

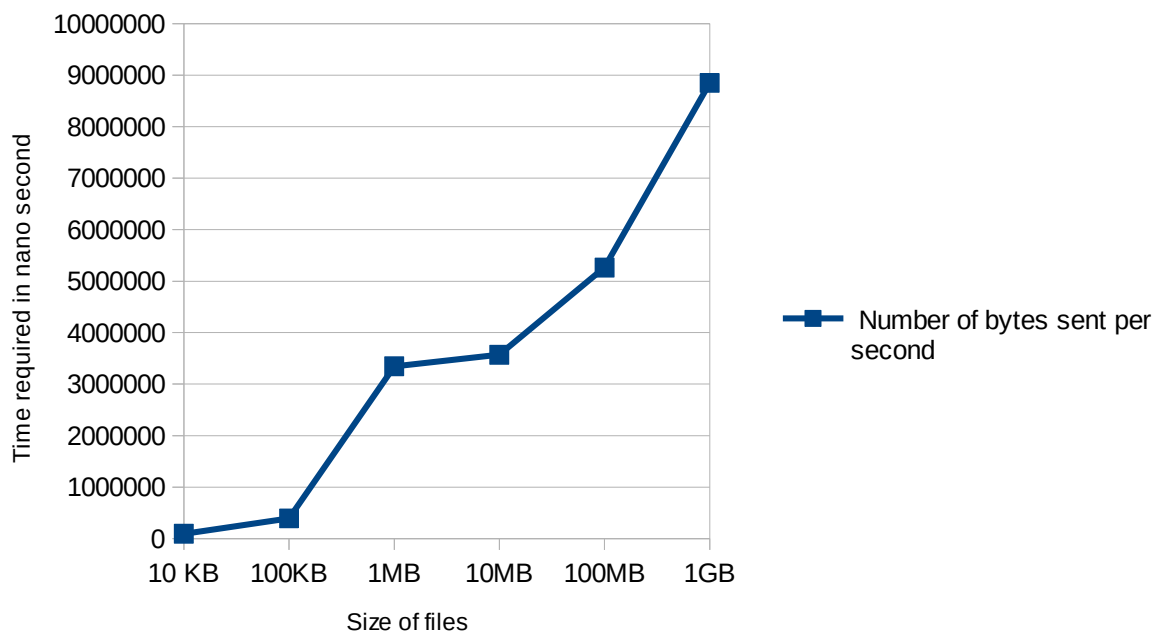
Evaluation part - II

Evaluation is performed on operation performed on 8 Peers concurrently.

Where size of data remains constant as 800MB. Evaluation is performed on data of 800MB. This data is divided into files of different size as 10KB, 100KB, 1MB, 10MB, 100MB and 1GB.

Following is the result of evaluation. More details of evaluation is mentioned after graph.

File Size	Number of files	Total File Size	Time required (Second)	Number of bytes sent per second
10 KB	10000 * 8	800MB	1060.375	94 ,306.25
100KB	1000 * 8	800 MB	255	392,156.86
1MB	100 * 8	800 MB	29.875	3,347,280.33
10MB	10 * 8	800 MB	28	3,571,428.57
100MB	1 * 8	800 MB	19	5,263,157.89
1GB	1 * 8	8 GB	113	8,849,557.52



1. 10 KB file :

Total Number of Peers Connected : 8

Files each server processing : 10000 Files

Total Number of files system processing : 80000(8 * 10000)

Each file Size : 10 kb

Time required for OBTAIN operation :

	Peer name							
	Peer-1	Peer-2	Peer-3	Peer-4	Peer-5	Peer-6	Peer-7	Peer-8
Time Required (Seconds)	1055	1060	1058	1062	1063	1061	1062	1062

Avg Time : 1060.375 Seconds

Bytes/Second = $(10,000 * 10,000) / 1060.375 = 94306.25957797$
files file-size

```
sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 10000 files.
Start Time : 2621173994816
DownloadedFiles directory created
Operation completed at 3676881648887
Time Required 1055707654071NanoSecond
Time Required 1055 Seconds

sachin@sachin-HP-Pavilion-15-Note:
at java.net.SocketInputStream
.read(SocketInputStream.java:122)
at Client.downloadFile(Client
.java:529)
at Client.main(Client.java:31
7)
Operation completed at 3688004750461
Time Required 1062945491088NanoSecond
Time Required 1062 Seconds

sachin@sachin-HP-Pavilion-15-Note:
at java.net.SocketInputStream
.read(SocketInputStream.java:122)
at Client.downloadFile(Client
.java:529)
at Client.main(Client.java:31
7)
Operation completed at 3688909368295
Time Required 1061561376267NanoSecond
Time Required 1061 Seconds

sachin@sachin-HP-Pavilion-15-Note:
at Client.main(Client.java:31
7)
Operation completed at 3681693010000
Time Required 1060139334754NanoSecond
Time Required 1060 Seconds

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice :

sachin@sachin-HP-Pavilion-15-Note:
at Client.main(Client.java:317
)
Operation completed at 3686570637839
Time Required 1063844713188NanoSecond
Time Required 1063 Seconds

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice :

sachin@sachin-HP-Pavilion-15-Note:
java:529)
at Client.main(Client.java:317
)
Operation completed at 3680473130698
Time Required 1058360146334NanoSecond
Time Required 1058 Seconds

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice :

sachin@sachin-HP-Pavilion-15-Note:
Start Time : 2623951297385
DownloadedFiles directory created
Operation completed at 3686141127880
Time Required 1062189830495NanoSecond
Time Required 1062 Seconds

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice :
```

2. 100 KB file :

Total Number of Peers Connected : 8

Files each server processing : 1000 Files

Total Number of files system processing : 8000(8 * 1000)

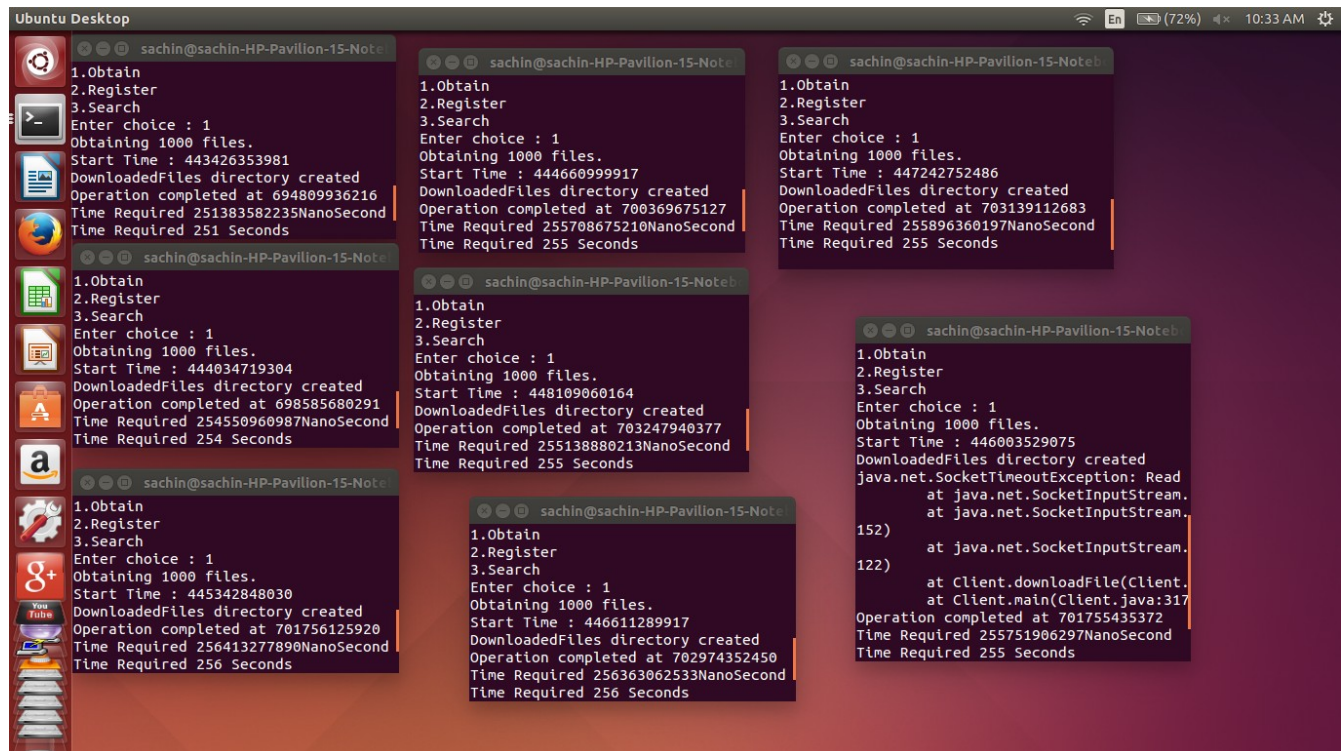
Each file Size : 100 kb

Time required for OBTAIN operation :

	Peer name							
	Peer-1	Peer-2	Peer-3	Peer-4	Peer-5	Peer-6	Peer-7	Peer-8
Time Required (Seconds)	251	255	255	254	255	256	256	255

Avg Time : 255 Seconds

Bytes/Second = $(100,000 \times 1000) / 255 = 392156.86$



```
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1000 files.
Start Time : 443426353981
DownloadedFiles directory created
Operation completed at 694809936216
Time Required 251383582235NanoSecond
Time Required 251 Seconds

1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1000 files.
Start Time : 444034719304
DownloadedFiles directory created
Operation completed at 698585680291
Time Required 254550960987NanoSecond
Time Required 254 Seconds

1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1000 files.
Start Time : 445342848030
DownloadedFiles directory created
Operation completed at 701756125920
Time Required 256413277890NanoSecond
Time Required 256 Seconds

1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1000 files.
Start Time : 446611289917
DownloadedFiles directory created
Operation completed at 702974352450
Time Required 256363062533NanoSecond
Time Required 256 Seconds

1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1000 files.
Start Time : 447242752486
DownloadedFiles directory created
Operation completed at 703139112683
Time Required 255896360197NanoSecond
Time Required 255 Seconds

1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1000 files.
Start Time : 446003529075
DownloadedFiles directory created
java.net.SocketTimeoutException: Read
    at java.net.SocketInputStream.
    at java.net.SocketInputStream.
152)    at java.net.SocketInputStream.
122)    at Client.downloadFile(Client.
    at Client.main(Client.java:317
Operation completed at 701755435372
Time Required 255751906297NanoSecond
Time Required 255 Seconds
```


(Socket connection exceptions occurred for 2 Peers. As I handled exception, because of this exception Peer might have not downloaded that file. So 2 peer could not download 1 file each out of 1000 files.)

The image is a collage of four terminal window screenshots, each with a dark background and light-colored text. The top-left window is titled 'Ubuntu Desktop' and shows a user 'sachin@sachin-HP-Pavilion-15-Notebook' running a Java program. The program lists options (1. Obtain, 2. Register, 3. Search), enters choice 1, and attempts to obtain 1000 files. It then throws a 'java.net.SocketTimeoutException: Read timed out' error. The top-right window shows a user 'sachin@sachin-HP-Pavilion-15-Notebook-PC' running the same program, which successfully obtains 1000 files and reports the time required. The bottom-left window shows a user 'sachin@sachin-HP-Pavilion-15-Notebook-PC' running the program, which also throws a 'java.net.SocketTimeoutException: Read timed out' error. The bottom-right window shows a user 'sachin@sachin-HP-Pavilion-15-Notebook-PC' running the program, which successfully obtains 1000 files and reports the time required. The collage is set against a background of a desktop environment with various application icons on the left and a taskbar at the bottom.

The average response time is 215 seconds.

The screenshot shows a desktop environment with the Ubuntu Desktop background. The taskbar on the left contains icons for various applications, including the Dash, Home Folder, Files, Firefox, LibreOffice, and the Dash to Dock extension. The main area of the screen is filled with several terminal windows, each displaying the output of a Java program. The windows are titled with the user's name and the machine name, such as "sachin@sachin-HP-Pavilion-15-Notebook-PC". The output in the terminals shows the execution of a Java program with a menu of choices (1. Obtain, 2. Register, 3. Search) and the resulting operation completion times. The windows are arranged in a grid-like fashion, with some windows overlapping others. The overall color scheme is dark, with the terminal windows having a black background and white text.

4. 1MB file :

Total Number of Peers Connected : 8

Files each server processing : 100 Files

Total Number of files system processing : 800 (8 * 100)

Each file Size : 1 mb

Time required for OBTAIN operation :

	Peer name							
	Peer-1	Peer-2	Peer-3	Peer-4	Peer-5	Peer-6	Peer-7	Peer-8
Time Required (Seconds)	34	41	11	10	43	44	11	45

Avg Time : 29.875 sec

Bytes per second : $(1,000,000 \text{ 1mb} * 100 \text{ num of file}) / 29.875 = 3347280.33$

The screenshot shows an Ubuntu Desktop environment with eight terminal windows open, each representing a different peer in a distributed system. The terminals are arranged in a grid-like fashion. Each terminal window has a title bar indicating the user 'sachin' and the host 'sachin-HP-Pavillon-15-Noteb' or 'sachin-HP-Pavillon-15-Notebook-PC'. The output in each terminal shows the execution of a script with the following steps: 1. Obtain, 2. Register, 3. Search. The user enters '1' for 'Obtain'. The script then reports 'Obtaining 100 files.', the 'Start Time' in nanoseconds, the 'Operation completed at' time in nanoseconds, the 'Time Required' in nanoseconds, and finally the 'Time Required' in seconds. The times vary across the peers, reflecting the data in the table above. For example, Peer-1 shows a time of 34 seconds, while Peer-4 shows 10 seconds.

```
sachin@sachin-HP-Pavillon-15-Noteb:~$ ./script
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 100 files.
Start Time : 13139084886956
Operation completed at 13173235205164
Time Required 34150318208NanoSecond
Time Required 34 Seconds

sachin@sachin-HP-Pavillon-15-Noteb:~$ ./script
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 100 files.
Start Time : 13139588836532
Operation completed at 13181454746403
Time Required 41865909871NanoSecond
Time Required 41 Seconds

sachin@sachin-HP-Pavillon-15-Notebook-PC:~$ ./script
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 100 files.
Start Time : 13141717730623
Operation completed at 13152918092700
Time Required 11200362077NanoSecond
Time Required 11 Seconds

sachin@sachin-HP-Pavillon-15-Noteb:~$ ./script
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 100 files.
Start Time : 13140931055397
Operation completed at 13151640380872
Time Required 10709325475NanoSecond
Time Required 10 Seconds

sachin@sachin-HP-Pavillon-15-Noteb:~$ ./script
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 100 files.
Start Time : 13144070180086
Operation completed at 13188108793683
Time Required 44038613597NanoSecond
Time Required 44 Seconds

sachin@sachin-HP-Pavillon-15-Noteb:~$ ./script
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 100 files.
Start Time : 13140292485229
Operation completed at 13184066042561
Time Required 43773557332NanoSecond
Time Required 43 Seconds

sachin@sachin-HP-Pavillon-15-Noteb:~$ ./script
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 100 files.
Start Time : 13143374735672
Operation completed at 13154906675950
Time Required 11531940278NanoSecond
Time Required 11 Seconds

sachin@sachin-HP-Pavillon-15-Notebook-PC:~$ ./script
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 100 files.
Start Time : 13142605808660
Operation completed at 13187919964619
Time Required 45314155959NanoSecond
Time Required 45 Seconds
```


5. 10MB file :

Total Number of Peers Connected : 8

Files each server processing : 10 Files

Total Number of files system processing : 80 (8 * 10)

Each file Size : 10 mb

Time required for OBTAIN operation :

	Peer name							
	Peer-1	Peer-2	Peer-3	Peer-4	Peer-5	Peer-6	Peer-7	Peer-8
Time Required (Seconds)	24	26	30	26	28	28	28	29

Avg Time(Seconds) : 28

Bytes per second : $(1,00,00,000 * 10) / 28 = 3571428.57$
 10mb num of files

```

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 10 files.
Start Time : 2206170512305
DownloadedFiles directory created
Operation completed at 2230911193334
Time Required 24740681029NanoSecond
Time Required 24 Seconds

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 10 files.
Start Time : 2206698284418
DownloadedFiles directory created
Operation completed at 2232947143723
Time Required 26248859305NanoSecond
Time Required 26 Seconds

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 10 files.
Start Time : 2211251730111
DownloadedFiles directory created
Operation completed at 2241952687810
Time Required 30700957699NanoSecond
Time Required 30 Seconds

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 10 files.
Start Time : 2207326816674
DownloadedFiles directory created
Operation completed at 2233905037275
Time Required 26578220601NanoSecond
Time Required 26 Seconds

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 10 files.
Start Time : 2208041821218
DownloadedFiles directory created
Operation completed at 2237557421776
Time Required 29515600558NanoSecond
Time Required 29 Seconds

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 10 files.
Start Time : 2209816205011
DownloadedFiles directory created
Operation completed at 2238741544502
Time Required 28925339491NanoSecond
Time Required 28 Seconds

sachin@sachin-HP-Pavilion-15-Note:
Operation completed at 2238738557139
Time Required 28190284380NanoSecond
Time Required 28 Seconds

sachin@sachin-HP-Pavilion-15-Note:
1.Obtain
2.Register
3.Search
Enter choice : 

```

6. 100MB file :

Total Number of Peers Connected : 8

Files each server processing : 1 File

Total Number of files system processing : 8 (8 * 1)

Each file Size : 100 mb

Time required for OBTAIN operation :

	Peer name							
	Peer-1	Peer-2	Peer-3	Peer-4	Peer-5	Peer-6	Peer-7	Peer-8
Time Required (Seconds)	17	17	18	18	20	19	20	19

Avg. Time : 19

Bytes per second : $\left(\frac{10,00,00,000}{100mb} * \frac{1}{\text{num of file}} \right) / 19 = 5263157.894$

```

sachin@sachin-HP-Pavilion-15-Note
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1 files.
Start Time : 2738479139674
DownloadedFiles directory created
Operation completed at 2756088545648
Time Required 17609405974NanoSecond
Time Required 17 Seconds

sachin@sachin-HP-Pavilion-15-Note
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1 files.
Start Time : 2743543920029
DownloadedFiles directory created
Operation completed at 2761405051547
Time Required 17861131518NanoSecond
Time Required 17 Seconds

sachin@sachin-HP-Pavilion-15-Note
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1 files.
Start Time : 2742807848038
DownloadedFiles directory created
Operation completed at 2761385866306
Time Required 18578018268NanoSecond
Time Required 18 Seconds

sachin@sachin-HP-Pavilion-15-Note
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1 files.
Start Time : 2738838860751
DownloadedFiles directory created
Operation completed at 2756994765740
Time Required 18155904989NanoSecond
Time Required 18 Seconds

sachin@sachin-HP-Pavilion-15-Note
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1 files.
Start Time : 2740253837896
DownloadedFiles directory created
Operation completed at 2760325700043
Time Required 20071862147NanoSecond
Time Required 20 Seconds

sachin@sachin-HP-Pavilion-15-Note
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1 files.
Start Time : 2742115626366
DownloadedFiles directory created
Operation completed at 2761273227139
Time Required 19157600773NanoSecond
Time Required 19 Seconds

sachin@sachin-HP-Pavilion-15-Note
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1 files.
Start Time : 2740889375086
DownloadedFiles directory created
Operation completed at 2761200951636
Time Required 20311576550NanoSecond
Time Required 20 Seconds

sachin@sachin-HP-Pavilion-15-Note
1.Obtain
2.Register
3.Search
Enter choice : 1
Obtaining 1 files.
Start Time : 2741572333796
DownloadedFiles directory created
Operation completed at 2761338102884
Time Required 19765769088NanoSecond
Time Required 19 Seconds
  
```

7. 1GB file :

Total Number of Peers Connected : 8

Files each server processing : 1 File

Total Number of files system processing : 8 (8 * 1)

Each file Size : 1GB

Time required for OBTAIN operation :

	Peer name							
	Peer-1	Peer-2	Peer-3	Peer-4	Peer-5	Peer-6	Peer-7	Peer-8
Time Required (Seconds)	114	113	111	115	112	110	108	49

Avg Time : 113

Bytes per second: (1,00,00,00,000 * 1) / 113 = 8849557.52 Seconds
1GB Num of file

```

sachin@sachin-HP-Pavillon-15-Note: 1.Obtain
sachin@sachin-HP-Pavillon-15-Note: 2.Register
sachin@sachin-HP-Pavillon-15-Note: 3.Search
sachin@sachin-HP-Pavillon-15-Note: Enter choice : 1
sachin@sachin-HP-Pavillon-15-Note: Obtaining 1 files.
sachin@sachin-HP-Pavillon-15-Note: Start Time : 5606989162939
sachin@sachin-HP-Pavillon-15-Note: Operation completed at 5721221486396
sachin@sachin-HP-Pavillon-15-Note: Time Required 114232323457NanoSecond
sachin@sachin-HP-Pavillon-15-Note: Time Required 114 Seconds

sachin@sachin-HP-Pavillon-15-Note: 1.Obtain
sachin@sachin-HP-Pavillon-15-Note: 2.Register
sachin@sachin-HP-Pavillon-15-Note: 3.Search
sachin@sachin-HP-Pavillon-15-Note: Enter choice : 1
sachin@sachin-HP-Pavillon-15-Note: Obtaining 1 files.
sachin@sachin-HP-Pavillon-15-Note: Start Time : 5607661004466
sachin@sachin-HP-Pavillon-15-Note: Operation completed at 5721213066803
sachin@sachin-HP-Pavillon-15-Note: Time Required 113552062337NanoSecond
sachin@sachin-HP-Pavillon-15-Note: Time Required 113 Seconds

sachin@sachin-HP-Pavillon-15-Note: 1.Obtain
sachin@sachin-HP-Pavillon-15-Note: 2.Register
sachin@sachin-HP-Pavillon-15-Note: 3.Search
sachin@sachin-HP-Pavillon-15-Note: Enter choice : 1
sachin@sachin-HP-Pavillon-15-Note: Obtaining 1 files.
sachin@sachin-HP-Pavillon-15-Note: Start Time : 5609555134738
sachin@sachin-HP-Pavillon-15-Note: Operation completed at 5721232595273
sachin@sachin-HP-Pavillon-15-Note: Time Required 111677460535NanoSecond
sachin@sachin-HP-Pavillon-15-Note: Time Required 111 Seconds

sachin@sachin-HP-Pavillon-15-Note: 1.Obtain
sachin@sachin-HP-Pavillon-15-Note: 2.Register
sachin@sachin-HP-Pavillon-15-Note: 3.Search
sachin@sachin-HP-Pavillon-15-Note: Enter choice : 1
sachin@sachin-HP-Pavillon-15-Note: Obtaining 1 files.
sachin@sachin-HP-Pavillon-15-Note: Start Time : 5605087500696
sachin@sachin-HP-Pavillon-15-Note: Operation completed at 5721085104586
sachin@sachin-HP-Pavillon-15-Note: Time Required 115997603890NanoSecond
sachin@sachin-HP-Pavillon-15-Note: Time Required 115 Seconds

sachin@sachin-HP-Pavillon-15-Note: 1.Obtain
sachin@sachin-HP-Pavillon-15-Note: 2.Register
sachin@sachin-HP-Pavillon-15-Note: 3.Search
sachin@sachin-HP-Pavillon-15-Note: Enter choice : 1
sachin@sachin-HP-Pavillon-15-Note: Obtaining 1 files.
sachin@sachin-HP-Pavillon-15-Note: Start Time : 5608730651937
sachin@sachin-HP-Pavillon-15-Note: Operation completed at 5721225819363
sachin@sachin-HP-Pavillon-15-Note: Time Required 112495167426NanoSecond
sachin@sachin-HP-Pavillon-15-Note: Time Required 112 Seconds

sachin@sachin-HP-Pavillon-15-Note: Operation completed at 5109107556807
sachin@sachin-HP-Pavillon-15-Note: Time Required 1134339193978NanoSecond
sachin@sachin-HP-Pavillon-15-Note: Time Required 1134 Seconds

sachin@sachin-HP-Pavillon-15-Note: 1.Obtain
sachin@sachin-HP-Pavillon-15-Note: 2.Register
sachin@sachin-HP-Pavillon-15-Note: 3.Search
sachin@sachin-HP-Pavillon-15-Note: Enter choice : 1
sachin@sachin-HP-Pavillon-15-Note: Obtaining 1 files.
sachin@sachin-HP-Pavillon-15-Note: Start Time : 5610284118007

sachin@sachin-HP-Pavillon-15-Note: 1.Obtain
sachin@sachin-HP-Pavillon-15-Note: 2.Register
sachin@sachin-HP-Pavillon-15-Note: 3.Search
sachin@sachin-HP-Pavillon-15-Note: Enter choice : 1
sachin@sachin-HP-Pavillon-15-Note: Obtaining 1 files.
sachin@sachin-HP-Pavillon-15-Note: Start Time : 5611353825143
sachin@sachin-HP-Pavillon-15-Note: Operation completed at 5660836067782
sachin@sachin-HP-Pavillon-15-Note: Time Required 49482242639NanoSecond
sachin@sachin-HP-Pavillon-15-Note: Time Required 49 Seconds

sachin@sachin-HP-Pavillon-15-Note: 1.Obtain
sachin@sachin-HP-Pavillon-15-Note: 2.Register
sachin@sachin-HP-Pavillon-15-Note: 3.Search
sachin@sachin-HP-Pavillon-15-Note: Enter choice : 1
sachin@sachin-HP-Pavillon-15-Note: Obtaining 1 files.
sachin@sachin-HP-Pavillon-15-Note: Start Time : 5613182878999
sachin@sachin-HP-Pavillon-15-Note: Operation completed at 5721812413277
sachin@sachin-HP-Pavillon-15-Note: Time Required 108629534278NanoSecond
sachin@sachin-HP-Pavillon-15-Note: Time Required 108 Seconds
  
```