Project#1 Introduction to Computer Networks

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分工

- Part A：李浩东
-

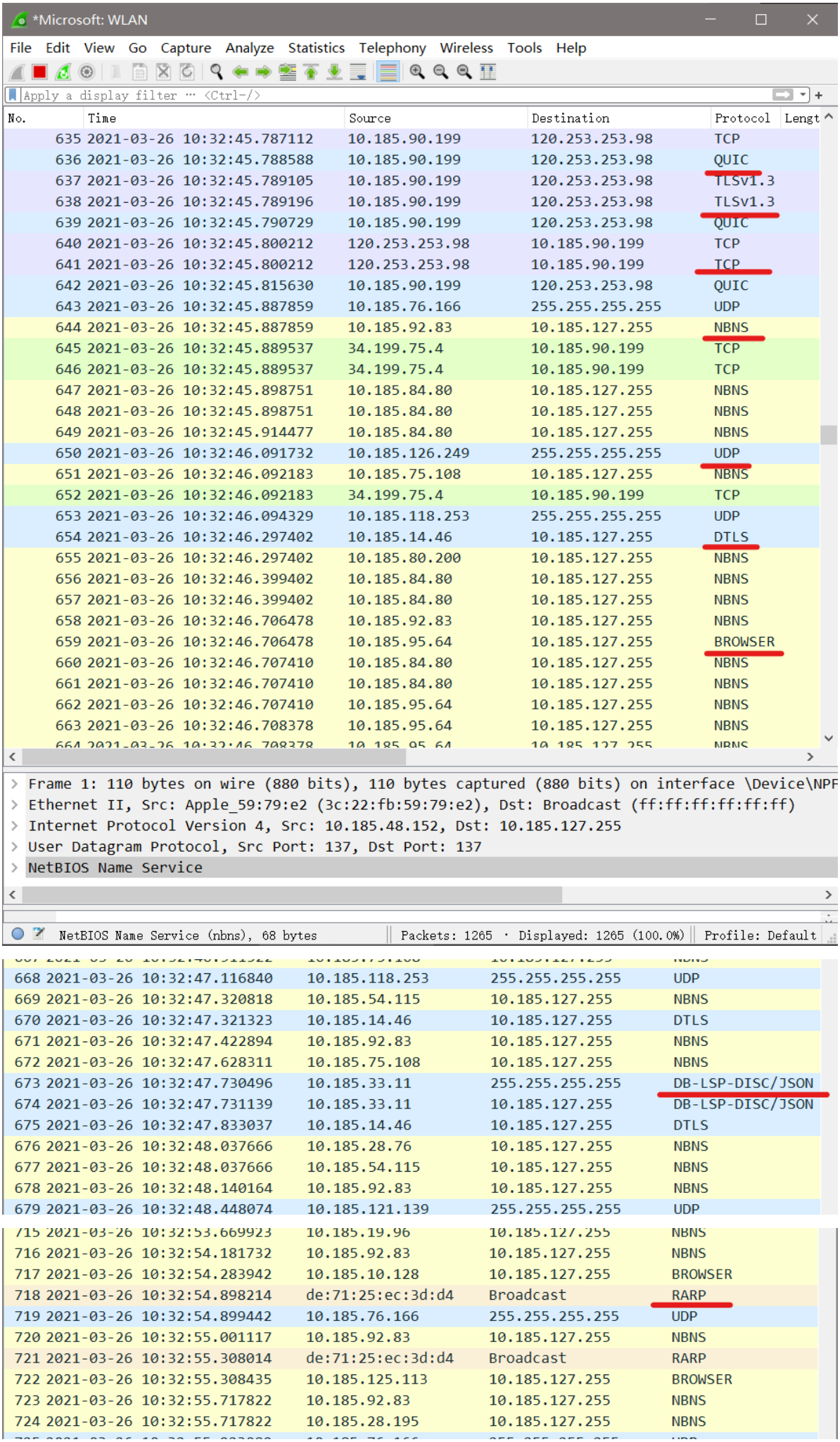
> 1. 60% for answering each question, and 40% for pointing out the correct part of the supporting material
> 2. the original questions and your answers right under the questions
> 3. include supporting material for your answers
> 4. explain how you get each answer by showing diagrams/screenshots when appropriate and highlighting the related fields

Part A

声明：由于访问http://gaia.cs.umass.edu/wireshark-labs/INTRO-wireshark-file1.html得到的`http`报文传输为`GET`与`Not Modofied`，而不是`GET`与`OK`，并且为了更好的体验`http`使用`TCP`的持续性串行连接，笔者将使用http://httpbin.org/替代原网站访问。

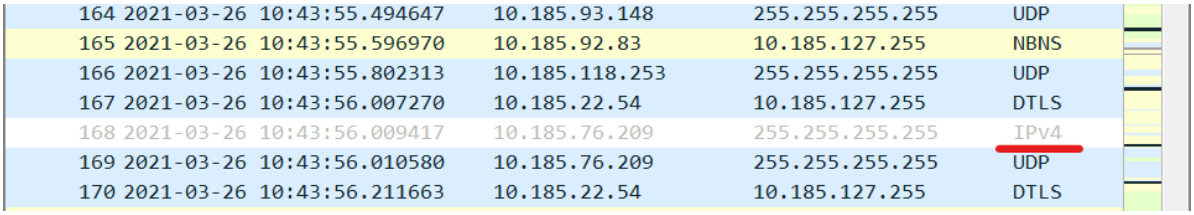
List up to 10 different protocols that appear in the protocol column in the unfiltered packet-listing window in step 7 above.

1. `QUIC`
2. `TLSv1.3`
3. `TCP`
4. `NBNS`
5. `UDP`
6. `DTLS`
7. `BROWSER`
8. `DB-LSP-DISC/JSON`
9. `RARP`
10. `IPv4`
11. `DNS`
12. `ARP`
13. `HTTP`

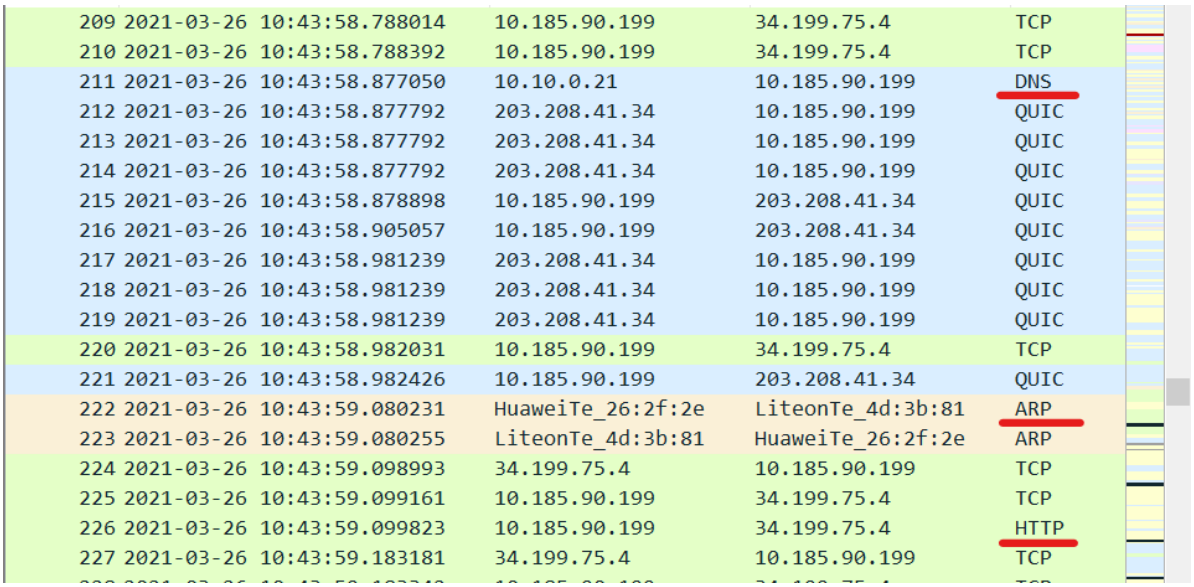


668	2021-03-26 10:32:47.116840	10.185.118.253	255.255.255.255	UDP
669	2021-03-26 10:32:47.320818	10.185.54.115	10.185.127.255	NBNS
670	2021-03-26 10:32:47.321323	10.185.14.46	10.185.127.255	DTLS
671	2021-03-26 10:32:47.422894	10.185.92.83	10.185.127.255	NBNS
672	2021-03-26 10:32:47.628311	10.185.75.108	10.185.127.255	NBNS
673	2021-03-26 10:32:47.730496	10.185.33.11	255.255.255.255	DB-LSP-DISC/JSON
674	2021-03-26 10:32:47.731139	10.185.33.11	10.185.127.255	DB-LSP-DISC/JSON
675	2021-03-26 10:32:47.833037	10.185.14.46	10.185.127.255	DTLS
676	2021-03-26 10:32:48.037666	10.185.28.76	10.185.127.255	NBNS
677	2021-03-26 10:32:48.037666	10.185.54.115	10.185.127.255	NBNS
678	2021-03-26 10:32:48.140164	10.185.92.83	10.185.127.255	NBNS
679	2021-03-26 10:32:48.448074	10.185.121.139	255.255.255.255	UDP

715	2021-03-26 10:32:53.669923	10.185.19.96	10.185.127.255	NBNS
716	2021-03-26 10:32:54.181732	10.185.92.83	10.185.127.255	NBNS
717	2021-03-26 10:32:54.283942	10.185.10.128	10.185.127.255	BROWSER
718	2021-03-26 10:32:54.898214	de:71:25:ec:3d:d4	Broadcast	RARP
719	2021-03-26 10:32:54.899442	10.185.76.166	255.255.255.255	UDP
720	2021-03-26 10:32:55.001117	10.185.92.83	10.185.127.255	NBNS
721	2021-03-26 10:32:55.308014	de:71:25:ec:3d:d4	Broadcast	RARP
722	2021-03-26 10:32:55.308435	10.185.125.113	10.185.127.255	BROWSER
723	2021-03-26 10:32:55.717822	10.185.92.83	10.185.127.255	NBNS
724	2021-03-26 10:32:55.717822	10.185.28.195	10.185.127.255	NBNS



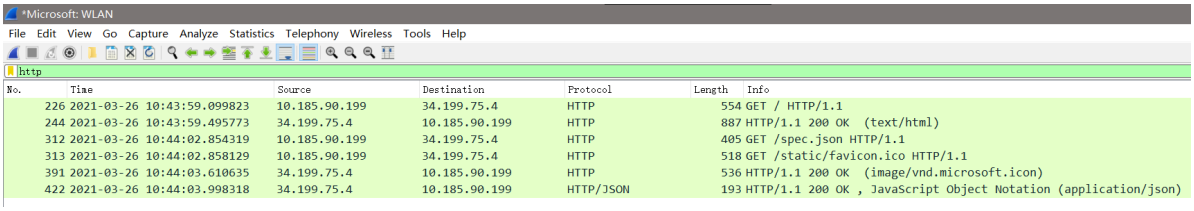
164	2021-03-26 10:43:55.494647	10.185.93.148	255.255.255.255	UDP
165	2021-03-26 10:43:55.596970	10.185.92.83	10.185.127.255	NBNS
166	2021-03-26 10:43:55.802313	10.185.118.253	255.255.255.255	UDP
167	2021-03-26 10:43:56.007270	10.185.22.54	10.185.127.255	DTLS
168	2021-03-26 10:43:56.009417	10.185.76.209	255.255.255.255	IPv4
169	2021-03-26 10:43:56.010580	10.185.76.209	255.255.255.255	UDP
170	2021-03-26 10:43:56.211663	10.185.22.54	10.185.127.255	DTLS



209	2021-03-26 10:43:58.788014	10.185.90.199	34.199.75.4	TCP
210	2021-03-26 10:43:58.788392	10.185.90.199	34.199.75.4	TCP
211	2021-03-26 10:43:58.877050	10.10.0.21	10.185.90.199	DNS
212	2021-03-26 10:43:58.877792	203.208.41.34	10.185.90.199	QUIC
213	2021-03-26 10:43:58.877792	203.208.41.34	10.185.90.199	QUIC
214	2021-03-26 10:43:58.877792	203.208.41.34	10.185.90.199	QUIC
215	2021-03-26 10:43:58.878898	10.185.90.199	203.208.41.34	QUIC
216	2021-03-26 10:43:58.905057	10.185.90.199	203.208.41.34	QUIC
217	2021-03-26 10:43:58.981239	203.208.41.34	10.185.90.199	QUIC
218	2021-03-26 10:43:58.981239	203.208.41.34	10.185.90.199	QUIC
219	2021-03-26 10:43:58.981239	203.208.41.34	10.185.90.199	QUIC
220	2021-03-26 10:43:58.982031	10.185.90.199	34.199.75.4	TCP
221	2021-03-26 10:43:58.982426	10.185.90.199	203.208.41.34	QUIC
222	2021-03-26 10:43:59.080231	HuaweiTe_26:2f:2e	LiteonTe_4d:3b:81	ARP
223	2021-03-26 10:43:59.080255	LiteonTe_4d:3b:81	HuaweiTe_26:2f:2e	ARP
224	2021-03-26 10:43:59.098993	34.199.75.4	10.185.90.199	TCP
225	2021-03-26 10:43:59.099161	10.185.90.199	34.199.75.4	TCP
226	2021-03-26 10:43:59.099823	10.185.90.199	34.199.75.4	HTTP
227	2021-03-26 10:43:59.183181	34.199.75.4	10.185.90.199	TCP

How long did it take from when the HTTP GET message was sent until the HTTP OK reply was received?

- when getting the TEXT/HTML
  - $Time = 59.099823 - 59.495773 = 0.395950 \quad (s)$
- when getting JavaScript Object Notation
  - $Time = 03.998318 - 02.854319 = 1.143999 \quad (s)$
- when getting img/vnd.microsoft.icon
  - $Time = 03.610635 - 02.858129 = 0.752506 \quad (S)$



Print the two HTTP messages displayed above.

We choose these two messages to dislay(the figure below).

Protocol	Length	Info
HTTP	554	GET / HTTP/1.1
HTTP	887	HTTP/1.1 200 OK (text/html)

- GET / HTTP/1.1

```
No.     Time                           Source                Destination           Protocol Length Info
    226 2021-03-26 10:43:59.099823     10.185.90.199         34.199.75.4           HTTP     554    GET / HTTP/1.1
Frame 226: 554 bytes on wire (4432 bits), 554 bytes captured (4432 bits) on interface \Device\NPF_{2185D483-DFDA-4A15-9370-
A13B7B9E1AA7}, id 0
Ethernet II, Src: LiteonTe_4d:3b:81 (3c:91:80:4d:3b:81), Dst: HuaweiTe_26:2f:2e (84:46:fe:26:2f:2e)
Internet Protocol Version 4, Src: 10.185.90.199, Dst: 34.199.75.4
Transmission Control Protocol, Src Port: 49808, Dst Port: 80, Seq: 1, Ack: 1, Len: 500
Hypertext Transfer Protocol
    GET / HTTP/1.1\r\n
    Host: httpbin.org\r\n
    Connection: keep-alive\r\n
    Cache-Control: max-age=0\r\n
    Upgrade-Insecure-Requests: 1\r\n
    User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/89.0.4389.90 Safari/
537.36\r\n
    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/
signed-exchange;v=b3;q=0.9\r\n
    Accept-Encoding: gzip, deflate\r\n
    Accept-Language: en-CN,en;q=0.9,zh-CN;q=0.8,zh;q=0.7,en-GB;q=0.6,en-US;q=0.5\r\n
    \r\n
    [Full request URI: http://httpbin.org/]
    [HTTP request 1/2]
    [Response in frame: 244]
    [Next request in frame: 312]
```

- HTTP/1.1 200 OK (text/html)

```
No.     Time                           Source                Destination           Protocol Length Info
    244 2021-03-26 10:43:59.495773     34.199.75.4           10.185.90.199         HTTP     887    HTTP/1.1 200 OK  (text/
html)
Frame 244: 887 bytes on wire (7096 bits), 887 bytes captured (7096 bits) on interface \Device\NPF_{2185D483-DFDA-4A15-9370-
A13B7B9E1AA7}, id 0
Ethernet II, Src: HuaweiTe_26:2f:2e (84:46:fe:26:2f:2e), Dst: LiteonTe_4d:3b:81 (3c:91:80:4d:3b:81)
Internet Protocol Version 4, Src: 34.199.75.4, Dst: 10.185.90.199
Transmission Control Protocol, Src Port: 80, Dst Port: 49808, Seq: 9000, Ack: 501, Len: 833
[8 Reassembled TCP Segments (9832 bytes): #236(239), #237(1460), #238(1460), #239(1460), #241(1460), #243(1460), #242(1460),
#244(833)]
Hypertext Transfer Protocol
    HTTP/1.1 200 OK\r\n
    Date: Fri, 26 Mar 2021 02:43:59 GMT\r\n
    Content-Type: text/html; charset=utf-8\r\n
    Content-Length: 9593\r\n
    Connection: keep-alive\r\n
    Server: gunicorn/19.9.0\r\n
    Access-Control-Allow-Origin: *\r\n
    Access-Control-Allow-Credentials: true\r\n
    \r\n
    [HTTP response 1/2]
    [Time since request: 0.395950000 seconds]
    [Request in frame: 226]
    [Next request in frame: 312]
    [Next response in frame: 422]
    [Request URI: http://httpbin.org/spec.json]
    File Data: 9593 bytes
Line-based text data: text/html (208 lines)
```

Part B