

Homework #2

CS 176A

Vishal Seenivasan

Winter 2025

Part 1

1.a What is a whois database?

A whois database is a public database that holds information on registered domain names, such as the owner of the domain, registration details, and expiration dates.

1.b Use a whois database on the Internet to lookup ucsb.edu. Who is in charge of the UCSB network? What are the names of the UCSB name servers? When did UCSB obtain its original DNS entry? Which whois database did you use to find this information?

The administrative contact for the UCSB network (i.e. the person in charge) is Kevin Schmidt. The names of the UCSB name servers are NS2.UCSB.EDU, BRU-NS2.BROWN.EDU, and NS1.UCSB.EDU. UCSB obtained its original DNS entry on April 27, 1987. This information all came from the EDUCAUSE whois database.

1.c Use nslookup to find a Web server that has multiple IP addresses (do not use an example from class). List the name of that web server and the addresses it maps to.

Using nslookup on reddit.com shows that it maps to 8 addresses: 151.101.193.140, 151.101.129.140, 151.101.65.140, 151.101.1.140, 2a04:4e42:400::396, 2a04:4e42:200::396, 2a04:4e42::396, and 2a04:4e42:600::396.

1.d Does the UCSB web server have multiple IP addresses?

Yes, the UCSB web server has 3 addresses associated with it: 23.185.0.3, 2620:12a:8001::3, and 2620:12a:8000::3.

1.e On a machine in CSIL, type the command “ip addr show”. What IP address does your machine have? (Hint: it is the address that starts with 128.111). Include the name of the machine you are on so we can check your answer (i.e. csil-01.cs.ucsb.edu)

The IP address of machine csilvm-12.cs.ucsb.edu is 128.111.30.212.

2.a Suppose you run TCPClient before running TCPServer. What happens? Why?

If TCPClient is run before running TCPServer, a ConnectionRefusedError is received. This is due to the fact that since TCPServer is not running, port 12000 (the default port used by the code) hasn't been opened, and thus the machine is not accepting any requests on that port, refusing the connection and causing the ConnectionRefusedError.

2.b Suppose you run UDPClient before you run UDPServer. What happens? Why?

If UDPClient is run before running UDPServer, the client simply hangs indefinitely. This is because, as is the case with the TCPClient, since the target port hasn't been opened by UDPServer, the server machine refuses the connection and does not send back a response. However, UDP is designed to allow for packet loss, so it simply keeps waiting for a response, causing it to hang indefinitely.

2.c What happens if you use different port numbers for the client and server sides?

Using different port numbers results in the same situations as above, since using a different port number results in the client again trying to message the server on a closed port.

3. Suppose that in UDPClient.py, after we create the socket, we add the line:

```
clientSocket.bind(('', 5432))
```

Will it become necessary to change UDPServer.py? What are the port numbers for the sockets in UDPClient and UDPServer? What were they before making this change?

It is not necessary to change UDPServer.py. All the additional line does is change the port used by the client, which is sent to the server alongside the client address and data. The server will still be able to communicate back to the client. The port number for the UDPClient socket will be 5432 and the port number for the UDPServer socket will be 12000. Before the change, the UDPClient port was not directly assigned, so it could have been any valid UDP port, while the UDPServer socket was directly assigned and thus would still be port 12000.

Part 2

2.1.1 Locate the DNS query and response messages. Are they sent over UDP or TCP?

All DNS messages are sent over UDP.

2.1.2 What is the destination port for the DNS query message? What is the source port of DNS response message?

The destination port number for the DNS query messages is 53. The source port number for the DNS response messages is also 53.

2.1.3 To what IP address is the DNS query message sent? This is the IP address of a local DNS server.

The IP address to which the DNS query messages are being sent is 128.111.1.1.

2.1.4 Examine the DNS query message. What “Type” of DNS query is it? Does the query message contain any “answers”?

The DNS queries are of type A. They do not contain any answers.

2.1.5 This web page contains images. Before retrieving each image, does the host issue new DNS queries?

No, the host does not issue new DNS queries for each image.

2.2.1 What is the destination port for the DNS query message? What is the source port of the DNS response message?

The destination port for the DNS query message is 53. The source port of the DNS response message is 53.

2.2.2 To what IP address is the DNS query message sent?

The IP address the DNS query message is sent to is 128.111.1.2.

2.2.3 Examine the DNS response message. How many “answers” are provided? What do each of these answers contain?

The DNS response message provides 3 answers. The first two answer are of type CNAME – they specify alias names for the canonical name, specifically `www.mit.edu` and `www.mit.edu.edgekey.net`. The third answer is of type A and specifies the hostname: `e9566.dscc.akamaiedge.net`.

2.3.1 Examine the DNS response message. What MIT nameservers does the response message provide? Does this response message also provide the IP addresses of the MIT nameservers?

The DNS response provides 8 MIT nameservers: asia1.akam.net, eur5.akam.net, ns1-37.akam.net, asia2.akam.net, use2.akam.net, use5.akam.net, usw2.akam.net, and ns1-173.akam.net. The IP addresses of the nameservers are not provided.