AT Lab1 Assignment

Q1) What is Plagiarism? What kind of steps should be taken to avoid it?

Plagiarism is the "wrongful appropriation" and "stealing and publication" of another author's "language, thoughts, ideas, or expressions" and the representation of them as one's own original work.

Following are the steps to avoid Plagiarism:

- Keep track of the sources you consult in your research.
- Paragraph or quote form your sources (and add your own ideas).
- Credit the original author in an in-text citation and reference list.
- Use a plagiarism checker before you submit.

Q2) What is Intellectual Property Right (IPR)? Why should we know it?

- Intellectual property rights are the rights given to persons over the creations of their mind**s**. They usually give the creator an exclusive right over the use of his/her creation for a certain period of time. Intellectual property rights are customarily divided into two main areas: (i) Copyright and rights related to copyright. (ii) Industrial Property.
- We should know the Intellectual Property Right as Strong IP rights help consumers make an educated choice about the safety, reliability, and effectiveness of their purchases. Enforced IP rights ensure products are authentic, and of the high-quality that consumers recognize and expect. IP rights foster the confidence and ease of mind that consumers demand and markets rely on.

Q3) What is the difference between URI and URL?

URL	URI
URL is used to describe the identity of an item.	URI provides a technique for defining the identity of an item.
URL links a web page, a component of a web page or a program on a web page with the help of accessing methods like protocols.	URI is used to distinguish one resource from other regardless of the method used.
URL provides the details about what type of protocol is to be used.	URI doesn’t contains the protocol specification.
URL is a type of URI.	URI is the superset of URL.

Q4) What is the maximum length of URL string?

Maximum Length of URL string is 2083 characters.

Q5) What are the different protocols understood by browsers?

The different types of protocols are:

- Transmission Control Protocol (TCP)
- Simple mail transport Protocol (SMTP)
- File Transfer Protocol (FTP)
- Hyper Text Transfer Protocol (HTTP)
- Address Resolution Protocol(ARP)
- Real-Time Transport Protocol(RTP)

Q6)What is the difference between HTTP and HTTPS?

The major differences are:

- In HTTP, URL begins with “http://” whereas URL starts with “https://”
- HTTP uses port number 80 for communication and HTTPS uses 443
- HTTP is considered to be unsecure and HTTPS is secure
- HTTP Works at Application Layer and HTTPS works at Transport Layer
- In HTTP, Encryption is absent and Encryption is present in HTTPS as discussed above
- HTTP does not require any certificates and HTTPS needs SSL Certificates

Q7) What is port number? What is the significance of it? What do you mean by reserved and unreserved port number? List some reserved port numbers of some popular applications.

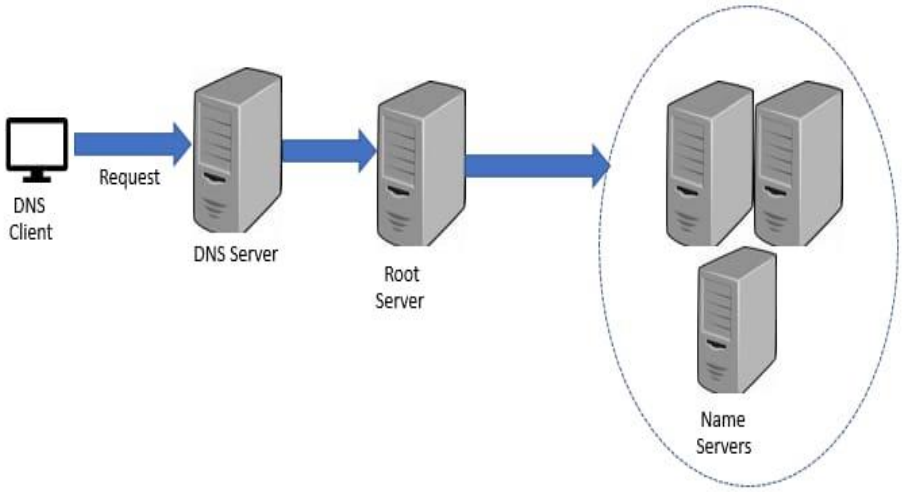
A port number is the logical address of each application or process that uses a network or the Internet to communicate. A port number uniquely identifies a network-based application on a computer. Each application/program is allocated a 16-bit integer port number. This number is assigned automatically by the OS, manually by the user or is set as a default for some popular applications. A port number primarily aids in the transmission of data between a network and an application. Port numbers work in collaboration with networking protocols to achieve this. For example, in an incoming message/packet, the IP address is used to identify the destination computer/node, whereas the port number further specifies the destination application/program in that computer. Similarly, all outgoing network packets contain application port numbers in the packet header to enable the receiver to distinguish the specific application. Port numbers 0 to 1024 are reserved for privileged services and designated as well-known ports. This list of port numbers are specified in RFC 1700. List of port numbers of some application:

Application	Port
HTTP	80,8080
FTP	20 t0 21
SNMP	161 to 162
MySQL	3306
Oracle SQL	1521, 1522, 1525, 1529
Webcam XP	8080, 8090
iTunes	3689
Yahoo Messenger	5010

Q8)What is DNS? Draw the architecture of DNS. List out types of DNS. Briefly explain the working of DNS

The Domain Name System is a hierarchical and decentralized naming system for computers, services, or other resources connected to the Internet or a private network. It associates various information with domain names assigned to each of the participating entities.

- Architecture of DNS:



- Types of DNS
  - Recursive resolvers
  - Root nameservers
  - TLD nameservers,
  - authoritative nameservers

- Working of DNS :

Computers address each other with numbers called IP addresses. However, remembering IP addresses is not an easy task for humans, who prefer to give things named. DNS is a useful system that ties names to IP addresses. DNS automatically converts the names we type in our web browser address bar to the IP addresses of web servers those specific sites requested. Therefore, when you enter a domain name, (e.g. google.com) your computer will find your nearest DNS server and ask it what the correct IP address is for that name. Then, the DNS will return the IP address and your computer can then address the relevant machine and display the requested website.

Q9) What is URL encoding? What is use of it?

URL encoding is the practice of translating unprintable characters or characters with special meaning within URLs to a representation that is unambiguous and universally accepted by web browsers and servers. ASCII control characters – Unprintable characters typically used for output control.

Q10)What are MIME types? Give examples.

MIME or Multipurpose Internet Mail Extension is a standard system which is used for identifying the type of data contained in a file based on its extension. It is used to send binary files across the Internet as attachments to e-mail messages. It is an Internet protocol.

Examples:

- text/html
- video/mp4
- image/jpeg
- application/pdf

Q11) Difference between block elements and inline elements in HTML. Give examples of each.

Block Level Elements:

- A block-level element always starts on a new line and takes up the full width available
- The element is a block-level and is often used as a container for other HTML elements
- Block-level elements are used within the HTML document's body. They can contain inline elements, as well as other block-level elements.
- A block-level element is an HTML element that begins a new line on a web page and extends the full width of the available horizontal space of its parent element. It creates large blocks of content like paragraphs or page divisions. In fact, most HTML elements are block-level elements.

Inline Elements:

In contrast to a block-level element, an inline element:

- It can begin within a line.
- It does not start a new line.
- Its width only extends as far as it is defined by its tags.
- The element is an inline container used to mark up a part of a text, or a part of a document

Q12) List and explain semantic tags of HTML5

HTML5 semantic tags define the purpose of the element. By using semantic markup, you help the browser understand the meaning of the content instead of just displaying it. By providing this extra level of clarity, HTML5 semantic elements also help search engines to read the page and find the required information faster.A semantic element clearly describes its meaning to both the browser and the developer.

- < article> : specifies independent, self-contained content.
- <figcaption> : defines a caption for a <figure> element. The <figcaption> element can be placed as the first or last child of the <figure> element.
- <figure> : specifies self-contained content, like illustrations, diagrams, photos, code listings etc.
- <footer> : defines a footer for a document or section
- <header> : represents a container for introductory content or a set of navigational links.
- <nav> : defines a set of navigation links
- <section> : defines a section in a document

Q13)What is web-form-url encoding? What is multipart form data? In which situation we have to use it?

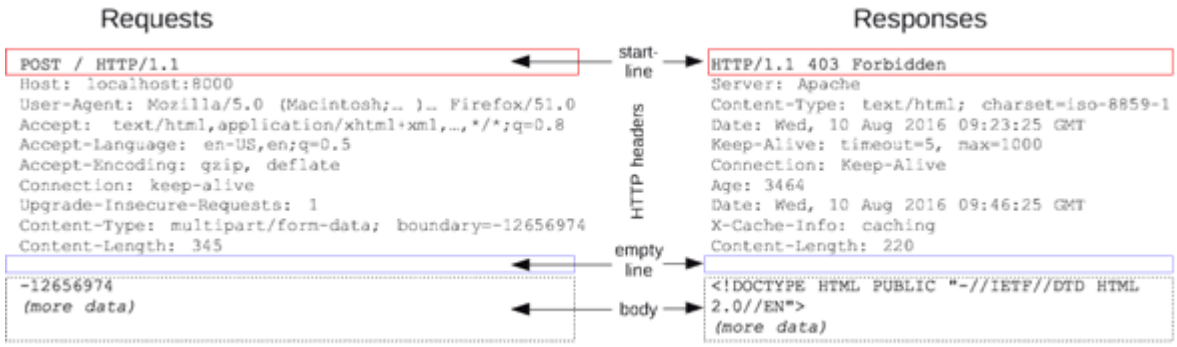
- application/x-www-form-urlencoded - Represents an URL encoded form. This is the default value if enctype attribute is not set to anything.
- multipart/form-data - Represents a Multipart form. This type of form is used when the user wants to upload files

Q14) Compare and contrast HTML and XML?

HTML	XML
HTML is used to display data and focuses on how data looks.	XML is a software and hardware independent tool used to transport and store data. It focuses on what data is.
HTML is a markup language itself.	XML provides a framework to define markup languages.
HTML is not case sensitive.	XML is case sensitive.
HTML is a presentation language.	XML is neither a presentation language nor a programming language.
HTML has its own predefined tags.	You can define tags according to your need.
In HTML, it is not necessary to use a closing tag.	XML makes it mandatory to use a closing tag.
HTML is static because it is used to display data.	XML is dynamic because it is used to transport data.
HTML does not preserve whitespaces.	XML preserve whitespaces.

Q15)Draw the structure of HTTP request and response message and show the typical content of it.

- The Structure of HTTP request and response is as follows:



Q16) List out the status code and its description of the HTTP response message

Following are some of the status code and its description:

- 101 : Switching Protocol
- 200 : OK
- 302 : the page that user is trying to access has been temporarily moved to a different location
- 404 : File Not Found
- 505 : HTTP Version Not Supported

Q17)List out the HTTP request method/verbs and purpose of each one.

The HTTP request methods and its purposes are:

- The GET Method : GET is used to request data from a specified resource. GET is one of the most common HTTP methods.
- The POST Method : POST is used to send data to a server to create/update a resource.
- The PUT Method : PUT is used to send data to a server to create/update a resource.
- The HEAD Method : HEAD is almost identical to GET, but without the response body.
- The DELETE Method : The DELETE method deletes the specified resource.

- The OPTIONS Method : The OPTIONS method describes the communication options for the target resource.

Q18) List and explain various HTTP request/response message header content.

The http message headers for request are:

- Protocol and version : describes the protocol used by the sender
- Host : name of the host
- User-agent : describes the agent application of the host
- Accept : list of file types acceptable by the hos
- Accept-language : list of language acceptable by the host
- Accept-encoding: list of encoding acceptable by the host
- Referrer : the name of referring web page if any
- Connection : type of connection desired by the host (e.g. keep-alive)
- If-modified-since : date-time of modification

Q19) Give the difference between the GET request and POST request.

The major differences are:

Basis for Comparison	GET	POST
Back button/Reload	Harmless	Data will be re-submitted (the browser should alert the user that the data are about to be re-submitted)
Bookmarked	Can be bookmarked	Cannot be bookmarked
Restrictions on data length	Yes, when sending data, the GET method adds the data to the URL; and the length of a URL is limited (maximum URL length is 2048 characters)	No restrictions
Restrictions on data type	Only ASCII characters allowed	No restrictions. Binary data is also allowed
History	Parameters remain in browser history	Parameters are not saved in browser history
Security	GET is less secure compared to POST because data sent is part of the URL Never use GET when sending passwords or other sensitive information!	POST is a little safer than GET because the parameters are not stored in browser history or in web server logs
Visibility	Data is visible to everyone in the URL	Data is not displayed in the URL

Q20) What are 'push' and 'pull' protocols? Give example applications which use these protocols .

- In push protocols, the client opens a connection to the server and keeps it constantly active. The server will send (push) all new events to the client using that single always-on connection. In other words, the server PUSHes the new events to the client.
- In pull protocols, the client periodically connects to the server, checks for and gets (pulls) recent events and then closes the connection and disconnects from the server. The client repeats this whole procedure to get updated about new events. In this mode, the clients periodically PULLs the new events from the server.
- The difference is that in push protocols, you get new events (such as a new email, a new chat message, etc) literally instantly. But you may experience a small time delay in pull protocols. Although many apps using the pull protocol, check for new events so regular (e.g. every 30 seconds) that the time delay is mostly not noticeable.

- For example, your cell phone is always connected to the mobile network. You can tell this by the signal bars on your phone's screen. When a caller calls, the network sends the call to your cell phone via that active connection your cell phone already have. This is PUSH.
- But, when you're waiting for a specific program on your TV, you repeatedly turn it on and check if your program started and then turn in off. This is PULL.

21) Download and install "wget" and "curl" utilities (On Linux it might be already available). Use them and write example commands and its output. (10 different commands for each one)

WGET

GNU Wget is a free utility for non-interactive download of files from the Web. It supports HTTP, HTTPS, and FTP protocols, as well as retrieval through HTTP proxies.

Synopsis : wget [option]... [URL]...

- wget -V : Display version
- wget -o logfile : Logs all messages to log file
- wget -d : Turn on debug output
- wget -a logfile : Append to logfile
- wget -F : When input is read from a file, force it to be treated as an HTML file
- wget --bind-address=ADDRESS : When making client TCP/IP connections, bind to ADDRESS on the local machine. ADDRESS may be specified as a hostname or IP address.
- wget -c : Continue getting a partially-downloaded file.
- wget --progress=type : Select the type of the progress indicator you wish to use. Legal indicators are "dot" and "bar".
- wget --show-progress :Force wget to display the progress bar in any verbosity.
- wget -T seconds : Set the network timeout to seconds seconds.

CURL

curl is a tool to transfer data from or to a server, using one of the supported protocols(FILE, FTP, HTTP, HTTPS).

Synopsis : curl [options]... [URL]...

curl --basic : Tells curl to use HTTP Basic authentication with the remote host.

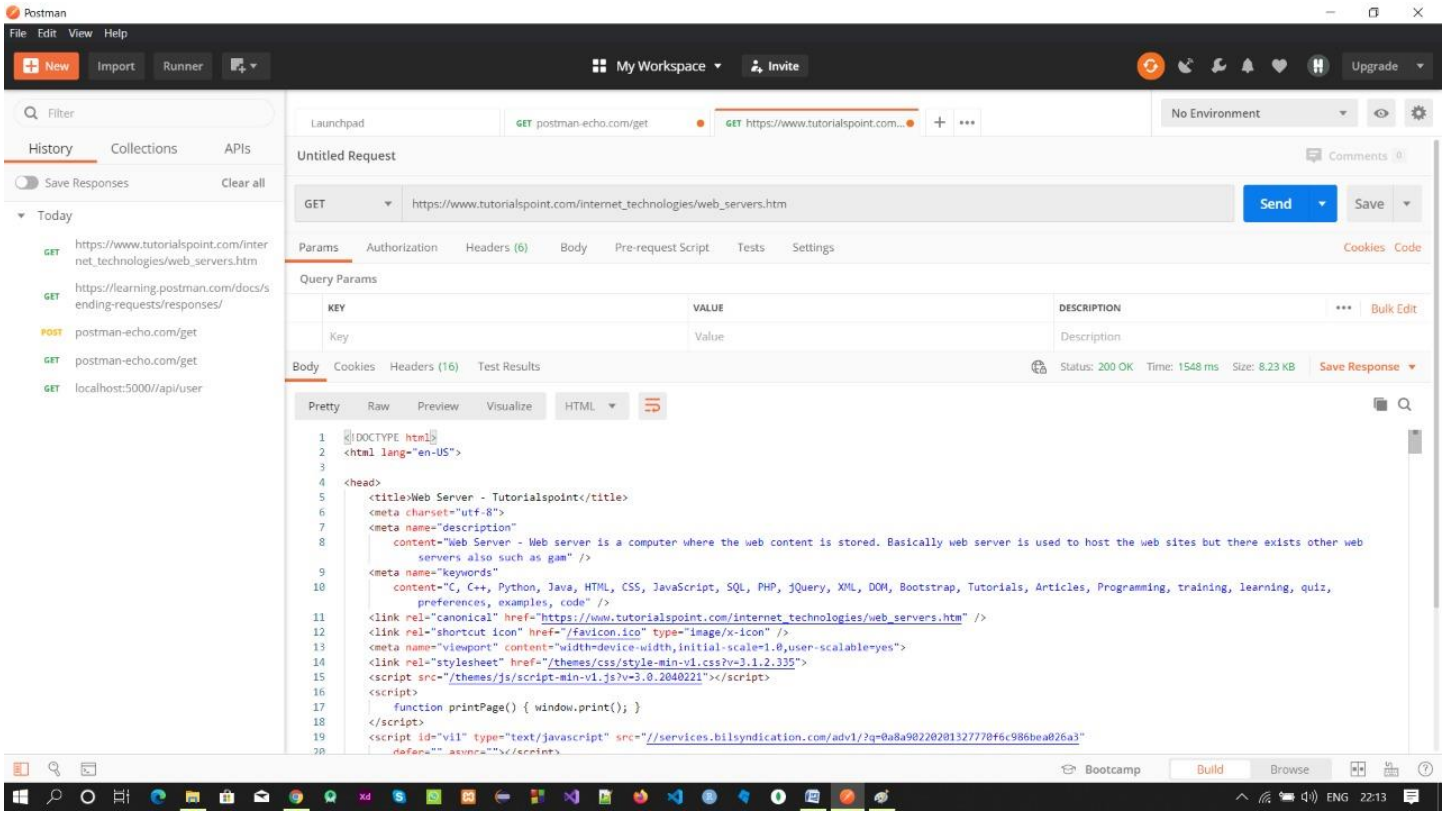
curl --compressed : Request a compressed response using one of the algorithms curl supports, and save the uncompressed document

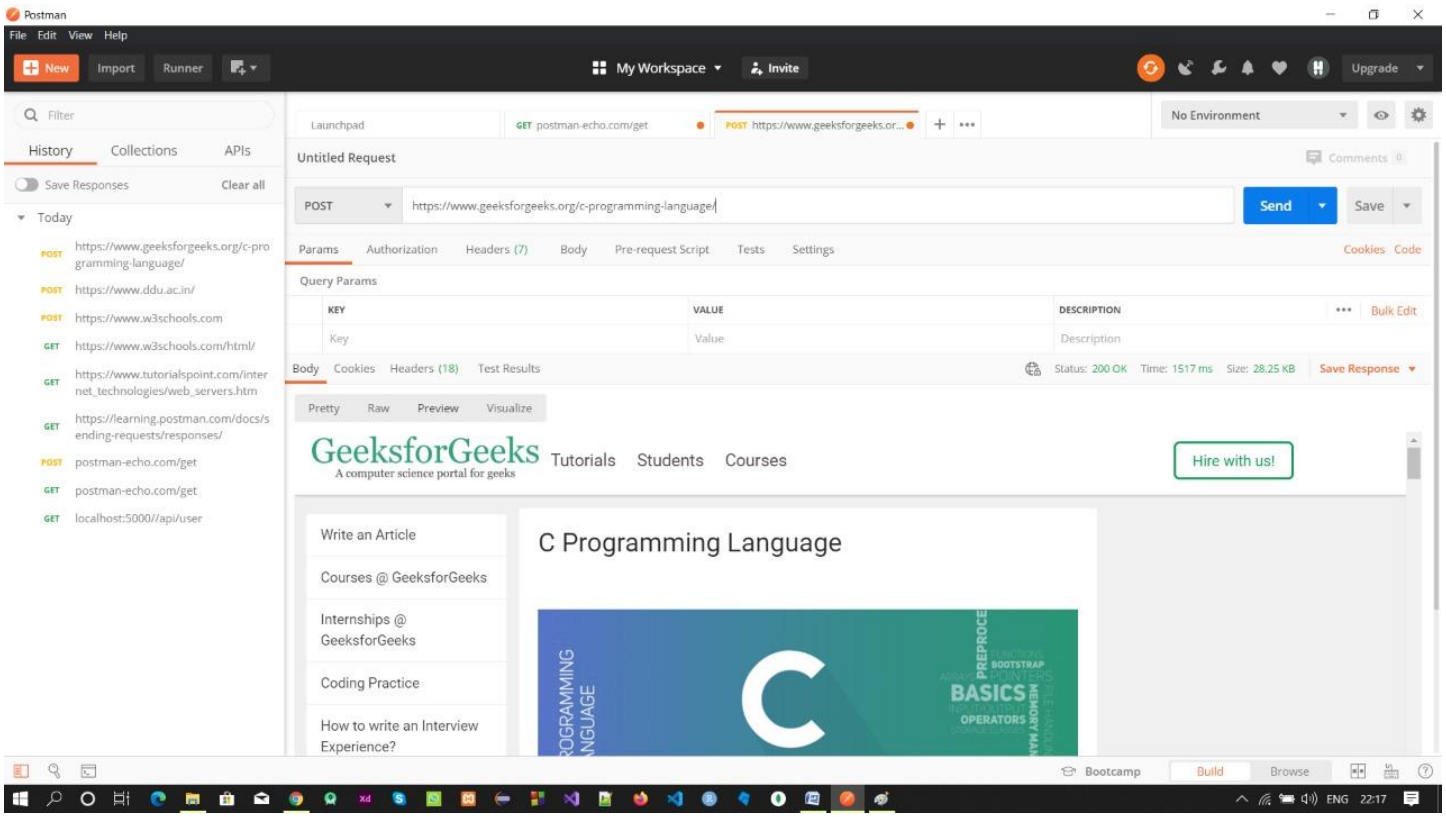
- curl -K <file> : Specify a text file to read curl arguments from
- curl --connect-timeout <seconds> : Maximum time in seconds that you allow curl's connection to take.
- curl -C <offset> : Continue/Resume a previous file transfer at the given offset.
- curl -d <data> : Sends the specified data in a POST request to the HTTP server
- curl -f : Fail silently (no output at all) on server errors.
- curl -i : Include the HTTP response headers in the output.
- curl -k : This option allows curl to proceed and operate even for server connections otherwise considered insecure.
- curl --limit-rate <speed> : Specify the maximum transfer rate you want curl to use - for both downloads and uploads

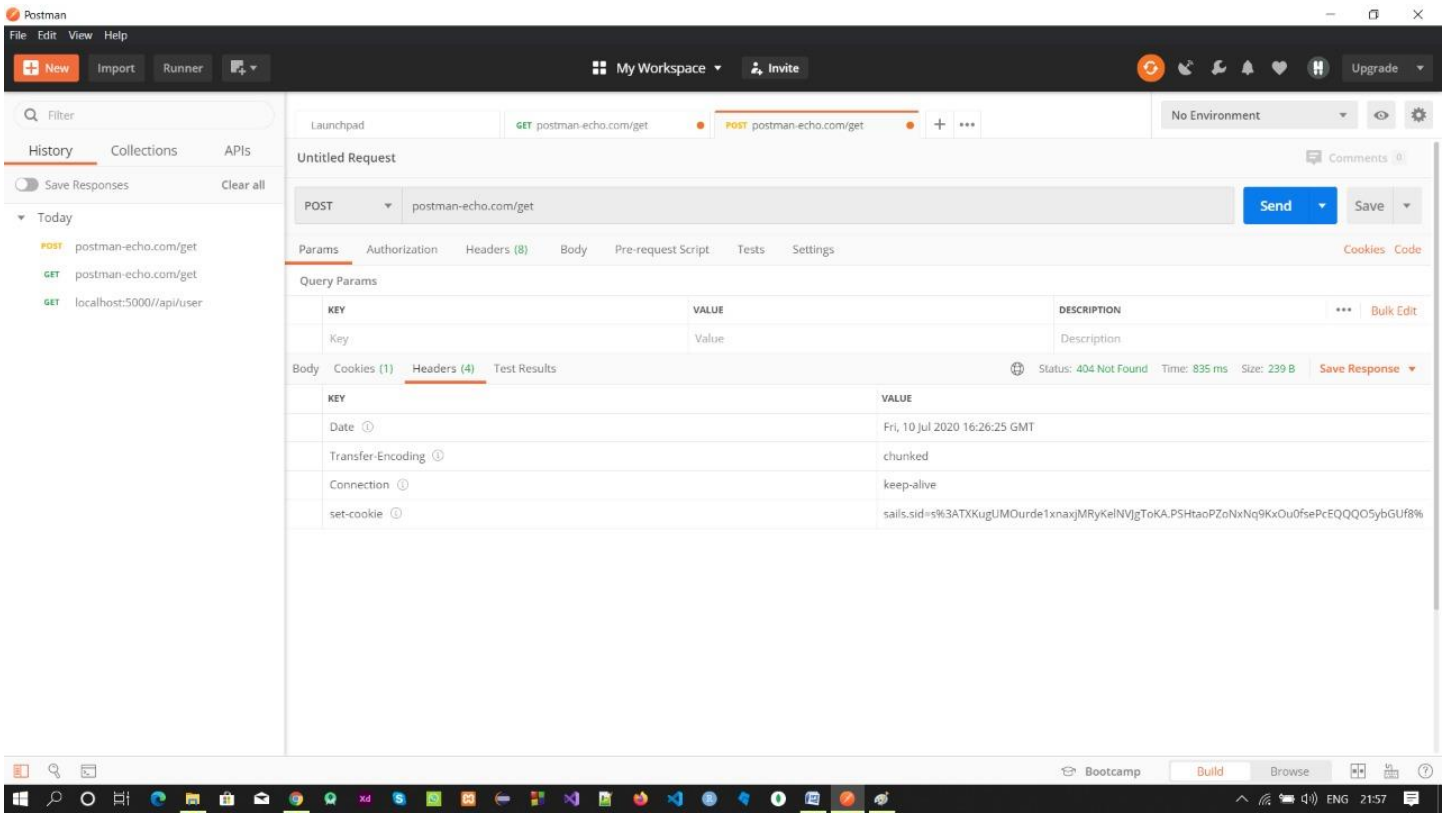
22) Download and install “Postman”. Learn how to use it and write description, how you have used it. (You can include screenshots (crop it, if required) if you wish)

Postman is a Google Chrome app for interacting with HTTP APIs. It presents you with a friendly GUI for constructing requests and reading response.

We can send request and see all header data.



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My Workspace Invite
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POST postman-echo.com/get
GET postman-echo.com/get
GET localhost:5000//api/user
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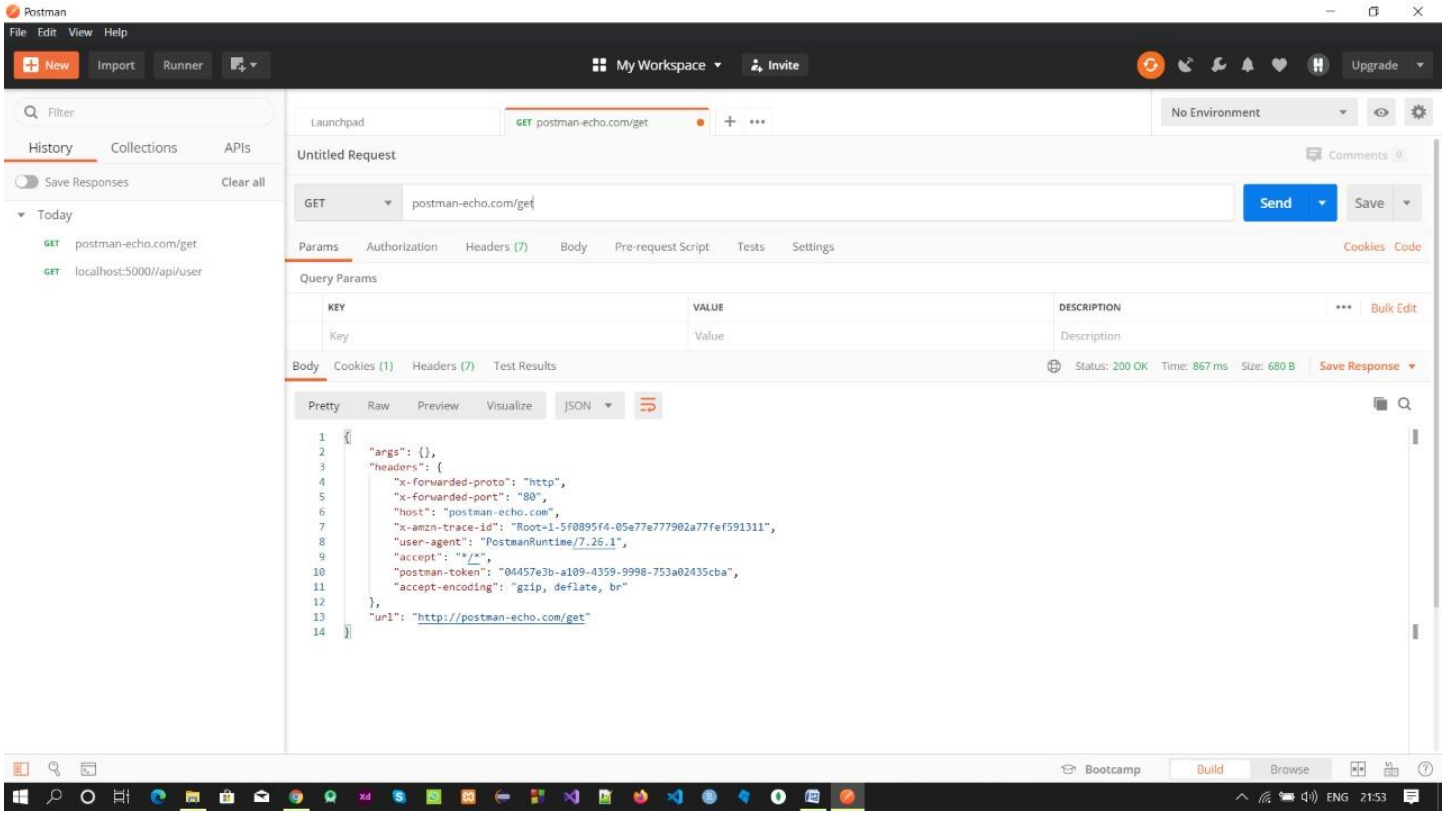
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Pretty Raw Preview Visualize JSON
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}
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23) What is "search engine optimization"? How to design our website to take benefit of it.

Search Engine optimization(SEO) is the process of growing the quality and quantity of website traffic by increasing the visibility of a website to users of a web search engine. The ways for SEO are:

- Improve site navigation.
- Fix duplicate content.
- Optimize website for mobile.
- Optimize website for speed.
- Produce high-quality content that adds value.
- Insert and improve metadata for websites .
- Include inbound and outbound hyperlinks.
- Make sure the content is easy to read, etc.

24) What are assistive technologies? Give examples and explain any two.

Assistive Technologies are products, equipments and systems that enhance learning, working and daily living for people with disabilities.

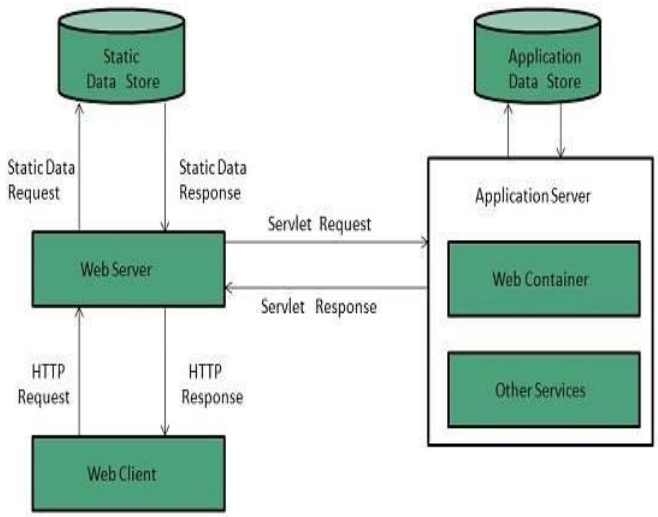
- Software used by blind or visually impaired people to read the content of the computer screen. Examples include JAWS for Windows, NVDA, or Voiceover for Mac.
- Alternative input devices **:** Some users may not be able to use a mouse or keyboard to work on a computer. E.g. Head Pointers, motion tracking or eye tracking, etc.

25) What is responsive web site? How to make our website responsive?

- A responsive website is one that has been designed to respond, or adapt, based on the technology and type of computing device used by the visitor to display the site. It is basically one website design that will looks good at any size — from a large desktop LCD monitor to the smaller screens we use on smartphones and tablets.
- The website can be made responsive in following ways
    - By layout
    - By medias
    - By typography

26) What is web server? What is application server? Draw the architecture of both. Compare and contrast web server with application server. Give real world examples of each server.

- A web-server is a software that runs a website and gives appropriate responses to the user as per the requests made by the user. Example: Apache, nginx, IIS.
- An application server allows us to host web application, create them and also provides us environment to run on them. Example: Tomcat, GlassFish, J2EE



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27) What is Cross-Origin-Resource-Sharing (CORS) request? What is the significance of it?

- Cross-Origin-Resource-Sharing(CORS) request is a method by which a browser allows us to access resources like images, audio, web page which are located outside the current domain. If the CORS policy of a website is not configured well, it is potential to many cross-domain attacks like cross-site request forgery.

28) What is polyfill (browser fallback)?

- The polyfill or browser fallback allows a javascript feature to work in old browsers exactly as expected to work in modern browsers as olders browsers may not support than functionality.

29) What is web accessibility?

- Web accessibility means people using a website should be able to understand the website, navigate through it, interact with it and also contribute to the world wide web. It should be accessible to person with disabilities as well.

30) How to validate your web page? Can we validate third-party web pages?

- We can validate a web page by ensuring it follows all standards defined by World Wide Web Consortium (W3C) which is the authority to maintain HTML standards.Yes we can validate third-party web pages if we have access to the source code and check if it follows the predefined set of standards defined by W3C.

31) What is UX and UI design? Differentiate between UX and UI.

- UI design refers to the user interface of a website. This includes elements like typeface, colors, and images, as well as the buttons, scroll bars, and text entry fields. It deals with responsiveness and interactivity of a website.

- UX design refers to the functionality and user experience of a website.It deals with purpose of the product, wireframing of the website and also analysis of the idea.

32) What is the difference between scalability and elasticity?

Scalability	elasticity
"Increasing" the capacity to meet the "increasing" workload.	"Increasing or reducing" the capacity to meet the "increasing or reducing" workload.
In a scaling environment, the available resources may exceed to meet the "future demands".	In the elastic environment, the available resources match the "current demands" as closely as possible.
Scalability adapts only to the "workload increase" by "provisioning" the resources in an "incremental" manner.	Elasticity adapts to both the "workload increase" as well as "workload decrease" by "provisioning and deprovisioning" resources in an "autonomic" manner.
Increasing workload is served with increasing the power of a single computer resource or with increasing the power by a group of computer resources.	Varying workload is served with dynamic variations in the use of computer resources.
Scalability enables a corporate to meet expected demands for services with "long-term, strategic needs".	Elasticity enables a corporate to meet unexpected changes in the demand for services with "short-term, tactical needs".
Example: Scaling Up - increasing the ability of an individual server Scaling out - increasing the ability by adding multiple servers to the individual server.	Elasticity: It is the ability to "scale up or scale down" the capacity to serve at will.
To use a simile, "scaling up" is an individual increasing her power to meet the increasing demands, and "scaling out" is building a team to meet the increasing demands.	To use a simile, a film actor increasing or reducing her body weight to meet differing needs of the film industry.