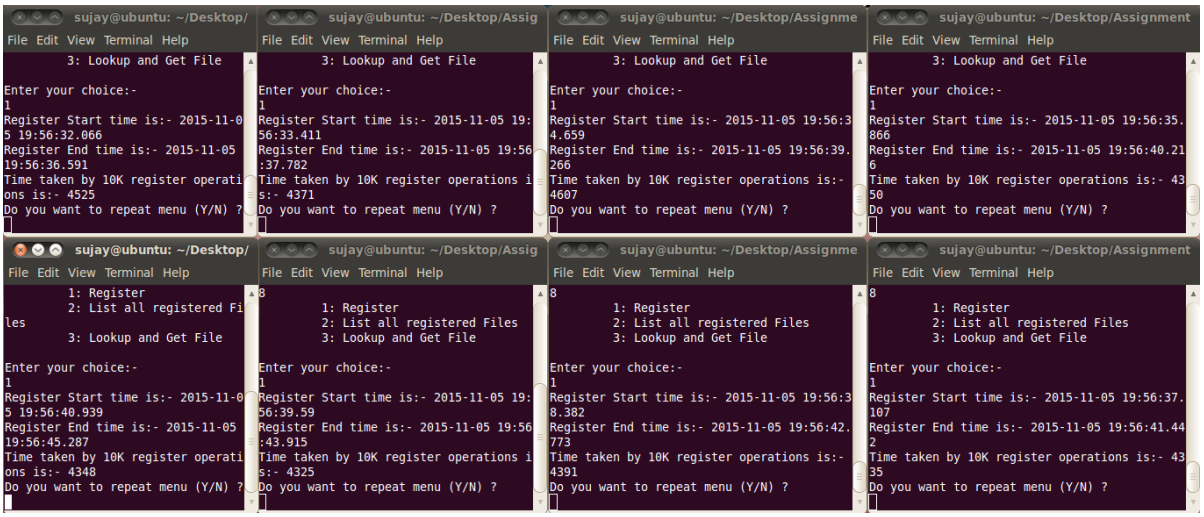
With eight client

Register Operation:-

Time :- 4406

Throughput 18157 operations/second

Response time- 0.055 milliseconds/ request

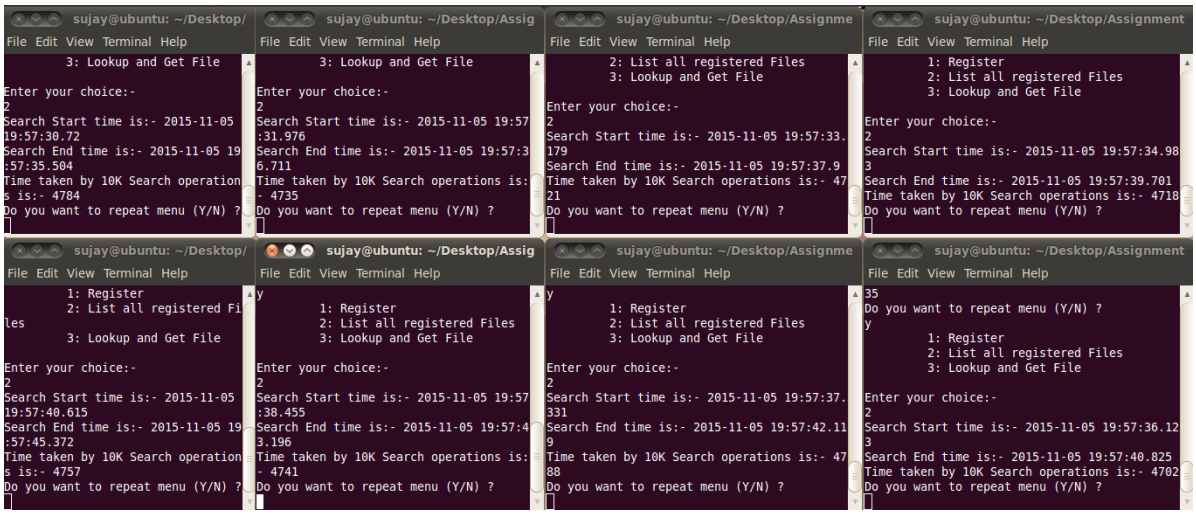


Search Operation:-

Time :- 4743

Throughput 16866 operations/second

Response time- 0.059 milliseconds/ request

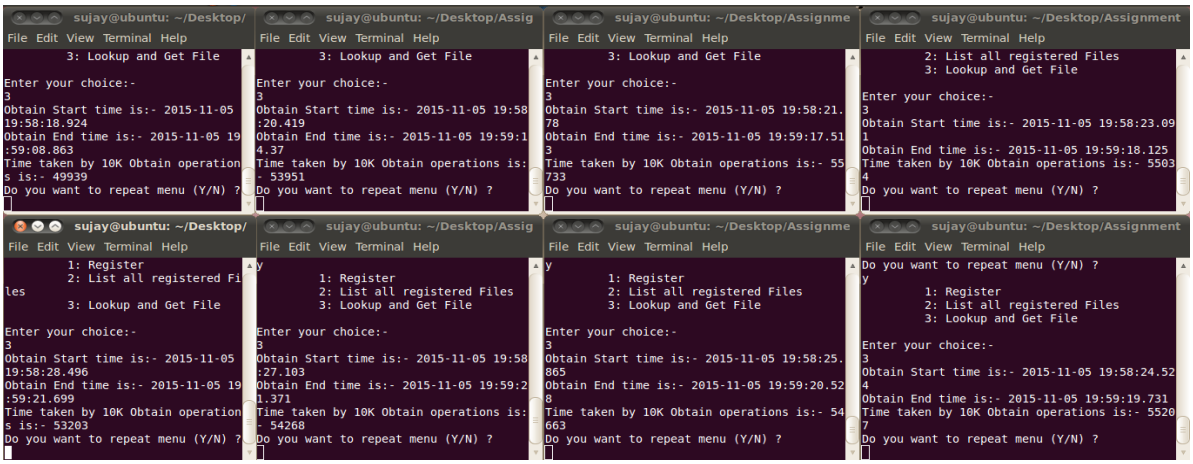


Obtain Operation:-

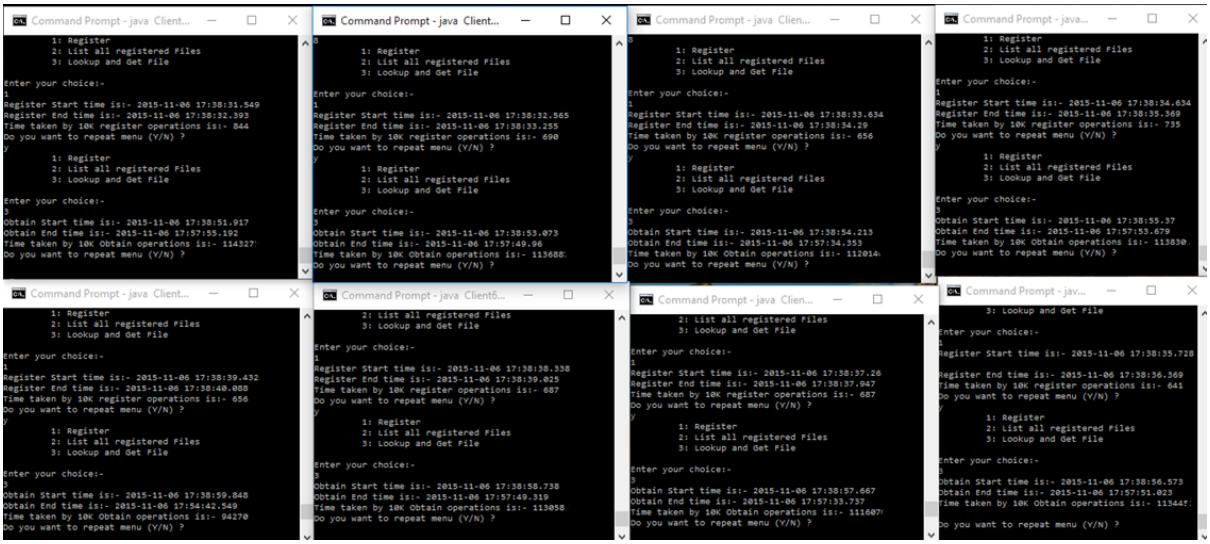
Time :- 53999

Throughput 1481 operations/second

Response time- 0.674 milliseconds/ request

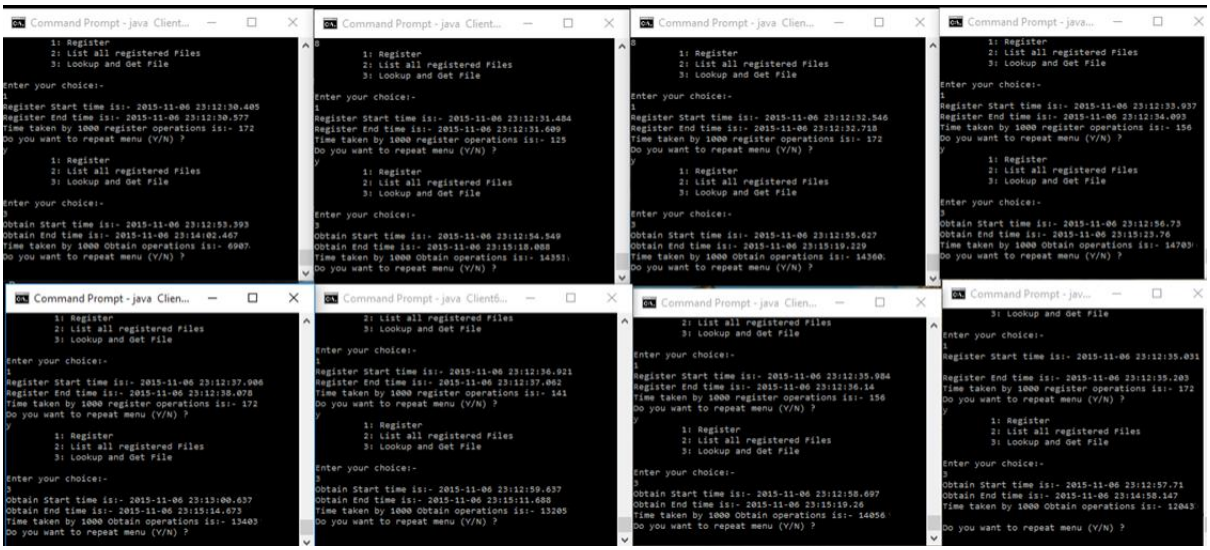


1KB

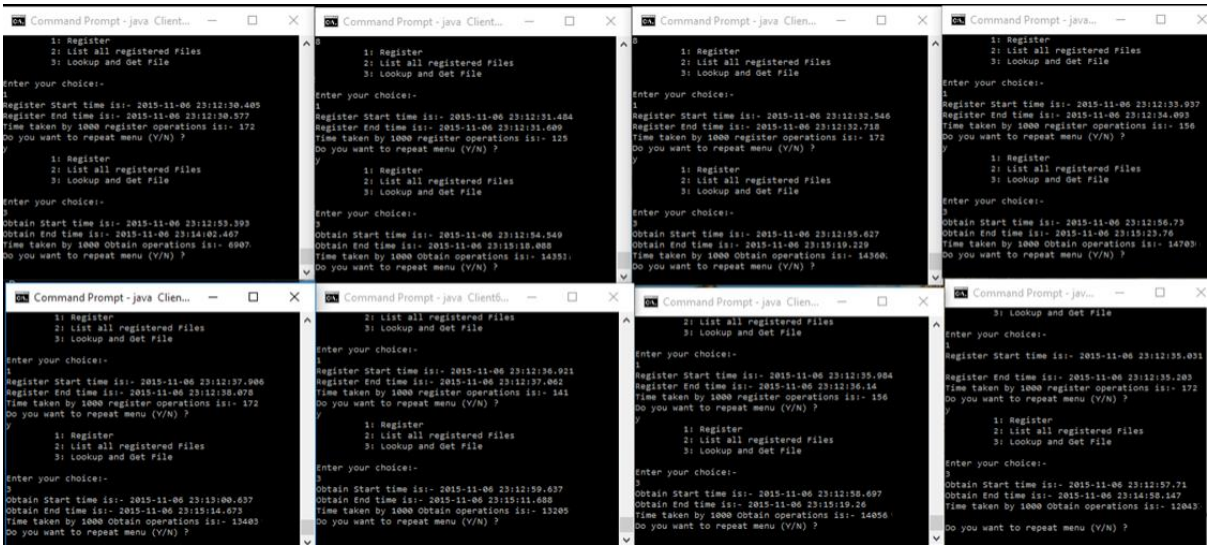


Average time :- 110780

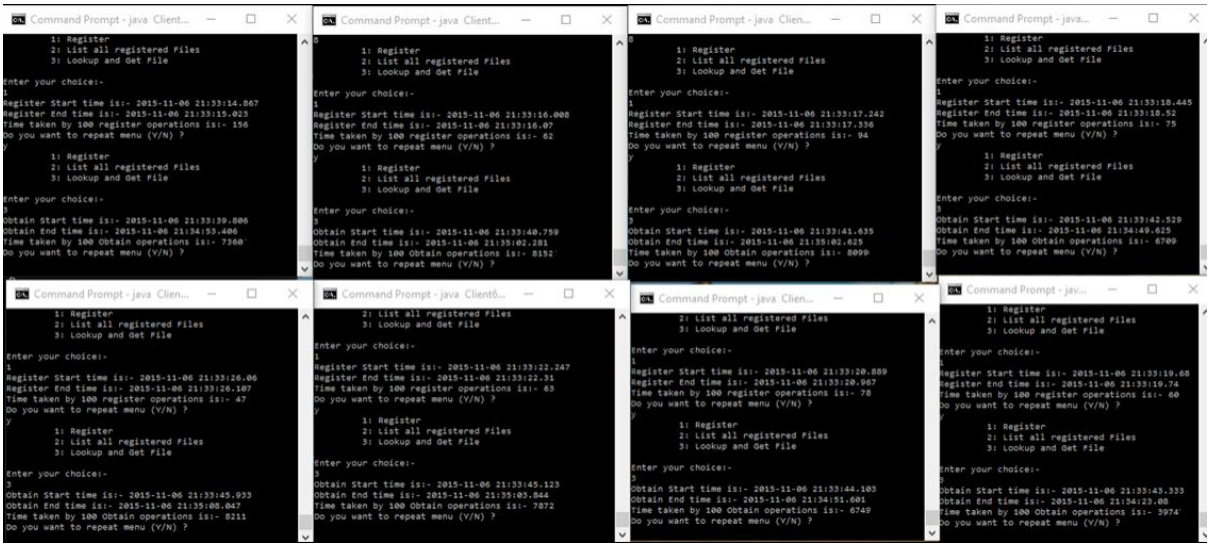
10KB



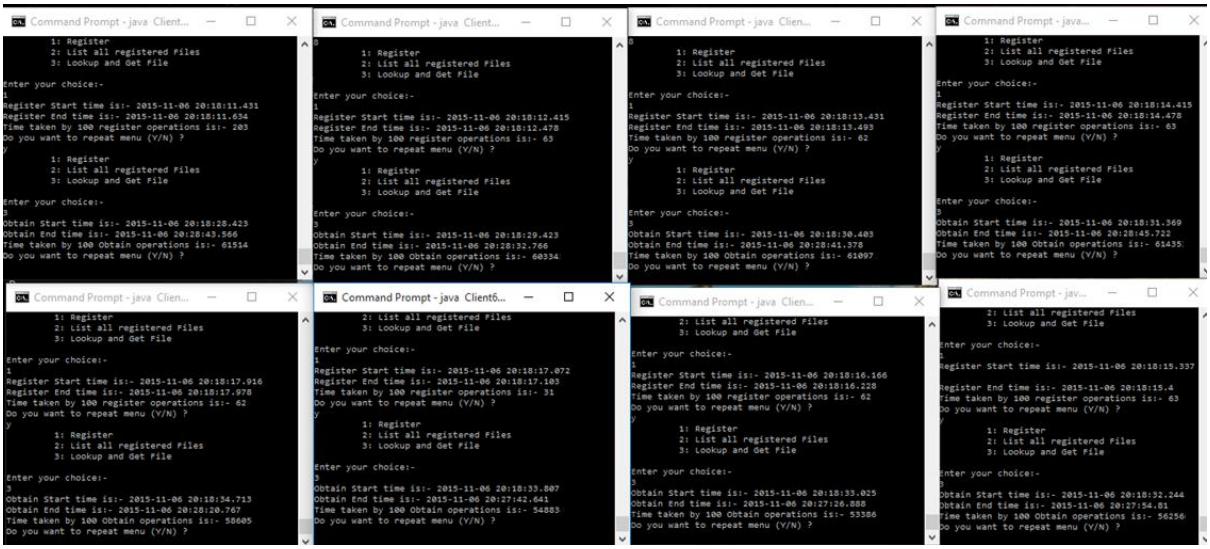
100kb


Command Prompt - java Client...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
Register Start time is:- 2015-11-06 23:12:30.405
Register End time is:- 2015-11-06 23:12:30.577
Time taken by 1000 register operations is:- 172
Do you want to repeat menu (Y/N) ?
Obtain Start time is:- 2015-11-06 23:12:53.393
Obtain End time is:- 2015-11-06 23:14:02.467
Time taken by 1000 Obtain operations is:- 6907
Register Start time is:- 2015-11-06 23:12:31.484
Register End time is:- 2015-11-06 23:12:31.609
Time taken by 1000 register operations is:- 125
Obtain Start time is:- 2015-11-06 23:12:54.549
Obtain End time is:- 2015-11-06 23:15:18.088
Time taken by 1000 Obtain operations is:- 14351
Register Start time is:- 2015-11-06 23:12:32.546
Register End time is:- 2015-11-06 23:12:32.718
Time taken by 1000 register operations is:- 172
Obtain Start time is:- 2015-11-06 23:12:55.627
Obtain End time is:- 2015-11-06 23:15:19.229
Time taken by 1000 Obtain operations is:- 14360
Register Start time is:- 2015-11-06 23:12:33.937
Register End time is:- 2015-11-06 23:12:34.093
Time taken by 1000 register operations is:- 156
Obtain Start time is:- 2015-11-06 23:12:56.73
Obtain End time is:- 2015-11-06 23:15:23.76
Time taken by 1000 Obtain operations is:- 14703
Command Prompt - java Clien...
Register Start time is:- 2015-11-06 23:12:37.906
Register End time is:- 2015-11-06 23:12:38.078
Time taken by 1000 register operations is:- 172
Obtain Start time is:- 2015-11-06 23:13:00.637
Obtain End time is:- 2015-11-06 23:15:14.673
Time taken by 1000 Obtain operations is:- 13403
Command Prompt - java Client6...
Register Start time is:- 2015-11-06 23:12:36.921
Register End time is:- 2015-11-06 23:12:37.062
Time taken by 1000 register operations is:- 141
Obtain Start time is:- 2015-11-06 23:12:59.637
Obtain End time is:- 2015-11-06 23:15:11.688
Time taken by 1000 Obtain operations is:- 13205
Register Start time is:- 2015-11-06 23:12:35.984
Register End time is:- 2015-11-06 23:12:36.14
Time taken by 1000 register operations is:- 156
Obtain Start time is:- 2015-11-06 23:12:58.697
Obtain End time is:- 2015-11-06 23:15:19.26
Time taken by 1000 Obtain operations is:- 14056
Command Prompt - jav...
Register Start time is:- 2015-11-06 23:12:35.031
Register End time is:- 2015-11-06 23:12:35.203
Time taken by 1000 register operations is:- 172
Obtain Start time is:- 2015-11-06 23:12:57.71
Obtain End time is:- 2015-11-06 23:14:58.147
Time taken by 1000 Obtain operations is:- 12043
Do you want to repeat menu (Y/N) ?

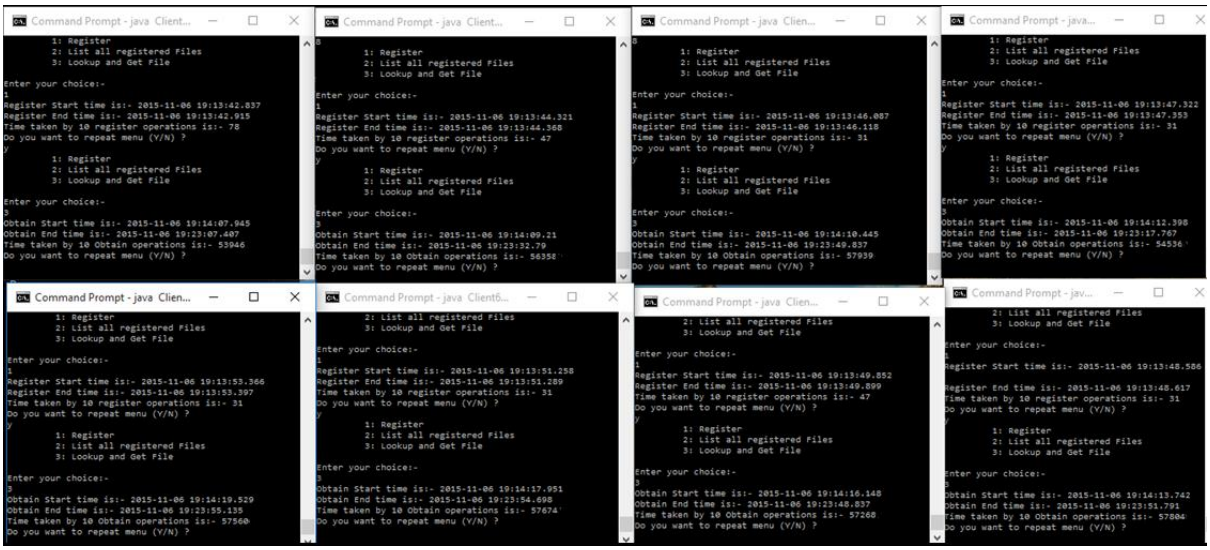
1mb


Command Prompt - java Client...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
Register Start time is:- 2015-11-06 21:33:14.867
Register End time is:- 2015-11-06 21:33:15.023
Time taken by 100 register operations is:- 156
Obtain Start time is:- 2015-11-06 21:33:39.806
Obtain End time is:- 2015-11-06 21:34:53.406
Time taken by 100 Obtain operations is:- 7360
Register Start time is:- 2015-11-06 21:33:16.008
Register End time is:- 2015-11-06 21:33:16.07
Time taken by 100 register operations is:- 62
Obtain Start time is:- 2015-11-06 21:33:40.759
Obtain End time is:- 2015-11-06 21:35:02.281
Time taken by 100 Obtain operations is:- 8152
Register Start time is:- 2015-11-06 21:33:17.242
Register End time is:- 2015-11-06 21:33:17.336
Time taken by 100 register operations is:- 94
Obtain Start time is:- 2015-11-06 21:33:41.635
Obtain End time is:- 2015-11-06 21:35:02.825
Time taken by 100 Obtain operations is:- 8099
Register Start time is:- 2015-11-06 21:33:18.445
Register End time is:- 2015-11-06 21:33:18.52
Time taken by 100 register operations is:- 75
Obtain Start time is:- 2015-11-06 21:33:42.529
Obtain End time is:- 2015-11-06 21:34:49.625
Time taken by 100 Obtain operations is:- 6709
Command Prompt - java Clien...
Register Start time is:- 2015-11-06 21:33:26.06
Register End time is:- 2015-11-06 21:33:26.107
Time taken by 100 register operations is:- 47
Obtain Start time is:- 2015-11-06 21:33:45.933
Obtain End time is:- 2015-11-06 21:35:03.047
Time taken by 100 Obtain operations is:- 8211
Command Prompt - java Client6...
Register Start time is:- 2015-11-06 21:33:22.247
Register End time is:- 2015-11-06 21:33:22.31
Time taken by 100 register operations is:- 63
Obtain Start time is:- 2015-11-06 21:33:45.123
Obtain End time is:- 2015-11-06 21:35:03.844
Time taken by 100 Obtain operations is:- 7872
Register Start time is:- 2015-11-06 21:33:20.889
Register End time is:- 2015-11-06 21:33:20.967
Time taken by 100 register operations is:- 78
Obtain Start time is:- 2015-11-06 21:33:44.103
Obtain End time is:- 2015-11-06 21:34:51.601
Time taken by 100 Obtain operations is:- 6749
Register Start time is:- 2015-11-06 21:33:19.68
Register End time is:- 2015-11-06 21:33:19.74
Time taken by 100 register operations is:- 60
Obtain Start time is:- 2015-11-06 21:33:43.333
Obtain End time is:- 2015-11-06 21:34:23.08
Time taken by 100 Obtain operations is:- 3974
Do you want to repeat menu (Y/N) ?

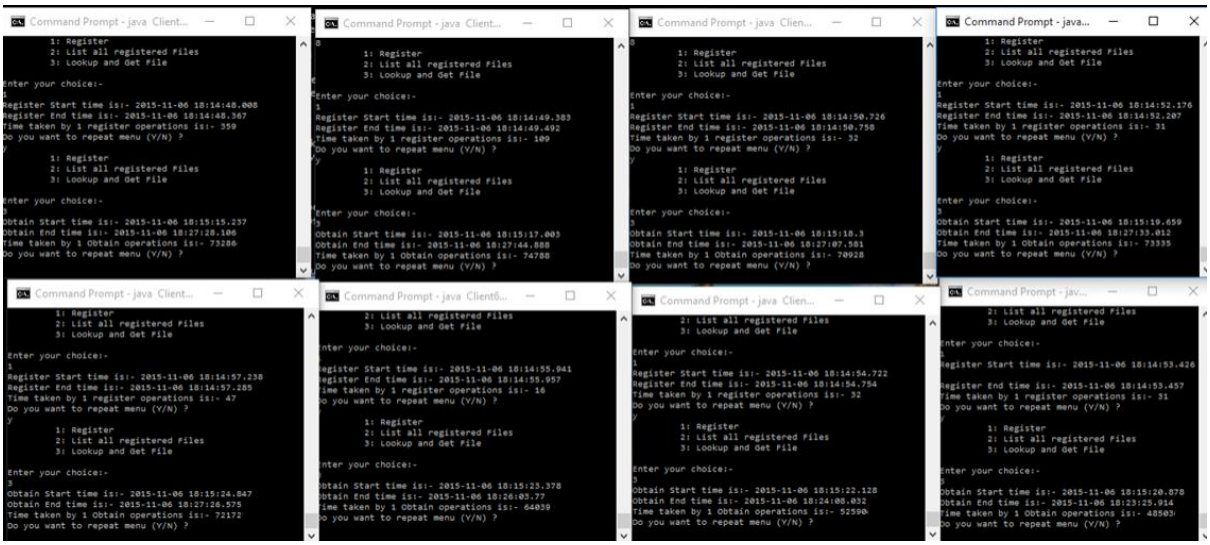
10mb


Command Prompt - java Client...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 20:18:11.431
Register End time is:- 2015-11-06 20:18:11.634
Time taken by 100 register operations is:- 203
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 20:18:28.423
Obtain End time is:- 2015-11-06 20:28:43.566
Time taken by 100 Obtain operations is:- 61514
Do you want to repeat menu (Y/N) ?
Command Prompt - java Client...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 20:18:12.415
Register End time is:- 2015-11-06 20:18:12.478
Time taken by 100 register operations is:- 63
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 20:18:29.423
Obtain End time is:- 2015-11-06 20:28:32.766
Time taken by 100 Obtain operations is:- 60334
Do you want to repeat menu (Y/N) ?
Command Prompt - java Clien...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 20:18:13.431
Register End time is:- 2015-11-06 20:18:13.493
Time taken by 100 register operations is:- 62
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 20:18:30.403
Obtain End time is:- 2015-11-06 20:28:41.378
Time taken by 100 Obtain operations is:- 61097
Do you want to repeat menu (Y/N) ?
Command Prompt - java...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 20:18:14.415
Register End time is:- 2015-11-06 20:18:14.478
Time taken by 100 register operations is:- 63
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 20:18:31.369
Obtain End time is:- 2015-11-06 20:28:45.722
Time taken by 100 Obtain operations is:- 61435
Do you want to repeat menu (Y/N) ?
Command Prompt - java Clien...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 20:18:17.916
Register End time is:- 2015-11-06 20:18:17.978
Time taken by 100 register operations is:- 62
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 20:18:34.713
Obtain End time is:- 2015-11-06 20:28:20.767
Time taken by 100 Obtain operations is:- 58605
Do you want to repeat menu (Y/N) ?
Command Prompt - java Client6...
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 20:18:17.072
Register End time is:- 2015-11-06 20:18:17.103
Time taken by 100 register operations is:- 31
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 20:18:33.807
Obtain End time is:- 2015-11-06 20:27:42.641
Time taken by 100 Obtain operations is:- 54883
Do you want to repeat menu (Y/N) ?
Command Prompt - java Clien...
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 20:18:16.166
Register End time is:- 2015-11-06 20:18:16.228
Time taken by 100 register operations is:- 62
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 20:18:33.025
Obtain End time is:- 2015-11-06 20:27:26.888
Time taken by 100 Obtain operations is:- 53386
Do you want to repeat menu (Y/N) ?
Command Prompt - jav...
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 20:18:15.337
Register End time is:- 2015-11-06 20:18:15.4
Time taken by 100 register operations is:- 63
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 20:18:32.244
Obtain End time is:- 2015-11-06 20:27:54.81
Time taken by 100 Obtain operations is:- 56256
Do you want to repeat menu (Y/N) ?

100mb


Command Prompt - java Client...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 19:13:42.837
Register End time is:- 2015-11-06 19:13:42.915
Time taken by 10 register operations is:- 78
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 19:14:07.945
Obtain End time is:- 2015-11-06 19:23:07.407
Time taken by 10 Obtain operations is:- 53946
Do you want to repeat menu (Y/N) ?
Command Prompt - java Client...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 19:13:44.321
Register End time is:- 2015-11-06 19:13:44.368
Time taken by 10 register operations is:- 47
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 19:14:09.21
Obtain End time is:- 2015-11-06 19:23:32.79
Time taken by 10 Obtain operations is:- 56358
Do you want to repeat menu (Y/N) ?
Command Prompt - java Clien...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 19:13:46.087
Register End time is:- 2015-11-06 19:13:46.118
Time taken by 10 register operations is:- 31
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 19:14:10.445
Obtain End time is:- 2015-11-06 19:23:49.837
Time taken by 10 Obtain operations is:- 57939
Do you want to repeat menu (Y/N) ?
Command Prompt - java...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 19:13:47.322
Register End time is:- 2015-11-06 19:13:47.353
Time taken by 10 register operations is:- 31
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 19:14:12.398
Obtain End time is:- 2015-11-06 19:23:17.767
Time taken by 10 Obtain operations is:- 54536
Do you want to repeat menu (Y/N) ?
Command Prompt - java Clien...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 19:13:53.366
Register End time is:- 2015-11-06 19:13:53.397
Time taken by 10 register operations is:- 31
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 19:14:19.529
Obtain End time is:- 2015-11-06 19:23:55.135
Time taken by 10 Obtain operations is:- 57560
Do you want to repeat menu (Y/N) ?
Command Prompt - java Client6...
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 19:13:51.258
Register End time is:- 2015-11-06 19:13:51.289
Time taken by 10 register operations is:- 31
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 19:14:17.951
Obtain End time is:- 2015-11-06 19:23:54.698
Time taken by 10 Obtain operations is:- 57674
Do you want to repeat menu (Y/N) ?
Command Prompt - java Clien...
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 19:13:49.852
Register End time is:- 2015-11-06 19:13:49.899
Time taken by 10 register operations is:- 47
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 19:14:16.148
Obtain End time is:- 2015-11-06 19:23:48.837
Time taken by 10 Obtain operations is:- 57268
Do you want to repeat menu (Y/N) ?
Command Prompt - jav...
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 19:13:48.586
Register End time is:- 2015-11-06 19:13:48.617
Time taken by 10 register operations is:- 31
Do you want to repeat menu (Y/N) ?
y
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 19:14:13.742
Obtain End time is:- 2015-11-06 19:23:51.791
Time taken by 10 Obtain operations is:- 57804
Do you want to repeat menu (Y/N) ?

1gb


Command Prompt - java Client...
1: Register
2: List all registered Files
3: Lookup and Get File
Enter your choice:-
1
Register Start time is:- 2015-11-06 18:14:48.008
Register End time is:- 2015-11-06 18:14:48.367
Time taken by 1 register operations is:- 359
Do you want to repeat menu (Y/N) ?
y
Enter your choice:-
3
Obtain Start time is:- 2015-11-06 18:15:15.237
Obtain End time is:- 2015-11-06 18:27:28.106
Time taken by 1 Obtain operations is:- 73286
Do you want to repeat menu (Y/N) ?
Command Prompt - java Client...
Register Start time is:- 2015-11-06 18:14:49.383
Register End time is:- 2015-11-06 18:14:49.492
Time taken by 1 register operations is:- 109
Obtain Start time is:- 2015-11-06 18:15:17.005
Obtain End time is:- 2015-11-06 18:27:44.888
Time taken by 1 Obtain operations is:- 74788
Command Prompt - java Clien...
Register Start time is:- 2015-11-06 18:14:50.726
Register End time is:- 2015-11-06 18:14:50.758
Time taken by 1 register operations is:- 32
Obtain Start time is:- 2015-11-06 18:15:18.3
Obtain End time is:- 2015-11-06 18:27:07.581
Time taken by 1 Obtain operations is:- 70928
Command Prompt - java...
Register Start time is:- 2015-11-06 18:14:52.176
Register End time is:- 2015-11-06 18:14:52.207
Time taken by 1 register operations is:- 31
Obtain Start time is:- 2015-11-06 18:15:19.659
Obtain End time is:- 2015-11-06 18:27:33.012
Time taken by 1 Obtain operations is:- 73335
Command Prompt - java Client...
Register Start time is:- 2015-11-06 18:14:57.238
Register End time is:- 2015-11-06 18:14:57.285
Time taken by 1 register operations is:- 47
Obtain Start time is:- 2015-11-06 18:15:24.847
Obtain End time is:- 2015-11-06 18:27:26.575
Time taken by 1 Obtain operations is:- 72172
Command Prompt - java Client6...
Register Start time is:- 2015-11-06 18:14:55.941
Register End time is:- 2015-11-06 18:14:55.957
Time taken by 1 register operations is:- 16
Obtain Start time is:- 2015-11-06 18:15:23.378
Obtain End time is:- 2015-11-06 18:26:03.77
Time taken by 1 Obtain operations is:- 64039
Command Prompt - java Clien...
Register Start time is:- 2015-11-06 18:14:54.722
Register End time is:- 2015-11-06 18:14:54.754
Time taken by 1 register operations is:- 32
Obtain Start time is:- 2015-11-06 18:15:22.128
Obtain End time is:- 2015-11-06 18:24:08.032
Time taken by 1 Obtain operations is:- 52590
Command Prompt - jav...
Register Start time is:- 2015-11-06 18:14:53.426
Register End time is:- 2015-11-06 18:14:53.457
Time taken by 1 register operations is:- 31
Obtain Start time is:- 2015-11-06 18:15:20.878
Obtain End time is:- 2015-11-06 18:23:25.914
Time taken by 1 Obtain operations is:- 48503