Sheet 7 - Sol

I Solve the following *Review Problems* from *Computer Science: An Overview*:

- **4.11**
  An internet is a network of networks that allows messages to be transferred form one network to another. In an internet, each computer has two addresses associated with it. One is the computer's network address; the other is the computer's internet address. Each network within an internet maintains its own internal characteristics, which may not be the same as those in the other networks. On the other hand, the Internet refers to a particular, worldwide internet that spans the world.
- **4.13**

Population of the world	$\approx 7{,}000{,}000{,}000$	$\approx 2^{32.7}$
Addresses per person (using 32 bits)	$\approx 2^{32}/2^{32.7}$	< 1
Addresses per person (using 128 bits)	$\approx 2^{128}/2^{32.7}$	$\approx 2^{95.3}$

- **4.14**
  a) `5.18.35` b) `128.32` c) `48.24`
- **4.15**
  a) `0000000000000000`
  b) `00011010000100110000000 1`
  c) `00001000000011000001010000001101`
- **4.25**
  The *Internet* is a world-wide network of computer networks. The *World Wide Web* is a collection of hypertext documents available on the Internet.
- **4.27**

`<title>`	Defines a title for the document
`<h1> to <h6>`	Define HTML headings
`<p>`	Defines a paragraph
`<img>`	Defines an image
`<a>`	Defines a hyperlink

  You can find more here: http://www.w3schools.com/tags/default.asp
- **4.28**

```
<html>
   <head>
      <title>Example</title>
   </head>
   <body>
      <h1>My Pet Dog</h1>
      <p>My dog's name is <a href = "http://en.wikipedia.org/wiki/Rover_Dangerfield">Rover</a>.</p>
   </body>
</html>
```

- **4.29**

My Pet Dog

- **4.40**

Application layer:	Constructs a message with the IP address of the final destination.
Transport layer:	Chops messages into manageable units (packets) and attaches a sequence number to them.
Network layer:	Handles routing packets through the Internet from source to destination.
Link layer:	Handles the actual transmission of a packet between two directly connected nodes.

- **4.41**
  Small packets will interweave with other traffic in the Internet more easily than large units, leading to a more efficient communication system.

II Answer the following questions:

1.

a) A *protocol* is a rule or set of rules governing communication.
b) *DNS* (Domain Name Server) translates mnemonic address to IP address
c) A web *browser* is a client program that presents hypertext documents to the user. {Chrome, Firefox}
d) A *URL* (Uniform Resource Locator) is given a unique address for a document on the World Wide Web {https://www.facebook.com/,http://bu.edu.eg/staff/islam.elshaarawy-courses/12145}
e) *HTML* (Hypertext Markup Language) is a markup language used for writing web pages.
f) A *Malware* is a malicious software that attack computer systems. {Viruses, Worms, Trojan Horses, Spyware, Phishing Software}
g) *Denial of Service* attack is overwhelming a computer system with unwanted messages to disrupt or halt it.
h) A *Spam* is an unwanted junk email sent to a large number of recipients.
i) An *antivirus* is a software used to detect and remove the presence of known viruses and other infections.
j) A *firewall* is system that filters traffic passing through a point in a network.
k) A *spam filter* is a firewall designed to block unwanted/spam email.
l) *http*: Hypertext Transfer Protocol, *ftp*: File Transfer Protocol, *https*: Secure http, *ftps*: Secure ftp

2.

All of them are *Network Interconnect Devices* but
Repeater: Extends **a** network
Bridge: Connects **two** compatible networks
Switch: Connects **several** compatible networks
Router: Connects two **incompatible** networks resulting in a network of networks called an internet

3.

CSMA/CD and *CSMA/CA* are two protocols for controlling the right to transmit a message in a network:

CSMA/CD	*CSMA/CA*
Carrier Sense Multiple Access with Collision Detection	Carrier Sense Multiple Access with Collision Avoidance
When two nodes transmit at the same time, collision is detected and transmission is restarted	Avoids collision by not allowing more than one node to transmit at any time
Does not suit wireless networks because of *Hidden Terminal Problem*	Suit both wired and wireless networks but it introduces overhead
Used mostly in wired installations	Used mostly in wireless installations

4.

Client/Server and Peer-to-Peer(P2P) are two process communication architectures

Client/Server	*Peer-to-Peer*
One process (the server) providing a service to numerous others (clients)	Two processes that provide service to and receive service from each other
Server process must execute continuously so that it is prepared to serve its clients at any time	Processes execute on a temporary basis
{File Server, Print Server}	{Instant Messaging, Torrent}

5.

Client-side activities are those activities performed by a client (such as a browser).
{JavaScript, Java Applet, Macromedia Flash}
Server-side activities are those activities performed by the server.
{ASP, JSP, PHP}

6.

TCP and *UDP* are two *Transport Layer* protocols

	TCP protocol	*UDP* protocol
Establishes a connection with the destination before sending a message.	Yes	No
Uses ACK and packet retransmission to ensure successful transmission.	Yes	No
More Reliable	Yes	No
More Efficient	No	Yes