Objectives of this assignment:

* to trace packets over a network with multiple bridges.

Grading Guidelines:

(Exceptionally, you will not have to justify your answers for THIS assignment)

A right answer will get full credit when:

1. It is right (worth 90%)
2. It is right **AND** neatly presented making it easy and pleasant to read. (worth an **extra** 10%)
3. (Not applicable for THIS assignment) There is an **obvious and clear link** between 1) the information provided in the exercise and in class and 2) the final answer. A clear link is built by properly writing, justifying, and documenting an answer (worth an **extra** 00%).
4. (Not applicable for THIS assignment) Calculation mistakes will be minimally penalized (2 to 5% of full credit) while errors on units will be more heavily penalized.

**Late Submission** : as specified in the syllabus. Days counting starts one minute after the deadline.

You are welcome/encouraged to discuss exercises with other students or the instructor. But, ultimately, **personal** writing is expected.

* USE THE HOMEWORK ASSIGNMENT AS THE STARTING DOCUMENT YOU WILL TURN IN. **DO NOT DELETE ANYTHING FROM THIS FILE:** JUST **INSERT** YOUR ANSWERS.
* IF USING HAND WRITING (STRONGLY DISCOURAGED), **USE THIS FILE** BY CREATING SUFFICIENT SPACE AND WRITE IN YOUR ANSWERS.
* FAILING TO FOLLOW TURN IN DIRECTIONS /GUIDELINES WILL COST **A 30% PENALTY.**

What you need to do:

Answer the questions described below.

Packet Tracing Exercise (100 points)

Use the data and diagram to show the frames resulting from the command "**Telnet B**" being executed on Host A. Use the answer sheet. There may be more lines than frames. You must also update the ARP caches and bridges' tables as you trace frames. Do not forget to update these caches while packet tracing.

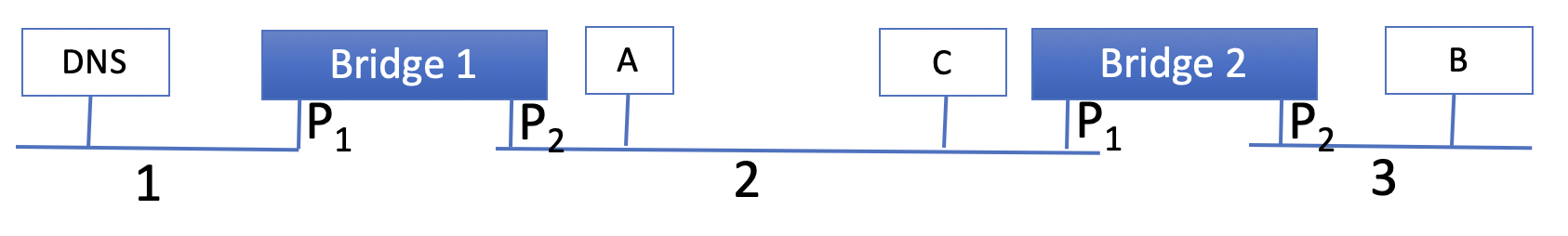
**Assumptions**: the diagram consists of 3 numbered Ethernet segments (1 to 3), 2 bridges (B1 and B2), and hosts A, B, C, and DNS. **Host DNS is the DNS** server and its IP address is known to all machines. ARP and bridges caches are initially empty. For each bridge, the ~~right~~ **left** port is labeled P1 and the ~~left~~ **right** port is labeled P2. Tables on bridges are empty.. There are two questions **a)** and **b).**

**Host A** : 131.204.99.10/24, Ethernet address is EA.

**Host B** : 131.204.99.21/24, Ethernet address is EB.

**Host C** : 131.204.99.34/24, Ethernet address is EC.

**Host DNS** : 131.204.99.5/24, Ethernet address is ED.

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Fill in the answer sheet below until the third TCP handshake segment is received. **In question b),** below, you must update the ARP caches and bridges' tables. Therefore, **do not forget** to update these while answering Question a). Stop when the third TCP handshake segment is received by the server.

a) **(80 Points**) Fill in the packet tracing table below

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Phy.** | **Data Link Layer** | | | **Network Layer** | | | **Transport Layer** | | | **Application/Comment** |
| Seg. | Dst. | Src | Type | Dest. | Src | Prot. # | Dst. | Src | Flags |  |
| 2,1,3 | 0xFFFFFFFF | EA | Arp Request | 131.204.99.5 | 131.204.99.10 | N/A | N/A | N/A | N/A |  |
| 1,2 | EA | ED | ARP Response | 131.204.99.10 | 131.204.99.5 | N/A | N/A | N/A | N/A |  |
| 2,1 | ED | EA | IP | 131.204.99.5 | 131.204.99.10 | 17 | 53 | Some Number X | N/A | DNS request |
| 1,2 | EA | ED | IP | 131.204.99.10 | 131.204.99.5 | 17 | X | 53 | N/A | DNS response |
| 2,3,1 | 0xFFFFFFFF | EA | ARP Request | 131.204.99.21 | 131.204.99.10 | N/A | N/A | N/A | N/A |  |
| 3,2 | EA | EB | ARP Response | 131.204.99.10 | 131.204.99.21 | N/A | N/A | N/A | N/A |  |
| 2,3 | EB | EA | IP | 131.204.99.21 | 131.204.99.10 | 6 | 23 | Y | SYN | SYN 2 open TCP |
| 3,2 | EA | EB | IP | 131.204.99.10 | 131.204.99.21 | 6 | Y | 23 | SYN/ACK | SYN/ACK handshake |
| 2,3 | EB | EA | IP | 131.204.99.21 | 131.204.99.10 | 6 | 23 | Y | ACK | ACK handshake |
|  |  |  |  |  |  |  |  |  |  |  |
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b) **(20 Points**) Provide the contents of all ARP and bridges caches after the third TCP handshake segment is received by the server. Use the same format on the lectures to describe the caches.

ARP Cache

Host A

|  |  |
| --- | --- |
| IP Address | MAC Address |
| 131.204.99.5 | ED |
| 131.204.99.21 | EB |

Host B

|  |  |
| --- | --- |
| IP Address | MAC Address |
| 131.204.99.10 | EA |
|  |  |

Host C

|  |  |
| --- | --- |
| IP Address | MAC Address |
|  |  |
|  |  |

DNS

|  |  |
| --- | --- |
| IP Address | MAC Address |
| 131.204.99.10 | EA |
|  |  |

Bridge Cache 1

|  |  |
| --- | --- |
| MAC Address | Port # |
| EA | P2 |
| ED | P1 |
| EB | P2 |

Bridge Cache 2

|  |  |
| --- | --- |
| MAC Address | Port # |
| EA | P1 |
| ED | P1 |
| EB | P2 |

**What you need to turn in**:

* Electronic copy of this file (including your answers) (standalone).
* You are welcome/encouraged to discuss exercises with other students or the instructor. But, ultimately, personal writing is expected.