Task 1.

Do a write up for the followings:?

1. **Difference between HTTP1.1 vs HTTP2**
2. **http version history**
3. **List 5 difference between Browser JS(console) vs Nodejs**
4. **what happens when you type a URL in the address bar in the browser?**

1. Difference between HTTP1.1 vs HTTP2

- Hypertext Transfer Protocol (HTTP) is a set of standards allowing internet users to exchange website information. There have been four HTTP iterations since its introduction in 1991.HTTP/2 was released in 2015 as a major revision to the HTTP/1.1 protocol. It was derived from the SPDY protocol as a way to improve the online experience by speeding up page loads and reducing round-trip time (RTT), especially on resource-heavy web pages. HTTP/1.1 was the third version of HTTP and the standard protocol for over 15 years. It introduced persistent connections for improved performance and laid the foundation for standard requests, such as GET, HEAD, PUT, and POST.

HTTP/1.1 vs. HTTP/2 Protocol

HTTP/2 improved on HTTP/1.1 in a number of ways that allowed for speedier content delivery and improved user experience, including:

1. **Binary protocols -** Binary protocols consume less bandwidth, are more efficiently parsed and are less error-prone than the textual protocols used by HTTP/1.1. Additionally, they can better handle elements such as whitespace, capitalization and line endings
2. **Multiplexing** – HTTP/2 is multiplexed, i.e., it can initiate multiple requests in parallel over a single TCP connection. As a result, web pages containing several elements are delivered over one TCP connection. These capabilities solve the head-of-line blocking problem in HTTP/1.1, in which a packet at the front of the line blocks others from being transmitted.
3. **Header compression** – HTTP/2 uses header compression to reduce the overhead caused by TCP's slow-start mechanism.
4. **Server push** – HTTP/2 servers push likely-to-be-used resources into a browser's cache, even before they're requested. This allows browsers to display content without additional request cycles.
5. **Increased security** – Web browsers only support HTTP/2 via encrypted connections, increasing user and application security.

2. Http version history

The Hypertext Transfer Protocol (HTTP) is an application layer protocol for distributed, collaborative, hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web, where hypertext documents include hyperlinks to other resources that the user can easily access, for example by a mouse click or by tapping the screen in a web browser.

Development of HTTP was initiated by Tim Berners-Lee at CERN in 1989. Development of early HTTP Requests for Comments (RFCs) was a coordinated effort by the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C), with work later moving to the IETF.

HTTP/1.1 was first documented in RFC 2068 in 1997, and as of 2021, it (plus older versions) is less popular (used by less than a third of websites; it's always a backup protocol) for web serving than its successors. That specification was obsoleted by RFC 2616 in 1999, which was likewise replaced by the RFC 7230 family of RFCs in 2014.

HTTP/2 is a more efficient expression of HTTP's semantics "on the wire", and was published in 2015, and is used by over 50% of websites; it is now supported by virtually all web browsers and major web servers over Transport Layer Security (TLS) using an Application-Layer Protocol Negotiation (ALPN) extension where TLS 1.2 or newer is required.

HTTP/3 is the proposed successor to HTTP/2, and 2/3rd of web browser users (both on desktop and mobile) can already use HTTP/3, on the 18% of websites that already support it; uses UDP instead of TCP for the underlying transport protocol. Like HTTP/2, it does not obsolete previous major versions of the protocol. Support for HTTP/3 was added to Cloudflare and Google Chrome in September 2019 (since enabled by default),and can be enabled in the stable versions of Firefox and Safari.

Year	HTTP Version
1991	0.9

1996 1.0

1997 1.1

2015 2.0

Draft (2020) 3.0

3. List 5 difference between Browser JS(console) vs Nodejs

Javascript	Node JS
Javascript is a programming language that is used for writing scripts on the website	NodeJS is a Javascript runtime environment
Javascript can only be run in the browsers	NodeJS code can be run outside the browser
It is basically used on the client-side	It is mostly used on the server-side
Javascript is capable enough to add HTML and play with the DOM.	Nodejs does not have capability to add HTML tags
Javascript can run in any browser engine as like JS core in safari and Spidermonkey in Firefox	Nodejs can only run in V8 engine of google chrome

4. What happens when you type a URL in the address bar in the browser?

For example, if we want to search maps.google.com, below process will occur for all urls when we type in address bar of the browser.

1. Type maps.google.com into the address bar of your browser.

2. The browser checks the cache for a DNS record to find the corresponding IP address of maps.google.com.

3. If the requested URL is not in the cache, ISP's DNS server initiates a DNS query to find the IP address of the server that hosts maps.google.com.

4. The browser initiates a TCP connection with the server.

5. The browser sends an HTTP request to the webserver.

6. The server handles the request and sends back a response.

7. The server sends out an HTTP response.

There are five types of statuses detailed using a numerical code.

- 1xx indicates an informational message only
- 2xx indicates success of some kind
- 3xx redirects the client to another URL
- 4xx indicates an error on the client's part
- 5xx indicates an error on the server's part

8. The browser displays the HTML content (for HTML responses, which is the most common).