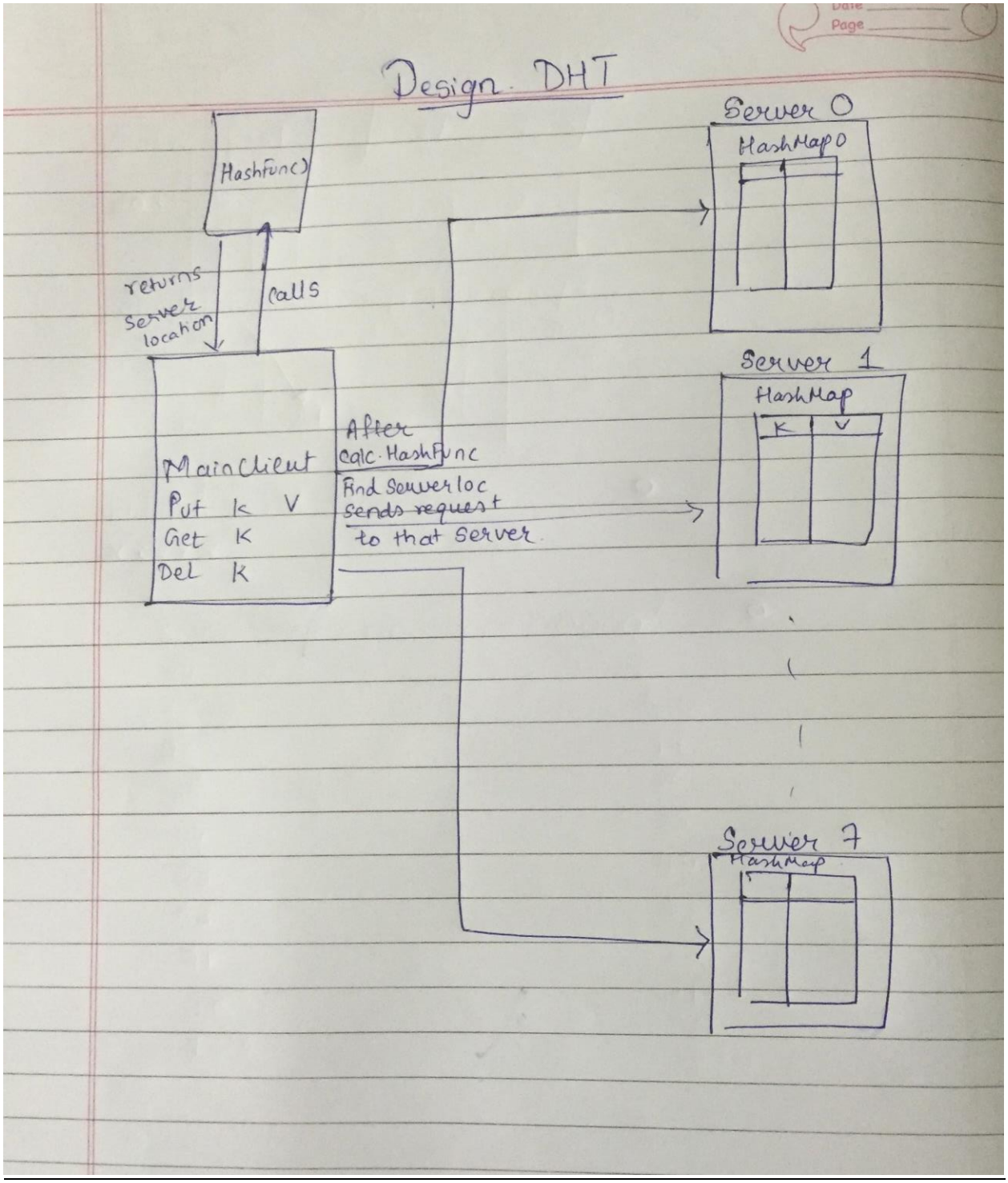
Design Document



- Figure shows the Design plan.
- The system is implemented on Virtual Box- Ubuntu.
- For creating a Distributed Hash Table 8 Servers and 1 Client are deployed.
- Key-Value pairs taken are Strings max of size 1024 bytes.

- Total 9 directories are created. MainClient, Server0, Server1,…..,Server7.
- Each directory contains code for respective functionality.
- The system is desgined as follows:
  - MainClient program provides user the interface through command prompt to enter commands like put, get, del.
  - As soon as user enters the command with key/value pairs, a hash function is called to calculate the location of server to which this key/value pair should be sent.
  - Hash Function: **Hashvalue =** $\Sigma(\boldsymbol{Ascii}(\boldsymbol{S}(\boldsymbol{i})))\%\ \boldsymbol{NO\_of\_Servers}$.
    Where S(i) is each character in String.
    Hashvalue returns an integer index.
    MainClient stores a Portarray which has all the servers' port number that are up.
    Hashvalue works as index of Portarray to locate server.
  - When the server is located, a connection is made to that client through sockets. These sockets remain open until the program ends.
  - Thereafter in that respective server using concurrent hashmap, key/value pairs are stored for put command.
  - If get command was executed, requested key's value is returned to the user.
  - If Del command was executed, requested key/value pair is removed from that hashmap.
- **TRADEOFFs:**
  It is assumed that all the Servers are up all time. No condition is mentioned if one of the Servers is down.
- **IMPROVEMENTS:**

  Here whenever a request from user comes, MainClient calculates Hash Function, locates Server, establishes connection to that Server through sockets and then performs put/get/del. However, for large number of requests coming establishing socket connections after calculating Hash Function creates some overhead. This overhead could be removed by creating a client for each server. This client-server pair would always remain connected. Whenever any request comes, key/value pairs alongwith command name are sent thru respective client to respective server.