Homework2

Problem1

a. 文档请求是 `http://gaia.cs.umass.edu/cs453/index.html`

b. HTTP版本为1.1

c. 持续连接

d. 仅看HTTP消息的交换无法看到IP地址，IP地址在承载HTTP GET请求的TCP段中

e. 浏览器类型是Mozilla/5.0。提供浏览器类型能方便服务器有效地为不同类型的用户代理发送相同对象的不同版本。

Problem2

MTA代表邮件传输代理(Mail Transfer Agent)。主机将消息发送给MTA。然后，该消息遵循一系列MTA以到达接收者的邮件阅读器。

诚实的主机应该报告它收到消息的位置"by。在此消息中，`"asusus-4b96([58.88.21.177])"`不报告它收到电子邮件的位置的IP地址。而由于恶意者只有一个，所以"`asusus-4b96([58.88.21.177])`是恶意主机。

Problem3

```
1   ; <<>> DiG 9.10.6 <<>> +norecurse @a.root-servers.net any
    www.cs.sjtu.edu.cn
2   ; (1 server found)
3   ;; global options: +cmd
4   ;; Got answer:
5   ;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 64981
6   ;; flags: qr; QUERY: 1, ANSWER: 0, AUTHORITY: 8, ADDITIONAL: 11
7
8   ;; OPT PSEUDOSECTION:
9   ; EDNS: version: 0, flags:; udp: 1472
10  ;; QUESTION SECTION:
11  ;www.cs.sjtu.edu.cn.      IN   ANY
12
13  ;; AUTHORITY SECTION:
14  cn.      172800   IN   NS   a.dns.cn.
15  cn.      172800   IN   NS   b.dns.cn.
16  cn.      172800   IN   NS   c.dns.cn.
17  cn.      172800   IN   NS   d.dns.cn.
18  cn.      172800   IN   NS   e.dns.cn.
19  cn.      172800   IN   NS   f.dns.cn.
20  cn.      172800   IN   NS   g.dns.cn.
21  cn.      172800   IN   NS   ns.cernet.net.
22
23
```

在所有返回的cn DNS服务器中，我们向第一个服务器发送一个查询。

```
1   (base) husky@Huskys-MacBook-Pro ~ % dig +norecurse @a.dns.cn any
    www.cs.sjtu.edu.cn
2
3   ; <<>> DiG 9.10.6 <<>> +norecurse @a.dns.cn any www.cs.sjtu.edu.cn
4   ; (1 server found)
5   ;; global options: +cmd
6   ;; Got answer:
7   ;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 18387
8   ;; flags: qr; QUERY: 1, ANSWER: 0, AUTHORITY: 5, ADDITIONAL: 5
9
10  ;; OPT PSEUDOSECTION:
11  ; EDNS: version: 0, flags:; udp: 4096
12  ;; QUESTION SECTION:
13  ;www.cs.sjtu.edu.cn.    IN  ANY
14
15  ;; AUTHORITY SECTION:
16  edu.cn.     172800  IN  NS  ns2.cernet.net.
17  edu.cn.     172800  IN  NS  deneb.dfn.de.
18  edu.cn.     172800  IN  NS  ns2.cuhk.hk.
19  edu.cn.     172800  IN  NS  dns2.edu.cn.
20  edu.cn.     172800  IN  NS  dns.edu.cn.
21
```

在返回的权威DNS服务器中，我们向第四个服务器发送一个查询。

```
1   ; <<>> DiG 9.10.6 <<>> +norecurse @dns2.edu.cn any
    www.cs.sjtu.edu.cn
2   ; (1 server found)
3   ;; global options: +cmd
4   ;; Got answer:
5   ;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 26228
6   ;; flags: qr; QUERY: 1, ANSWER: 0, AUTHORITY: 2, ADDITIONAL: 5
7
8   ;; OPT PSEUDOSECTION:
9   ; EDNS: version: 0, flags:; udp: 1232
10  ;; QUESTION SECTION:
11  ;www.cs.sjtu.edu.cn.    IN  ANY
12
13  ;; AUTHORITY SECTION:
14  sjtu.edu.cn.    172800  IN  NS  dns.sjtu.edu.cn.
15  sjtu.edu.cn.    172800  IN  NS  apple.sjtu.edu.cn.
```

b) amazon.com：

```
1   ; <<>> DiG 9.10.6 <<>> +norecurse @a.root-servers.net any
    amazon.com
2   ; (1 server found)
3   ;; global options: +cmd
4   ;; Got answer:
5   ;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 1787
6   ;; flags: qr; QUERY: 1, ANSWER: 0, AUTHORITY: 13, ADDITIONAL: 27
7
8   ;; OPT PSEUDOSECTION:
9   ; EDNS: version: 0, flags:; udp: 4096
10  ;; QUESTION SECTION:
```

```
11   ;amazon.com.        IN   ANY
12
13   ;; AUTHORITY SECTION:
14   com.       172800   IN   NS   e.gtld-servers.net.
15   com.       172800   IN   NS   b.gtld-servers.net.
16   com.       172800   IN   NS   j.gtld-servers.net.
17   com.       172800   IN   NS   m.gtld-servers.net.
18   com.       172800   IN   NS   i.gtld-servers.net.
19   com.       172800   IN   NS   f.gtld-servers.net.
20   com.       172800   IN   NS   a.gtld-servers.net.
21   com.       172800   IN   NS   g.gtld-servers.net.
22   com.       172800   IN   NS   h.gtld-servers.net.
23   com.       172800   IN   NS   l.gtld-servers.net.
24   com.       172800   IN   NS   k.gtld-servers.net.
25   com.       172800   IN   NS   c.gtld-servers.net.
26   com.       172800   IN   NS   d.gtld-servers.net.
```

向第一个com DNS服务器发送请求：

```
1    (base) husky@Huskys-MacBook-Pro ~ % dig +norecurse @e.gtld-
     servers.net any amazon.com
2
3    ; <<>> DiG 9.10.6 <<>> +norecurse @e.gtld-servers.net any
     amazon.com
4    ; (1 server found)
5    ;; global options: +cmd
6    ;; Got answer:
7    ;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 24410
8    ;; flags: qr; QUERY: 1, ANSWER: 0, AUTHORITY: 6, ADDITIONAL: 1
9
10   ;; OPT PSEUDOSECTION:
11   ; EDNS: version: 0, flags:; udp: 4096
12   ;; QUESTION SECTION:
13   ;amazon.com.        IN   ANY
14
15   ;; AUTHORITY SECTION:
16   amazon.com.    172800   IN   NS   pdns1.ultradns.net.
17   amazon.com.    172800   IN   NS   pdns6.ultradns.co.uk.
18   amazon.com.    172800   IN   NS   ns1.p31.dynect.net.
19   amazon.com.    172800   IN   NS   ns3.p31.dynect.net.
20   amazon.com.    172800   IN   NS   ns2.p31.dynect.net.
21   amazon.com.    172800   IN   NS   ns4.p31.dynect.net.
```

Problem4

在计算C-S分发的最小分发时间时，我们使用以下公式：

$$D_{cs} = \max\{NF/u_s, F/d_{min}\}。 \tag{1}$$

同样地，在计算P2P分发的最小分发时间时，我们使用以下公式：

$$D_{p2p} = \max\left\{F/u_s, F/d_{min}, NF/\left(u_s + \sum_{i=1}^{N} u_i\right)\right\} \tag{2}$$

其中$F = 15\,Gb = 15 * 1024Mb$
$u_s = 30Mbps，d_{min} = d_i = 2Mbps，300\,Kbps = 300/1024Mbps$

Client Server

		N		
		10	100	1000
	300 Kbps	7680	51200	512000
u	700 Kbps	7680	51200	512000
	2 Mbps	7680	51200	512000

Peer to Peer

		N		
		10	100	1000
	300 Kbps	7680	25904	47559
u	700 Kbps	7680	15616	21525
	2 Mbps	7680	7680	7680