**Questions 5 - Solutions**

1)

1) You typed amazon.com in the web browser and clicked enter.

2) Your computer generated a request message and sent this request message to the server of amazon.com that best suits your location.

3) The message went through different POPs and different ISPs and reached one of the Amazon servers.

4) Amazon web server understood that you request the files of the website. For this reason, it created a response message and put all the information about the web page into this response message. (Images, Videos, Links, HTML File and etc.)

5) Web Server sent the response message to you. The response message went through different POPs and different ISPs and reached your computer.

6) Web browser obtained the necessary information from the response message and rendered the page on your screen.

2)

Packets move through a different path each time because routing tables are constantly changing. Many (excessive) events happen every second on the Internet that human perception cannot perceive. For this reason, the processors in the router are constantly making new calculations and changing the routing tables. For this reason, even 2 different packets sent to the same destination consecutively can go on completely different routes.

3)

First of all, you should know the meaning of the refreshing process. If you were on a web page, refreshing the page would bring up the most recent content published on that page. Essentially, you're asking the webpage to send your computer the newest version of the page you're viewing.

Back to my question, if you send a new request message to the server, the server will never question your request and send you the response message you want again. Because the servers do not keep any state information about whether they send you a response message shortly before or not.

The situation that the server stores status information about users complicates the software but we don't like complex solutions in computer science!! We always prefer easy and efficient ways. Hence, instead of more complex software, each time you send a request message to the server, the server will quickly send you a response message.

\*\*\*If you want more detailed information, I recommend that you should research the concepts of HTTP and Stateless. However, these topics are beyond the scope of this course.

4)

1) Distributed Server Structure: It is a very organized structure spread all over the world.

2) Peering: It is a method that allows 2 networks to connect and exchange traffic directly without having to pay a third party to carry traffic across the Internet. According to statistics, communication with Google Servers is almost 10 times faster by using a peering connection.

5)

We call the universal network of global ISPs as Internet Backbone. I mean all global ISPs come together and form the Internet Backbone. We can think of it as the core of the communication of the whole world.

6)

\*There are both technical and economic reasons for this.

1) First of all, we never want a 'Single Point of Failure' to occur and if there was only one global ISP in the world at a single point, we would have to tackle problems with 'Single Point of Failure' and load balancing. I am sure that you can currently analyze this situation very well.

2) Global ISP means communication between countries, and which means a lot of money. Hence, companies that can do business with international competence are very willing to provide global ISP services. By the way, I'm talking about a very serious amount of money so there is serious competition among global ISPs.

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7)

IXP basically represents the structures that Global ISPs are connected to in order to work synchronously. There is no single IXP. There are several ISPs and the Internet Backbone works efficiently thanks to these IXPs.

8)

In fact, there is a very nice hierarchical and balanced relationship between ISPs. I mean, the hierarchy on the internet was really smooth and efficient. However, giant companies such as Google, Amazon, or Facebook have started to use different structures such as peering instead of using the current infrastructure of the ISPs to reach their customers faster. As a result, the hierarchy of ISPs has started to deteriorate gradually. Because these giant companies started to cover more space than ISPs. They want to access almost everywhere directly. Please do not confuse these giant companies with ISPs. Their aims are different.