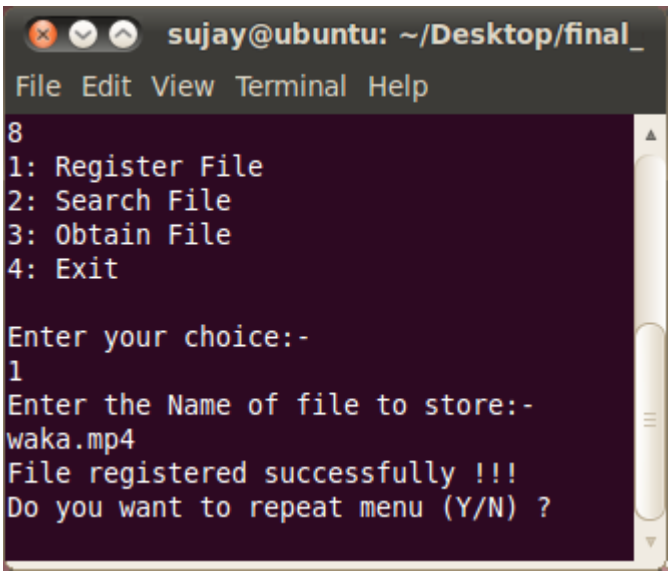
Below are the screen shots of output:-

1) Register Operation:-

- User should enter 1 on console to do put operation



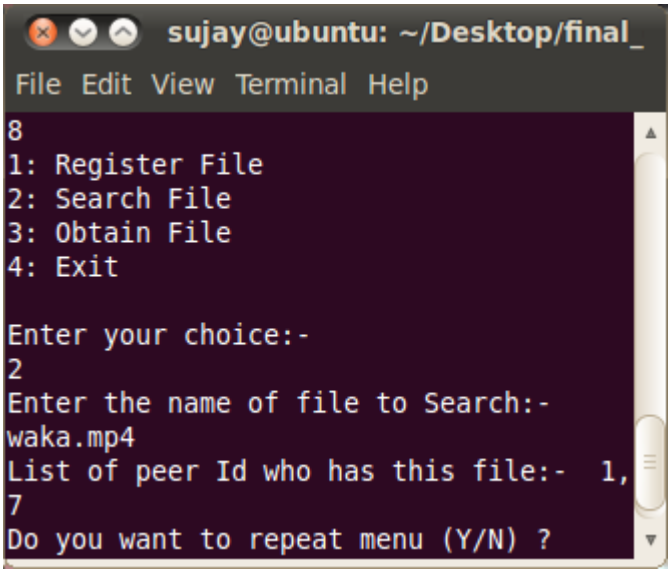
- User will be asked to enter filename to register.
- Once file name get registered on primary and replica server user will get message that "value stored successfully" from server.
- User will be asked if he want to continue any more operations. If user wish to do then he can type 'Y' to repeat menu else user can enter 'N' to exit.

Register Resilience:-

- Users file name will be stored at multiple locations primary and replica server.
- Also file will be sent to another server to maintain replica. This replica will be retrieved when primary server fails to deliver the file.

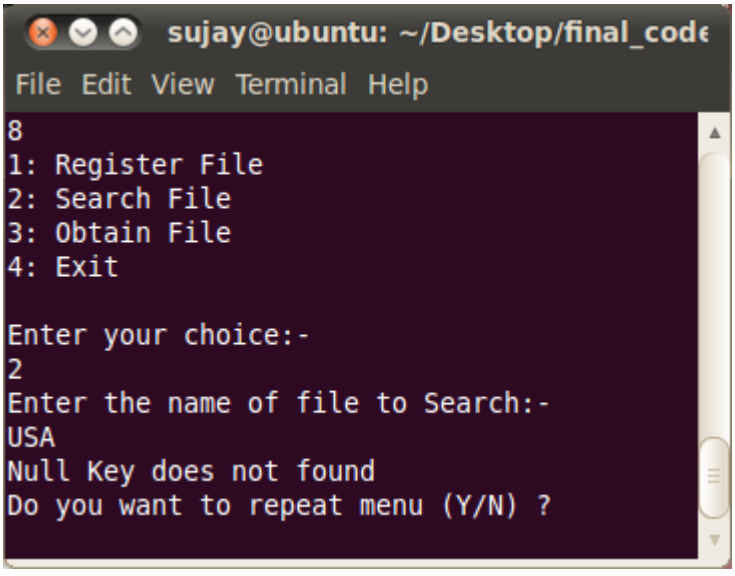
2) Search Operation:-

- User should enter 2 to do search operation as shown below.



- User will be asked to enter file name to search. We can see above, user entered waka.mp4 and peer Id who has this file is returned.

- If user enters a key which is not registered then get will return NULL and message that "Key does not found" as shown below.

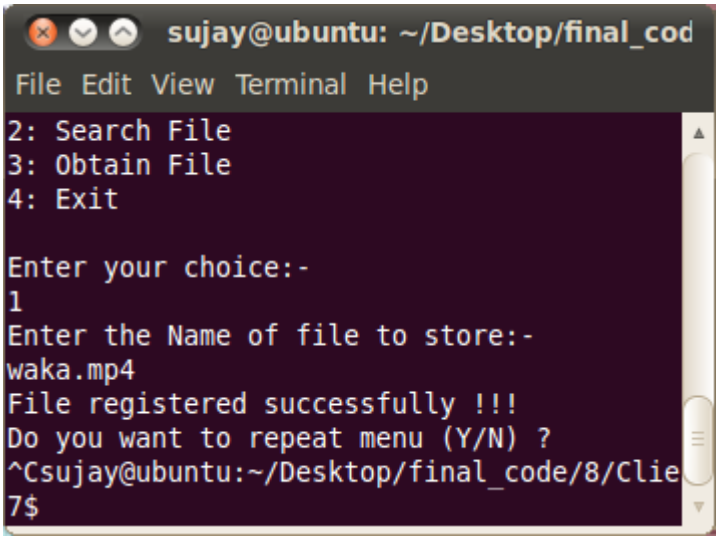


Search Resilience:-

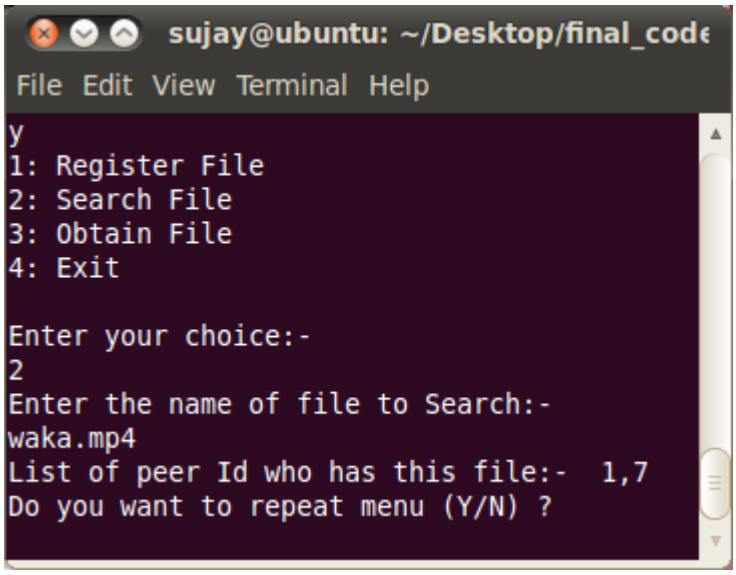
If primary source failed to deliver value due to connection issue, then replica server will provide the key and value to user as shown below.

Example:-

- Suppose user stores file name waka.mp4 and peer id 1 and 7.
- Client will calculate which server to connect based on below Hash Function.
- Hash Value = (Sum of ascii value of waka.mp4) % 8;
- Hash value = (230) % 8;
- Hash Value = 6;
- Primary server is 7 in this case. We can kill Client & Server 7 to see if replica provides the value associated with key 1,7.
- In Below screenshot i have killed server 7 which was primary server to store filename waka.mp4.

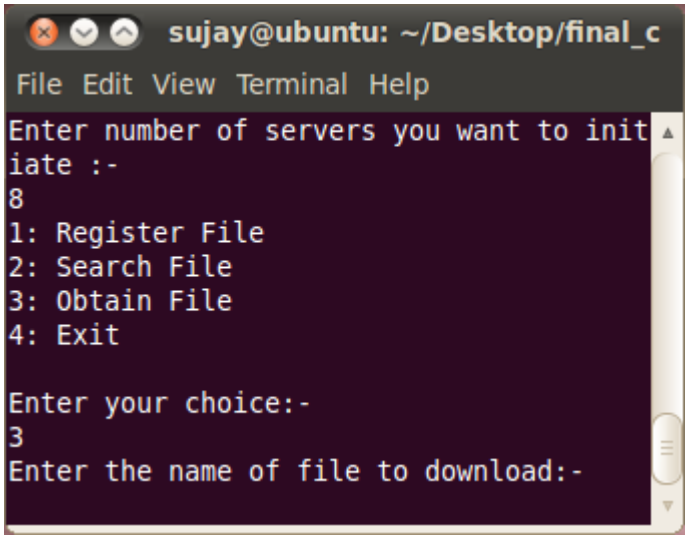


- Now I will try to get the value from Replica Server. Below is the screen shot that peer id 1,7 returned by replica server.

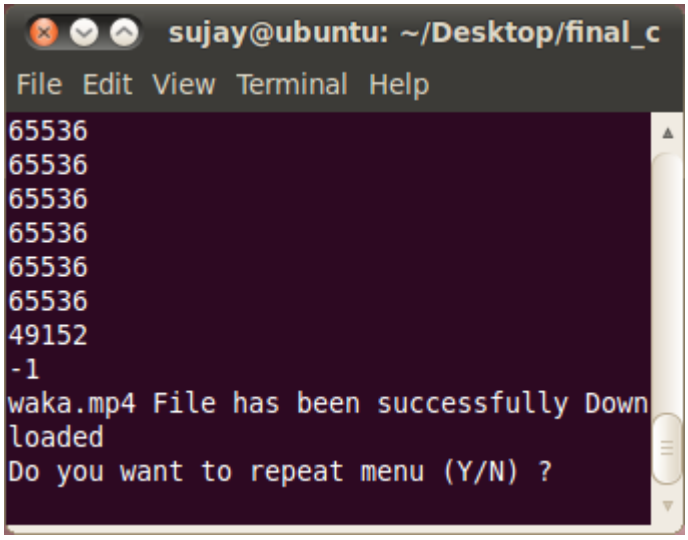


3) Obtain Operation:-

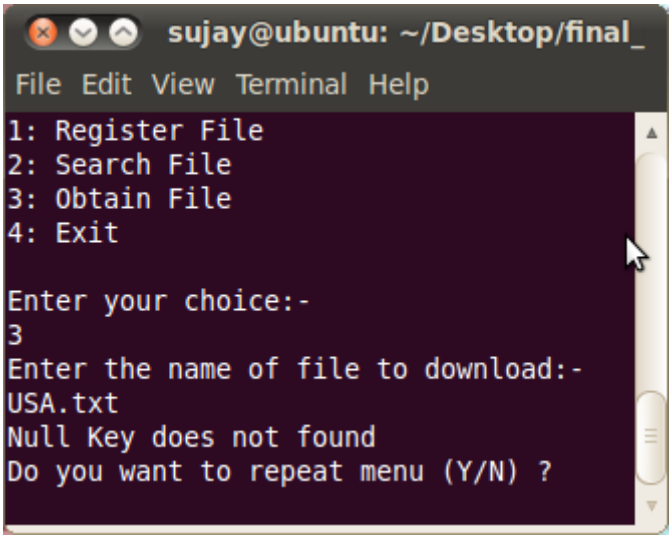
- User should enter 3 to do obtain operation. As shown below.



- User will be asked to enter file name to obtain as shown above. Once user enters filename, peer id who has this file will be returned to user.
- Then user will be asked to entre peerid from which he want to receive file.
- Once user get the peerid that peer server will be contacted to get value.



– If filename does not found then user will get message that “Failed key does not found” as below.



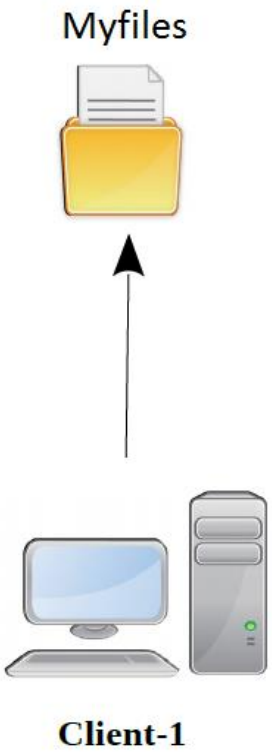
Obtain Resilience:-

If user performs obtain operation and primary server is shutdown then replica server will be contacted to obtain file. All the details to connect to replica will be kept hidden from user.

When user goes for registration file will be sent to other server to store replica.

Example:

1. If user wants to register “xyz.txt” file.
2. Generated hashcode is 1.
3. Now file is going to register at PEER_SERVER_1.
4. Replica of file is going to save in PEER_SERVER_7.
5. All files will be stored at Myfiles directory
6. When user get SocketConnection exception from primary server while trying to download file then user will connect to replica server automatically to get file.



Condition where code will not work:-

1) To increase performance, all messages are passing are sent in string format.

2) User should register all its server details correctly without extra space at server.txt file.

3) User should register all the files before search or obtain operation.