Week1

- An embedded application is only used to perform a specific task.
- It may be possible to install an embedded application in another device.
- Distributed network can suffer from the failure of a certain number of nodes.
- Peer-to-peer network is fault-tolerant. In this arrangement, a computer can act as a client, a server or both at a time. BitTorrent is an example of peer-to-peer network.
- In telephone networks invented during late 19th century, communication occurs in real time, since there exists a dedicated path for communication.
- A network protocol is a set of rules that describes formatting, transmission and receiving of data between two network devices.
- UDP is a connectionless protocol and doesn't provide acknowledgement after receiving data. Communication using UDP can result in data loss.
- TCP is a connection-oriented protocol, and gives prioritizes reliability of data delivered.
- Internet protocol helps bridge different network protocols, with the help of a standard header for each.
- Internet is a network of networks, whereas world wide web is a system of interconnected resources over the internet.
- HTTP is a text-based protocol and is stateless. It uses port 80 for communication.
- Web servers don't/can't maintain state information of the client.
- 127.0.0.1 (IPv4) and ::1(IPv6) are called loopback addresses, and refer to localhost.
- 0.0.0.0 (IPv4) and :: (IPv6) are called placeholder addresses, and matches all possible addresses.
- Common Gateway Interface (CGI) is an interface specification that enables web servers to execute an application program
- There are 65535 ($2^{16} - 1$) ports available for communication between devices in TCP. Port 0 is reserved and is not available for communication.
- IPv4 uses 4 sets of 8 bits each, and hence needs 32 bits for representing an address
- IPv6 uses 8 sets of 16 bits (4 hexadecimal characters) each, and hence needs 128 bits for representing an address
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Week2

- "Markup" is a way of using cues and codes in regular flow of text that indicates how the text should be displayed. It is not necessarily computer readable.
- Unicode encoding.

1st Byte	2nd Byte	3rd Byte	4th Byte	Free Bits	Maximum Expressible Unicode Value
0xxxxxxx				7	007F hex (127)
110xxxxx	10xxxxxx			(5+6)=11	07FF hex (2047)
1110xxxx	10xxxxxx	10xxxxxx		(4+6+6)=16	FFFF hex (65535)
11110xxx	10xxxxxx	10xxxxxx	10xxxxxx	(3+6+6+6)=21	10FFFF hex (1,114,111)

For example,

	A	א	好	不
Code point	U+0041	U+05D0	U+597D	U+233B4
UTF-8	41	D7 90	E5 A5 BD	F0 A3 8E B4
UTF-16	00 41	05 D0	59 7D	D8 4C DF B4
UTF-32	00 00 00 41	00 00 05 D0	00 00 59 7D	00 02 33 B4

- In order to refer to an external CSS, use the following line within <head> tag
  <link rel = "stylesheet" type ="text/css" href ="example.css">
- Inline CSS have higher precedence compared to internal (inside head tag) or external CSS.
- Precedence rule of applying styles is: !important > inline> id > class > element.

It means that if a style exists for an #<id>, it'll be honored, even when style exists for .<class_name>. Latter will be honored, only if former doesn't exist.

References:

https://discourse.onlinedegree.iitm.ac.in/t/previous-quiz/67651

https://discourse.onlinedegree.iitm.ac.in/t/week-2-aq2-6/50499

Week3

- Wireframes are tools (Lucid Chart is an example) that provide a visual guide to represent the anatomy of a web page.
- Jinja templates can help format the output as HTML, JSON or XML.
- Core principles described by W3C to make the page accessible include
  - Perceivable - Perceivable information and user interface
  - Operable - Operable user interface and navigation
  - Understandable – Understandable
  - Robust - Robust content and reliable information
- The correct syntax to get the length of a list variable in jinja2 template is: {{list | length}}
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Week4

- Relational databases allow to reduce the data duplication.
- NoSQL databases are better than Relational databases for storing semi structured data.
- Truncate command only deletes the data, but the schema/structure is preserved.
- DROP command deletes the data from the table, as well as removes the entire schema/structure of the table from the database.
- Tables deleted using DROP are permanently lost, and it cannot be rolled back (assuming no backup was taken before

Week5

- User uses controller to manipulate the model that updates the view which the user sees.
- In MVC architecture for software applications
  - Model represents the database, and takes care adding, deleting, updating and fetching data from storage.
  - Controller directs the the model and the view.
  - Controller represents and executes the business logic of an application.
  - The developer can create multiple views of a model.
  - The 'View' does not always refer to what the user can see. All user interactions happen at this level.
- Advantages of MVC include
  - Ability to provide multiple views.
  - Separation of concerns.
  - Easier to debug

Week6

- The web architecture should be based on preferably client-server model.
- The server should not assume state of the client.
- The web architecture should promote uniform interface.
- A REST API is an API that corresponds to the design principles of the REST (representational state transfer).
- REST APIs communicate via HTTP requests that can be used to perform database functions like creating, reading, updating, and deleting (or CRUD) records within a resource.
- REST adheres to stateless communication.
- A resource is delivered to a client in any format including JavaScript Object Notation (JSON), HTML, XML, or plain text.
- The REST API is called idempotent when clients can make the identical call repeatedly while producing the same result
- POST method is not idempotent, because if you post the same request multiple times, it will have a cumulative effect.
- Caching allows storing server response in proxy frontend so that a client need not request the server for same resources repeatedly. All GET requests are cached by default, whereas not all POST requests are cached.
- Caching improves the overall quality of service and reduce load on the servers.

- A proxy server is a server application that acts as an intermediary between a client requesting a resource and the server providing that resource. It can be used to control what part of the application is accessible to an unauthorized user.
- An HTTP method is safe if it does not alter the state of the server. GET method is safe, whereas none of the other methods (POST, DELETE, PUT) are safe.
- A JSON object is a collection of key : value pairs, where a key must be a string and value can be a number, string, object, true, false, array or null.

Week7

- Hash tables are used with in-memory tables.
- Data on social networks can be stored with the help of graphs.
- Storing data in graphs involve different degrees like number of outgoing edges, weights of edges, nodes etc.
- In graphs, path finding is more important than just searching the data.
- ACID properties of databases – Atomicity, Consistency, Isolation, Durability.
- A binary tree has 2^L nodes at level L.
- A binary tree of height H can store a max of $2^H - 1$ nodes.
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Week8

- DOM updates can be used to add/remove text to the HTML page
- Generating a page completely through DOM updates will make the page almost inaccessible.
- HTML is generated on client side and cannot be done by browsers with limitations.
- Web browsers usually have JS engines to run Javascript.
- It is quite possible to build some other browser that supports languages other than Javascript
- Even though most text-mode browsers do not support it, there is nothing preventing a text browser from loading JS files and executing them WebAssembly (WASM) is an open standard supported on many browsers, that specifies a portable binary-code format for executable programs, as well as a textual assembly language and interfaces to make interactions between these programs and their host environment easier. WASM is not limited to Javascript and can be generated from other languages also.
- JavaScript on a browser with native mode access is very risky to the system.