

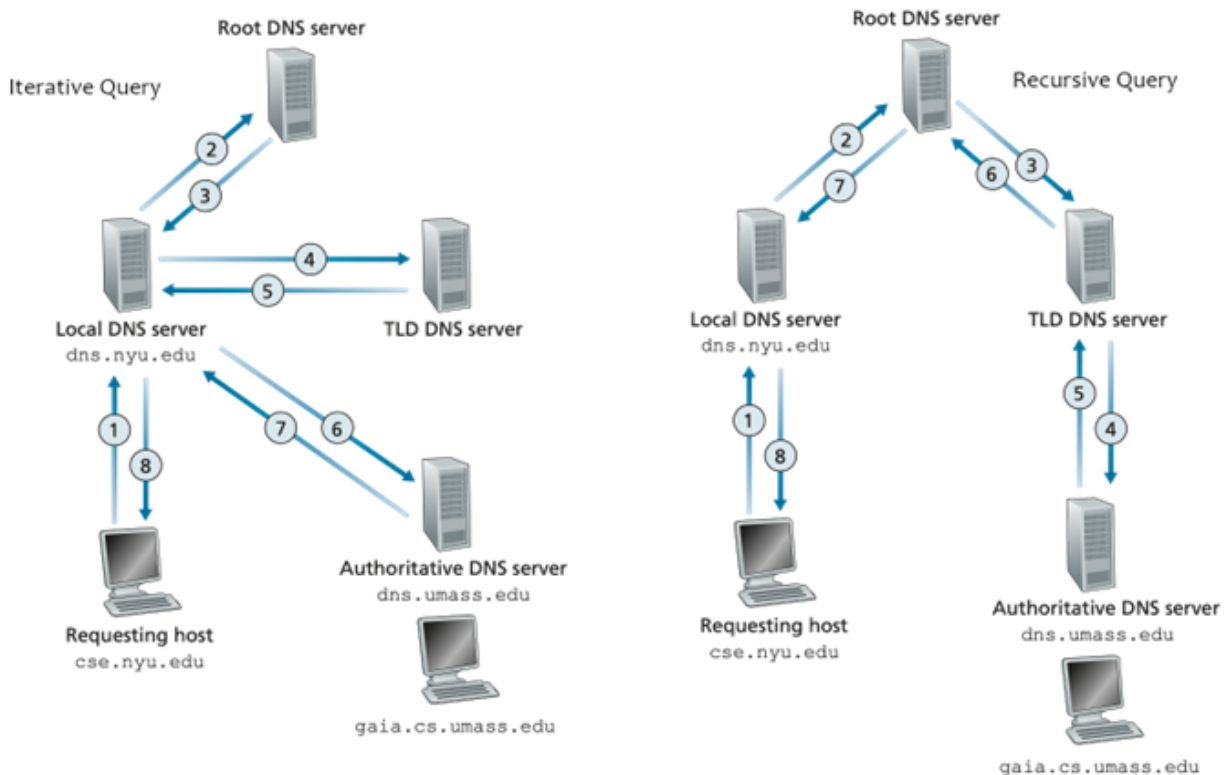
ECE4016 Assignment 1

In this assignment, you are required to implement a simple Local DNS Server .

Introduction

The **Domain Name System (DNS)** is the hierarchical and decentralized naming system used to identify computers reachable through the Internet or other Internet Protocol (IP) networks. The resource records contained in the DNS associate domain names with other forms of information. These are most commonly used to map human-friendly domain names to the numerical IP addresses computers need to locate services and devices using the underlying network protocols, but have been extended over time to perform many other functions as well. The Domain Name System has been an essential component of the functionality of the Internet since 1985. (wikipedia)

Iterative query and Recursive query



Detailed grading rule

The local DNS server should have the following function:

- Listen and accept the DNS queries
- Send response to the clients
- Maintain a cache(**20 points**). If the ip address is queried before, it should be stored in the cache. if the answer for the query is found in cache, Local DNS Server send this answer to Client as the DNS response
- Support the DNS queries of www.baidu.com through recursive or iterative searching (**30 points**)
- Support the DNS queries of www.example.com through recursive or iterative searching (**20 points**)
- Support the DNS queries of www.baidu.com through public DNS server (**15 points**)
- Support the DNS queries of www.example.com through public DNS server (**15 points**)

Requirements

- Print the ip address of all the servers you pass by during the searching
- Use a variable `flag` to indicate whether ask the public server for the IP address. When the flag is set to be `0`, ask the public server for the IP address. When the flag is set to be `1` do the recursive or iterative searching
- Make sure your program works under ubuntu 20
- Show how to execute your code
- The programming language should be Python(version 3.9)
- Dnspython is not allowed to use in this lab
- The server is required to work on port **1234** of **127.0.0.1**

Useful tools

There are some useful tools that may help you in your programming. (Dnspython is not allowed to use in this lab)

- socket
- dnslib

Simple test by yourself

You can use `dig` to test your local NDS server.

An example test code:

- `dig www.example.com @127.0.0.1 -p 1234`
- `dig www.baidu.com @127.0.0.1 -p 1234`

Note that this test code will be used in the evaluation of this project, make sure your program works given this test code.

Submission

- Due on **23:59, 13 Oct 2024**(Late submission within 5 minutes is allowed without punishment)
- Every 24h late delivery will be deducted 10%, and 48h late delivery will be allowed at most. After 48h, 0 marks will be given for this assignment

Honesty

We take your honesty seriously. If you are caught copying others' code, you will get an automatic **0** in this project. Please write your own code.