

# FAST- National University of Computer and Emerging Sciences, Karachi.

## FAST School of Computing Assignment # 3 (CLO-2), Fall 2023 CS3001- Computer Networks

### ASSIGNMENT-III (DNS Implementation)

#### Submission Guidelines:

- This is a group assignment. Each group can be of two members only.
- This is a programming assignment and the submission will be based on 4-5 minutes demo followed by a short viva on Wednesday 08<sup>th</sup> November, 2023.
- Each group member has to submit the code and screenshot of the working demo on Google classroom.
- The student ID, names and section must be mentioned clearly during the demo.
- Each group should mark their attendance during the demo.
- Plagiarism in any form will result in straight "F".

#### Assignment # 3 (100 points)

Suppose within your web browser you click on a link to obtain a Web Page. The requested IP Address is not cached in your local host, so a DNS lookup is necessary to obtain the IP Address, refer to Figure 01.

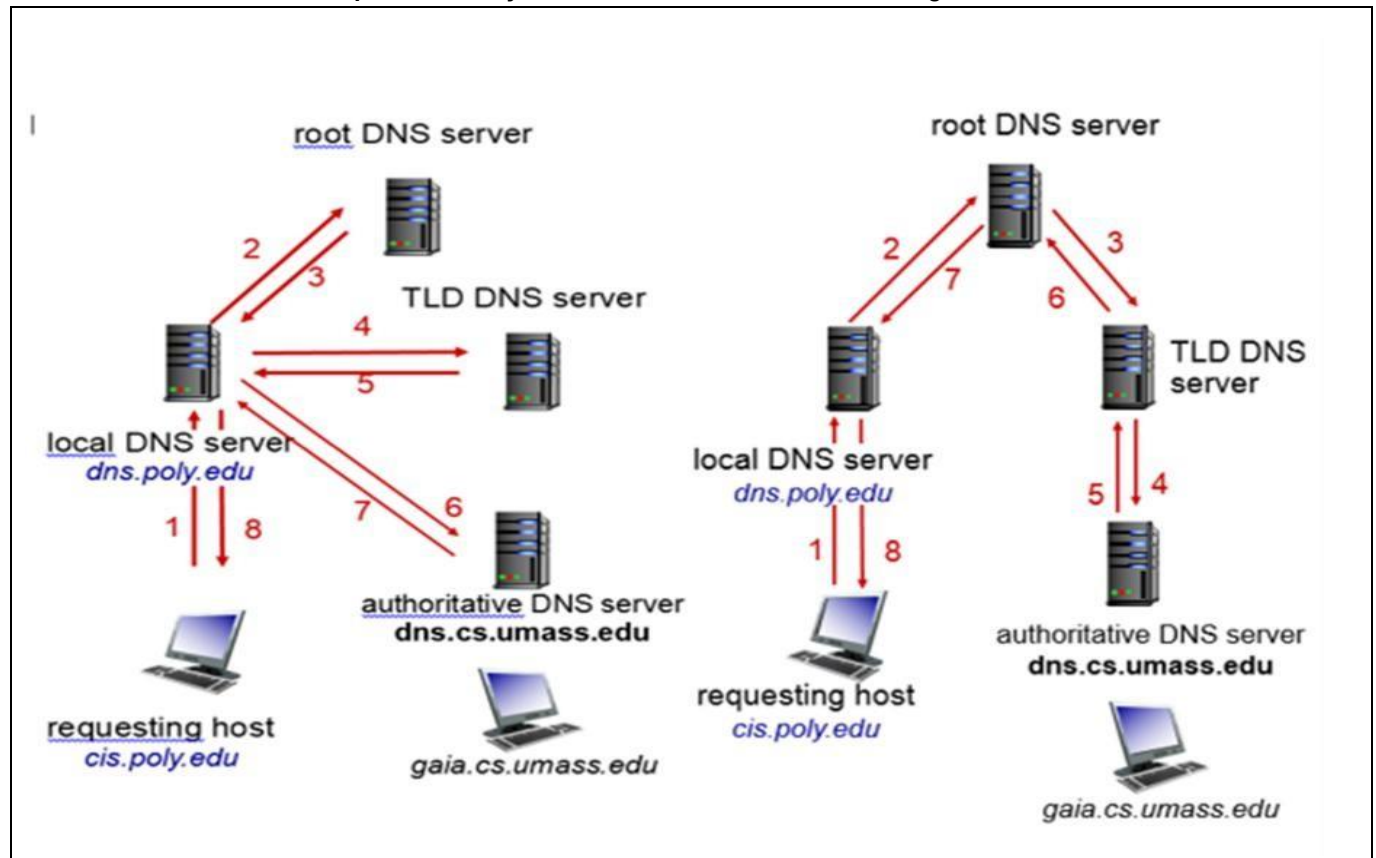


Figure 01: DNS name resolution (The right side of figure is showing Iterative name resolution and leftside of figure is showing sequential name resolution)

Your task:

- Design an application for DNS-Server which implements the Root-Level, Top-Level and Authoritative-Level servers, show how these servers actually work. When the client send query for DNS lookup, it query and reply messages, both with same message format. It take 16# bit for identification and 16# bit for reply to query, refer to Figure 02.

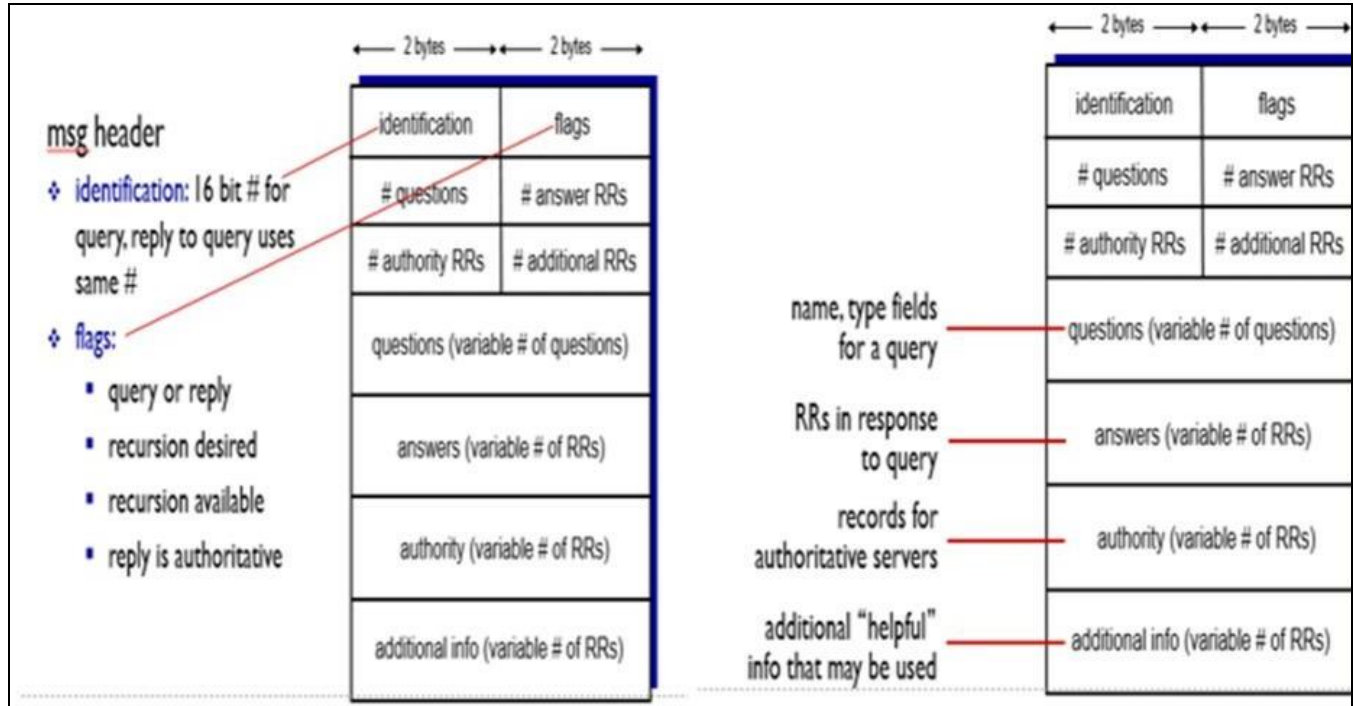


Figure 02: DNS, protocol messages

- Your application should maintain DNS record list (as per actual records - no assumption), which prints requested IP Address records.

```
Sample run for google.com:
google.com/64.233.167.99
-- DNS INFORMATION --
A: 64.233.187.99, 72.14.207.99, 64.233.167.99
NS: ns4.google.com., ns1.google.com., ns2.google.com.,
ns3.google.com.
MX: 10 smtp4.google.com., 10 smtp1.google.com., 10
smtp2.google.com., 10smtp3.google.com.
```

- Show how caching a DNS request will help for recursive request.
- Enable auto flushing of records if cache gets full on local host level.

Help:

Reading: Text-Book Chapter # 02 (Section 2.5)

<http://www.eyasme.com/Shayne/DNSLOOKUP/DNSLookup.html>