Assignment 1

Ques-1: How Https work behind the Scene?

Ans:

a- Https is secure version of Http, In Simple word Http over TLS(Transport Layer securities)/SSL(Secure Socket layer).

b- Https do two different thing-

b:1-Encrypt data you send to/from Website.

b:2-Authenticate the Website Identity.

c-To achieve this security in https, public key Infrastructure(PKI) is used because public keys can be used by several web browser while private key can be used by web server of that particular website. The distribution of these public key is done via certificates which are maintained by browser.

d-First of all, Browser uses a SSL/TLS certificate(Used to authenticate each https website) to identify a website, the website send it SSL/TLS certificate to your web browser for verification, if verification confirm request is processed further where Client makes a request to the server over HTTPS. Server sends a copy of its SSL certificate + public key. After verifying the identity of the server , client(browser) generates a secret session key, encrypts it using the server's public key and sends it. Server decrypts the secret session key using its private key and sends an acknowledgment to the client. Secure channel established."

Ques-2:What are different http methods available and what they exactly do?

Ans-Following are the Http method are-

a-**GET**: A GET request retrieves data from a web server by specifying parameters in the URL portion of the request. This is the main method used for document retrieval.

b-**HEAD:** The HEAD method is functionally similar to GET, except that the server replies with a response line and headers, but no entity-body.

c-**POST:** A POST request is used to send data to the server, for example, customer information, file upload, etc. using HTML forms.

d- **PUT:** The PUT method is used to request the server to store the included entity-body at a location specified by the given URL.

e- **DELETE**: The DELETE method is used to request the server to delete a file at a location specified by the given URL.

f- **CONNECT**: The CONNECT method is used by the client to establish a network connection to a web server over HTTP.

g- **OPTIONS**: The OPTIONS method is used by the client to find out the HTTP methods and other options supported by a web server.

h- **TRACE:** The TRACE method is used to echo the contents of an HTTP Request back to the requester which can be used for debugging purpose at the time of development.

Ques-3:Understand and explain the use of various Http response code?
Ans - Responses are grouped in five classes as follow:

1-Information Response-

1-a: **100 Continue:** The server has received the request headers and the client should proceed to send the request body.

1-b: **101 Switching Protocols:** The requester has asked the server to switch protocols and the server has agreed to do so

1-c: **102 Processing:** This code indicates that the server has received and is processing the request, but no response is available yet.

1-d: **103 Early Hints :** Used to return some response headers before final HTTP message.

2-Sucessful Response-

2-a: **200 OK:** Standard response for successful HTTP requests. The actual response will depend on the request method used.

2-b:**201 Created**: The request has succeeded and a new resource has been created as a result. This is typically the response sent after POST requests, or some PUT requests.

2-c: **202 Accepted:** The request has been accepted for processing, but the processing has not been completed.

2-d: **203 Non-Authoritative Information:** This response code means the returned meta-information is not exactly the same as is available from the origin server, but is collected from a local or a third-party copy.

2-e: **204 No Content:** The server successfully processed the request, and is not returning any content.

2-f: **205 Reset Content:**Tells the user-agent to reset the document which sent this request.

3-Redirection message-

3-a: **300 Multiple Choice:** The request has more than one possible response. The user-agent or user should choose one of them.

3-b: **301 Moved Permanently:** The URL of the requested resource has been changed permanently. The new URL is given in the response.

3-d: **302 Found:** This response code means that the URI of requested resource has been changed temporary. Therefore, this same URI should be used by the client in future requests.

3-e: **303 See Other:**The server sent this response to direct the client to get the requested resource at another URI with a GET request.

3-f: **304 Not Modified:**This is used for caching purposes. It tells the client that the response has not been modified, so the client can continue to use the same cached version of the response.

4-Client error Response-

4-a: **400 Bad Request**: The server could not understand the request due to invalid syntax.

4-b**:401 Unauthorized:** Although the HTTP standard specifies "unauthorized". That is, the client must authenticate itself to get the requested response.

4-c:**402 Payment Required :** This response code is reserved for future use. The initial aim for creating this code was using it for digital payment systems, however this status code is used very rarely and no standard convention exists.

4-d**:403 Forbidden:** The client does not have access rights to the content; that is, it is unauthorized, so the server is refusing to give the requested resource.

4-e: **404 Not Found:** The server can not find the requested resource. In the browser, this means the URL is not recognized.

5-Servor error response-

5-a: **500 Internal Server Error:** The server has encountered a situation it doesn't know how to handle.

5-b**:501 Not Implemented:** The request method is not supported by the server and cannot be handled.

5-c**:502 Bad Gateway:** This error response means that the server, while working as a gateway to get a response needed to handle the request, got an invalid response.

5-d: **503 Service Unavailable:**The server is not ready to handle the request. Common causes are a server that is down for maintenance or that is overloaded.

5-e: **504 Gateway Timeout:**This error response is given when the server is acting as a gateway and cannot get a response in time.

5-f: **505 HTTP Version Not Supported:**The HTTP version used in the request is not supported by the server.

Ques-4: What are different web communication protocol and their use cases?

Ans -Different type of protocol are as follow-

1- **Transmission Control Protocol (TCP):**

a- TCP is a connection-oriented protocol, which means a connection is established and maintained until the application programs at each end have finished exchanging messages

b- TCP handles congestion and flow control by controlling the window size. & reacts to congestion by reducing the sender window size.

c- It is Full Duplex ,Transport layer protocol and TCP divides the data into chunks where each chunk is a collection of bytes.

2**-User Datagram Protocol (UDP):**

a- UDP is a alternative communication protocol to Transmission Control Protocol implemented primarily for creating loss-tolerating and low-latency linking between different applications.

b- It basically used in video calling. And it is not connection oriented.

3**-Post office Protocol (POP):**

a- POP is designed for receiving incoming E-mails.

b- It is an application layer protocol and connection oriented.

c- POP uses TCP at the transport layer.

d- POP uses port number 110.

4-**Simple mail transport Protocol (SMTP):**

a- SMTP is designed to send and distribute outgoing E-Mail.

b- SMTP server listens for a connection and initiates a connection on that port. and the connection is established.

c- Client informs the SMTP server that it would like to send a mail. and the server is ok, then client sends the mail to its mail server.

d- SMTP uses port number 25.

5- **File Transfer Protocol (FTP):**

FTP establishes two TCP connections between the client and the server.

a- One connection is used for transferring data.
b- Other connection is used for transferring control information.
c- FTP allows users to transfer files from one machine to another. Types of files may include program files, multimedia files, text files, and documents, etc. and it is not used on web apps it need intranet.
d- It is a connection oriented protocol and FTP requires the connection establishment between the client and server before transferring the files. So, both have to be online at the same time. that is why, emails are not sent using FTP.

6**-Hyper Text Transfer Protocol (HTTP):**

a- HTTP is short for Hyper Text Transfer Protocol .and It is an application layer protocol.
b- It is mainly used for the retrieval of data from websites throughout the internet and It works on the top of TCP/IP suite of protocols.
c- HTTP connections can be of two types-
    1- Non-persistent HTTP connection.
    2- Persistent HTTP connection.

7**-Hyper Text Transfer Protocol Secure (HTTPS):**

a-HTTPS is abbreviated as Hyper Text Transfer Protocol Secure is a standard protocol to secure the communication among two computers one using the browser and other fetching data from web server.

b-HTTP is used for transferring data between the client browser (request) and the web server (response) in the hypertext format, same in case of HTTPS except that the transferring of data is done in an encrypted format.

8-**Domain Name Service(DNS):**

a- DNS is a host name to IP Address translation service.

b-It converts the names we type in our web browser address bar to the IP Address of web servers hosting those sites.

c- DNS uses UDP at the transport layer protocol. SO it is a connection less protocol.

Ques-5: Pros and cons of single page and multi page application?

Ans-**Single Page**-

Pros-

a-All resources loaded during one session. Only necessary data is changed while interacting .this approach help to increase the performance of web app.

b- After the first request to the server, all the necessary local data is stored in the cache, and that provides users with the possibility to work in an offline mode.

c-It increase the reusability of code.

Cons-

a- If the platform is complex, large, and poorly optimized, browsers will take more time to load the content.

b- If users disable JS in their browser, they will not be able to use the app to its fullest.

Multi-Page-

Pros-

a- This architecture type allows creating as many new pages for each product you like and implementing any changes in them.

b- Each page have different html page and each render on server. and each of them can be optimized for a specific group of requests to get free organic traffic from Google.

Cons-

a- In case of a large number of requests and the necessity to reload a large number of pages, performance and speed will down.
b- these components of a web app are deeply integrated, and that is why it can take longer to develop and test them.