

Problem 1

Compile the `hostinfo` program from Figure 11.12. Then run `hostinfo google.com` three times in a row on your system.

- A. What do you notice about the ordering of the IP addresses in the three host entries?
- B. How might this ordering be useful?

A. Each time we request the host entry for `google.com`, the list of corresponding Internet addresses is returned in a different round-robin order.

B. The different ordering of the addresses in different DNS queries is known as *DNS round-robin*. It can be used to load-balance requests to a heavily used domain name.

Problem 2

Modify `Tiny` so that it reaps CGI children inside a `SIGCHLD` handler instead of explicitly waiting for them to terminate.

```
Void handler(int sig)
{
    pid_t pid;
    while((pid = waitpid(-1, NULL, 0)) > 0);

    if (!(pid == 0) || (pid == -1 && errno == ECHILD))
        unix_error("sigchld_handler wait error");
}
```

```
Inside main():
    signal(SIGCHLD, handler);
```

Problem 3

Modify `Tiny` so that when it serves static content, it copies the requested file to the connected descriptor using `malloc`, `rio_readn`, and `rio_writen`, instead of `mmap` and `rio_writen`.

```
srcfd = Open(filename, O_RDONLY, 0);
srcp = (char*)malloc(filesize);
Rio_readn(srcfd, srcp, filesize);
Rio_writen(fd, srcp, filesize);
close(srcfd);
free(srcp);
```

Problem 4

This problem is about HTTP protocol and it. Assume the situation is as follows: Microsoft's Hotmail server does not allow Google chrome to use its service. However chrome uses a trick to go through the Hazard – like other browsers not supported. Now, please tell me how Microsoft distinguishes different browsers and how chrome makes the hit.

(hint: learn the fields of HTTP request header)

In the HTTP request head, there is a field called “User-Agent”, which is used to “automated recognition of user agents for the sake of tailoring responses to avoid particular user agent limitations”. Using this field, the server can recognize browsers. However, browsers can fill this field for their own purpose either.