BSCCS2003: Practice Questions with Solutions
Week 1

1. Which component is responsible for executing the business logic in the MVC architecture?
   Note: No space or uppercase letter is allowed in the answer. Please enter the answer as a singular noun only.

   √ controller

   Solution: The controller directs the model and the view.
   It is also responsible for executing the business logic of the application.

2. Suppose a client machine C is communicating with a data center D located 10,000 km away from C. Assume that the TCP connection has been established and is kept alive. If each new request can be sent only after receiving an acknowledgement from D for the previous request, then what is the maximum number of requests that can be sent from C to D in one second? (Assume speed of light in cable is 2e8 m/s).

   √ 10

   Solution: Recall that,

   $$Speed = \frac{Distance \text{ (in m)}}{Time \text{ (in s)}}$$

   $$\implies Time = \frac{Distance \text{ (in m)}}{Speed \text{ (in m/s)}}$$

   So,

   $$time = \frac{10^7 \text{ m}}{2 \times 10^8 \text{ m/s}}$$

   $$\implies time = 50 \text{ ms}$$

   The round trip time $= 50 \times 2 = 100$ ms.

   Number of requests in one second $=$

   $$\frac{1000 \text{ ms}}{100 \text{ ms}}$$

$\implies$ 10 requests

Therefore, the answer is **10 requests / s**.

3. How many port numbers are available in total for communication between devices in TCP?

   ◯ 131072
   ◯ 65530
   √ 65535
   ◯ 32768

Solution: The size of source or destination port field in TCP header is 16 bits.
So, total number of ports possible = 2^{16} i.e, 65536.
But the port 0 (zero) is reserved and cannot be used for communication.
Therefore, total available port numbers are : $65536 - 1$ i.e, **65535**.

4. How many bits are there in an IPv4 address?

   √ 32

Solution: There are 4 octets (each separated by a period) in a typical IPv4 address and each octet uses 8 bits.
So, 4 octets use 8×4 i.e, 32 bits. Therefore, the size of an IPv4 address is **32 bits**.

5. How many bits are there in an IPv6 address?

   √ 128

Solution: IPv6 is a hexadecimal address which uses 8 sets of 16 bits each (each set separated by a colon).
Each set has 4 hexadecimal characters and each hexadecimal character uses 4 bits.
So, 8 sets use 8×16 i.e, 128 bits. Therefore, the size of an IPv6 address is **128 bits**.

6. Read the following statements below carefully and choose the correct option.
   Statement I: In a packet switched network, the transfer of information is not only confined to voice.
   Statement II: The information in packet switched networks is transferred in the form of packets of data.

√ Both statement I and Statement II are correct.

◯ Both statement I and Statement II are incorrect.

◯ Statement I is correct, Statement II is incorrect.

◯ Statement I is incorrect, Statement II is correct.

Solution: In packet switched networks, the analog voice data is digitized and broken down into packets of information which are then sent through the wires. This means that, before being digitized, the information may be of any form, not just voice.

7. Which among the following options is incorrect about HTTP?

◯ It is a set of rules which web browsers and web servers use for communication.

◯ It is a stateless protocol.

◯ It generally uses port 80 for communication.

√ It generally uses port 25 for communication.

Solution: Hypertext Transfer Protocol (HTTP) is a set of rules that clients and servers in a network use for communication. It is a stateless protocol i.e. all the communications are independent. Server does not need to store any information about previous communication in order to respond to future requests.

Port 80 is the default port for HTTP services.

8. Which of the following is not a valid HTTP request method?

◯ GET

◯ POST

◯ DELETE

√ UPDATE

Solution: GET, POST, DELETE are HTTP methods. GET is used to ask for a resource from the server. POST is used to send data to the server. DELETE is used to delete resource on the server. UPDATE is not an HTTP method. PUT is used to replace the current representation of targeted resource with the payload.

9. Consider the server response shown below:
HTTP/2.0 200 OK
Which of the following is true?

◯ **HTTP/2.0** indicates that it is connected to Web 2.0.
◯ **200** is a version of the protocol.
◯ **OK** is a status code.
√ None of the above

Solution: HTTP/2.0 200 OK

- **HTTP/2.0** is a version of the protocol.
- **200** is a status code.
- **OK** is a status message.

10. Which of the following is/are valid IPv4 address(es)?

√ 1.2.3.4
◯ 192.102::2.1
√ 192.102.2.1
◯ 2001:db8::1234:5678

Solution: An IPv4 address has the format x.x.x.x, where x is called an octet and must be a decimal value between 0 and 255. Octets are separated by periods. An IPv4 address must contain three periods and four octets.
192.102.2.1 and 1.2.3.4 are valid IPv4 addresses.
2001:db8::1234:5678 is a valid IPv6 address.

11. Which of the following statements is/are false?

√ A web server is a software that must be used in a web browser.
√ A web client is a software that listens to requests and respond to them.
◯ Laptop and android smartphone can act as a web server host.
◯ A browser can make a request to a server without a domain name.

Solution:

- A **web app** is a software that can be used in a web browser.
- A **web server** is a software that can listen to requests and respond to them.
- Laptop and android smartphone can act as a web server host.
- A browser can make a request to a server without a domain name.