**TASK 1**

1. **Difference between HTTP1.1 vs HTTP2**

With significant increase in the use of internet, complexity in the webpages and the exchange of large amount of data over the internet, the need for faster protocol system to deal with multiple HTTP requests was high. So an improvised extended version of HTTP1.1, called HTTP2 was basically designed and developed by Google in 2015 with a major focus on better performance. The main differences between these two versions are:

* HTTP2 enables more efficient use of network resources
* HTTP2 is a binary protocol and HTTP1.1. is textual
* Multiplexing of request and responses in HTTP2 allows parallel requests to be handled over the same connection as compared to HTTP1.1 which delivered single response at a time per connection
* Compressed request and response header data in HTTP2 reduced the size of transferred header data resulting in faster page loads.
* The new concept of server push introduced in HTTP2 which is the ability of the server to send additional resources to the client without having an explicit request for each allowed populating of client cache.

1. **HTTP Version History**

In the year 1989, when Tim Berners Lee came up with the concept of World Wide Web, its implementation included four building blocks, one of which was HTTP (Hyper Text Transfer Protocol).

**HTTP/0.9** : The first version of HTTP was a simple protocol consisted of a single line with the standard GET method followed by the path to the resource. It is therefore called the one-line protocol. This version had no HTTP headers, which meant that only HTML files could be transmitted. It also did not include status or error codes.

**HTTP/1.0** : This version brought flexibility and extensibility factors to the earlier version of HTTP by introducing HTTP headers for both requests and responses which allowed the transmission of metadata. This also made different documents to be transmitted other than just the plain HTML files.

Each request carried the version number with the GET line, a status code line at the beginning of the response enabling the browser to understand the success or failure of the request.

**HTTP/1.1 :** Published in early 1997, this version is the standardised protocol which clarified ambiguities and introduced many improvements. A connection could be reused, pipelining was added, supported chunked responses, included additional cache control mechanisms, hosting different domains at the same IP address with the Host header was also introduced. This version is the most stable version for over 15 years.

**HTTP/2 :** To deal with complex web pages, increased data traffic and volume of the scripts adding interactivity, the need for more efficient and high performance protocol for data transmission arose. In the first half of 2010s, an experimental protocol called SPDY was demonstrated by Google as an alternative way for exchange of data. Built on SPDY was the new version HTTP/2, which was officially introduced in May 2015.

This is a multiplexed binary protocol, allowing server to populate data in client cache with a mechanism called server push. It removes duplication and overhead of data transmitted by compressing headers.

HTTP still continues to evolve adding new features to the existing HTTP/2.

1. **List five differences between Browser JS Vs Node JS.**

* In browser the interaction is mostly with DOM or APIs like cookies. All these objects provided by browser (like document, window objects) are not present in Node.js
* In Node.js, programmer can control the environment, he can choose the version of Node on which application is built. On the other hand, in browser environment, the programmer cannot choose which browser a user visits.
* Browsers and the users might be slow in upgrading to the new script versions of JS, making the user to use the older version of ECMA Script. There may be a need to transform the code to be ES-5 compatible before shipping to the browser, but in Node.JS there is no need to do this.
* In browser, all the useful APIs that node.js brings through its modules are absent. Like the file system access functionality.
* JavaScript can be run on any browser javascript engine in browser environment whereas Node is an interpreter or running environment for JavaScript with specific libraries which the programming language can use separately.

1. **What happens when you type a URL in the address bar of browser?**

* The browser checks its cache for DNS entry to find the IP address of the website.
* If not found in cache, ISP server initiates DNS query to find IP address of server that hosts the domain name. These requests are sent in small data packets.
* Browser initiates a TCP connection with the top level domain server.
* Browser sends an HTTP request (GET or POST) to the web server.
* Server on the host computer receives the request and sends back an HTTP response along with the status of the response.
* Browser finally displays the HTML content.