1. Briefly explain the role of the following entities in the operation of the domain name system
   a) root name servers: Authoritative name servers for the root zone. Direct resolvers to appropriate gTLD server.
   b) zone authority: Prepares DNS records for the zone
   c) authoritative name server: Hosts DNS records for the zone. Typically queried by local DNS servers.
   d) local DNS servers: Perform iterated queries to respond to a query from a stub resolver
   e) stub resolvers: located in the same host as the application that triggers the DNS query. If queried record is not available in their cache they query a local DNS server.

2. Briefly explain how one would send an email message to alice@somedomain.net

Perform a DNS lookup for a the MX record of somedomain.net to get the name of the mail server. DNS look up for address of the mail server. The mail server is an SMTP server listening at port 25. Connect to the server and send mail using SMTP commands.

3. Explain the need for the field “Host:” that was mandated by the HTTP 1.1 protocol.

To permit virtual hosting. Most often a web server running on a single host may act s a web server for many domains. As all connection attempts to such a server come to port 80, the sever needs to know the name of the domain corresponding to the path specified in the GET request.