CS 352 **Project 2 DNS client server (RECURSIVE)** Due date November 12, 2018

For Project 2, you will extend your implementation of Project 1 by implementing two TLDS servers (.com server and .edu server) in addition to the Root server and a DNS client program. Over all you will have four different programs. In Project 1, you have already implemented a client program with two sockets. In this project, you will extend the root server to contain three sockets, one to accept connections from the client, and two other to make connections to the TLDS servers (TLDS1 (say a .com server) and TLDS2 (say a .edu server). Also, the Root server operates in **recursive** mode. If a Hostname is not found in its table, based on the domain specified in query, the root server will contact the appropriate TLDS server and then get the response from the appropriate TLDS server and then send the response back to the client.

The RS server and the two TS servers each maintain a DNS_table consisting of three fields: Hostname, IP address, Flag (A). In addition, the RS server maintains two NS records indicating the hostname for each of the TS servers. The client always connects first to the RS server and sends the hostname as a string. The RS server does a look up in the DNS_table and if there is a match, sends the DNS table entry as a string ["Hostname IPaddress A"]. If the domain name does not end with a .com or a .edu, either the domain name entry should be in the DNS table of the root server or return Error: HOST NOT FOUND.

If the domain name in the query string ends in either a .com or a .edu, **and** it is not in the DNS table of the root server, the root server makes a connection with the appropriate TLDS server. Each TLDS server on receiving a string, does a look up and returns a [Hostname, IP address, A record] or Error: HOST NOT FOUND string back to the root server. The root server then sends the reply back to the client. The client outputs the received string from the Root Server. As in Project 1, the hostname strings will be given one per line in a file (PROJ2-HNS.txt). The DNS tables entries will also be one per line and will be in (PROJ2-DNSRS.txt and PROJ2-DNSEDU.txt and PROJ2-DNSCOM.txt. Your client program should output the results to a file RESOLVED.txt. As part of your submission, you need to submit four program files as well as the output file.

As always, first start the two TS servers, then the RS server and then the client program. Figure out how you will communicate the port number and hostname of TS servers to the RS server and hostname of the RS server to the client program. Choose a suitable data structure for the DNS table.

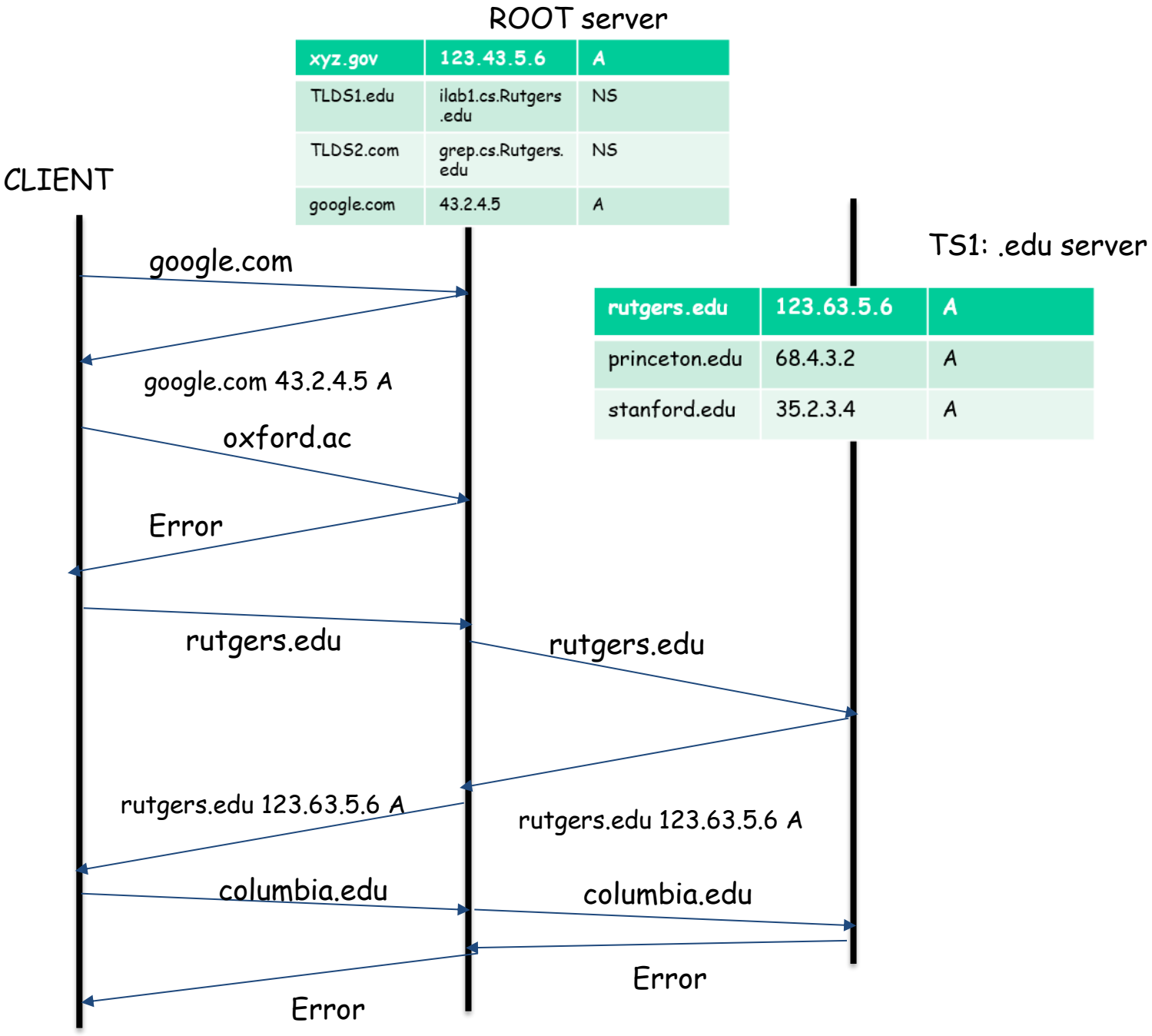
Here is a sample input line:

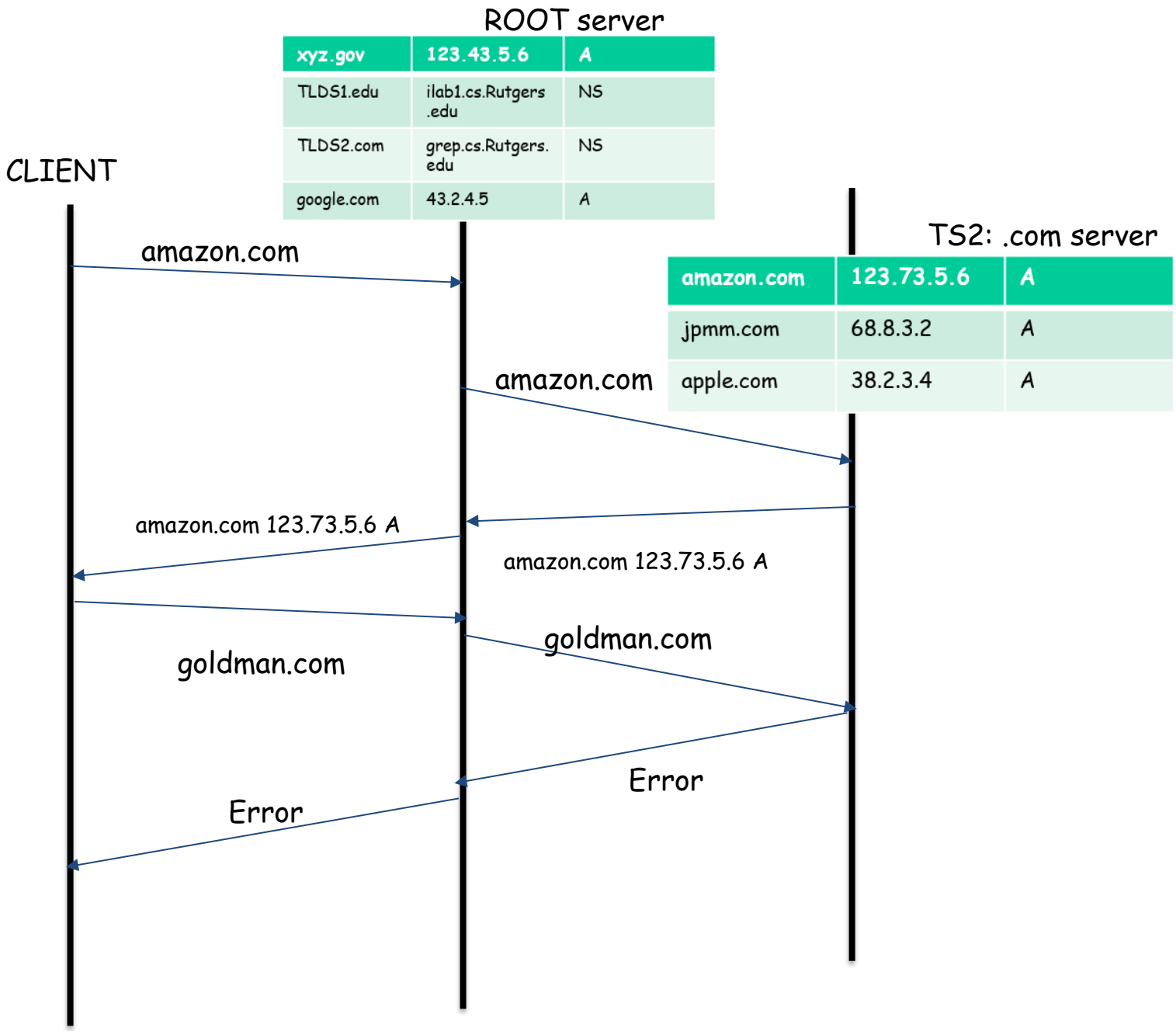
www.princeton.edu

Here is a sample output line:

www.princeton.edu 68.4.32 A

A brief sketch of the interaction among the programs is as shown.




ROOT server
xyz.gov 123.43.5.6 A
TLDS1.edu ilab1.cs.Rutgers .edu NS
TLDS2.com grep.cs.Rutgers. edu NS
google.com 43.2.4.5 A
CLIENT
TS2: .com server
amazon.com 123.73.5.6 A
jpmm.com 68.8.3.2 A
apple.com 38.2.3.4 A
amazon.com
amazon.com
amazon.com 123.73.5.6 A
amazon.com 123.73.5.6 A
goldman.com
goldman.com
Error
Error