ICT 2404 - Web Technologies
COM 2303 – Web Design

Lecture 01: Introduction to Computers and the Internet

Aloka Dissanayake
Department of Computing
Rajarata University of Sri Lanka

Course Content and Intended Learning Outcomes

- Delivered in 15 weeks, covering various topics, such as World wide web, HTML, Client-Side Scripting, Server-Side Scripting, Session handling, Cookies, Ajax and New trends in web technologies.
- Learning outcomes:
  - Understanding the development of a client-side browser-based web application.
  - Demonstrate web design techniques.
  - Create a functioning web applications.
  - Reflect on and evaluate the appropriateness of the chosen element, technologies and architectures.

References

- “Internet & World Wide Web How to Program”, Fifth Edition. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Pearson,2011

Evaluation Criteria

- End Exam 70%
- Theory Assignment 5%
- Practical Assignment 5%
- Mini Project 20%

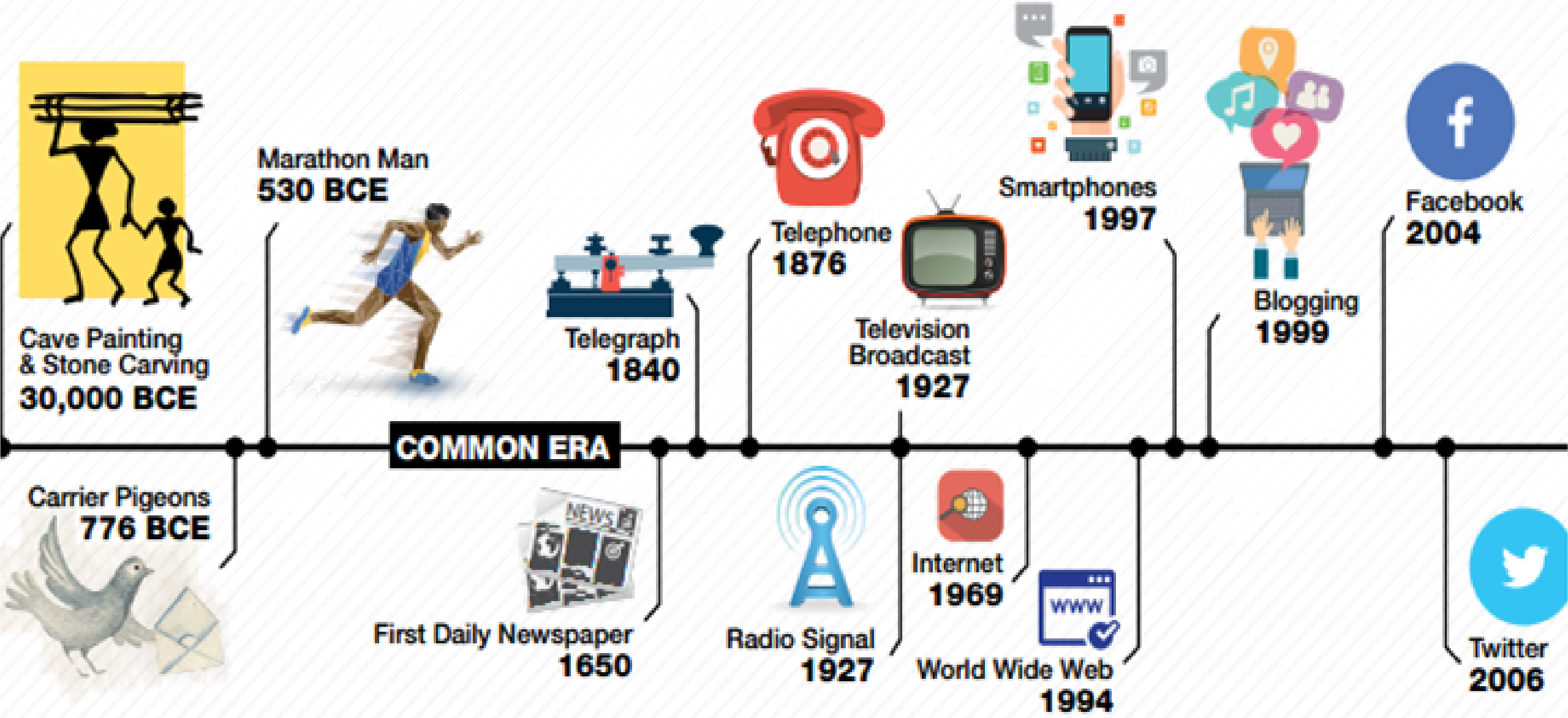
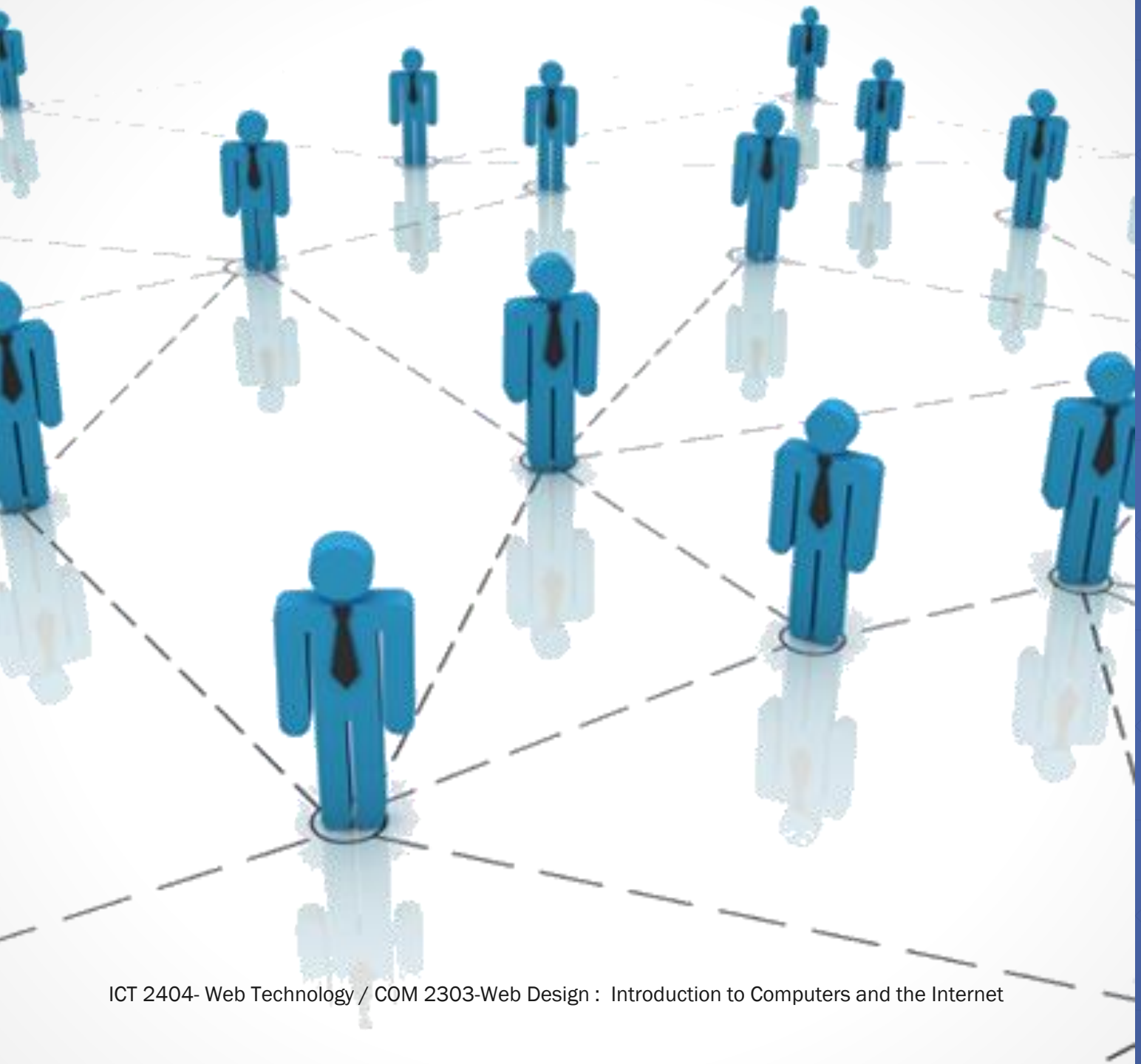


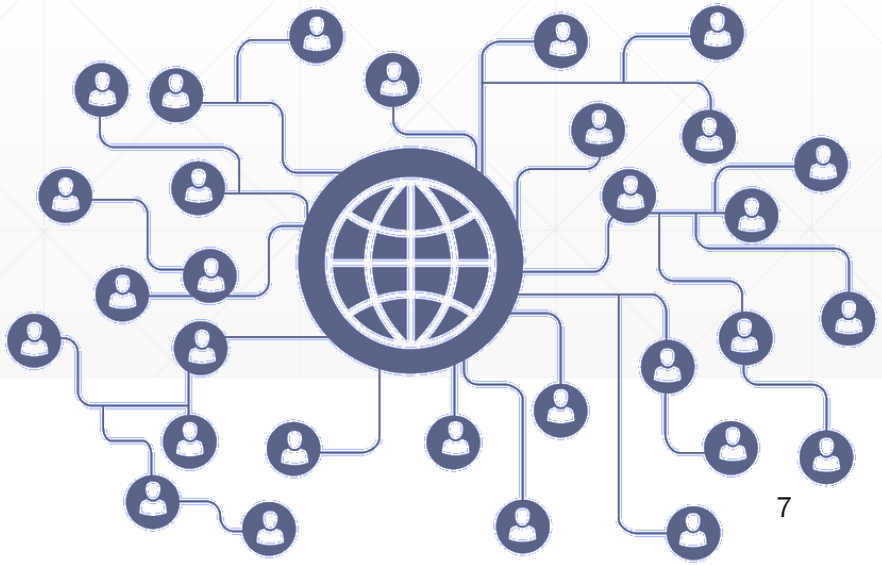
Figure 1: Evolution of communication technology



Network

What is a Network?

- According to the Cambridge Dictionary,
  - A network is a **large system** consisting of **many similar parts** that are **connected together** to allow movement or **communication between** or along the parts, or between the parts and a control center.

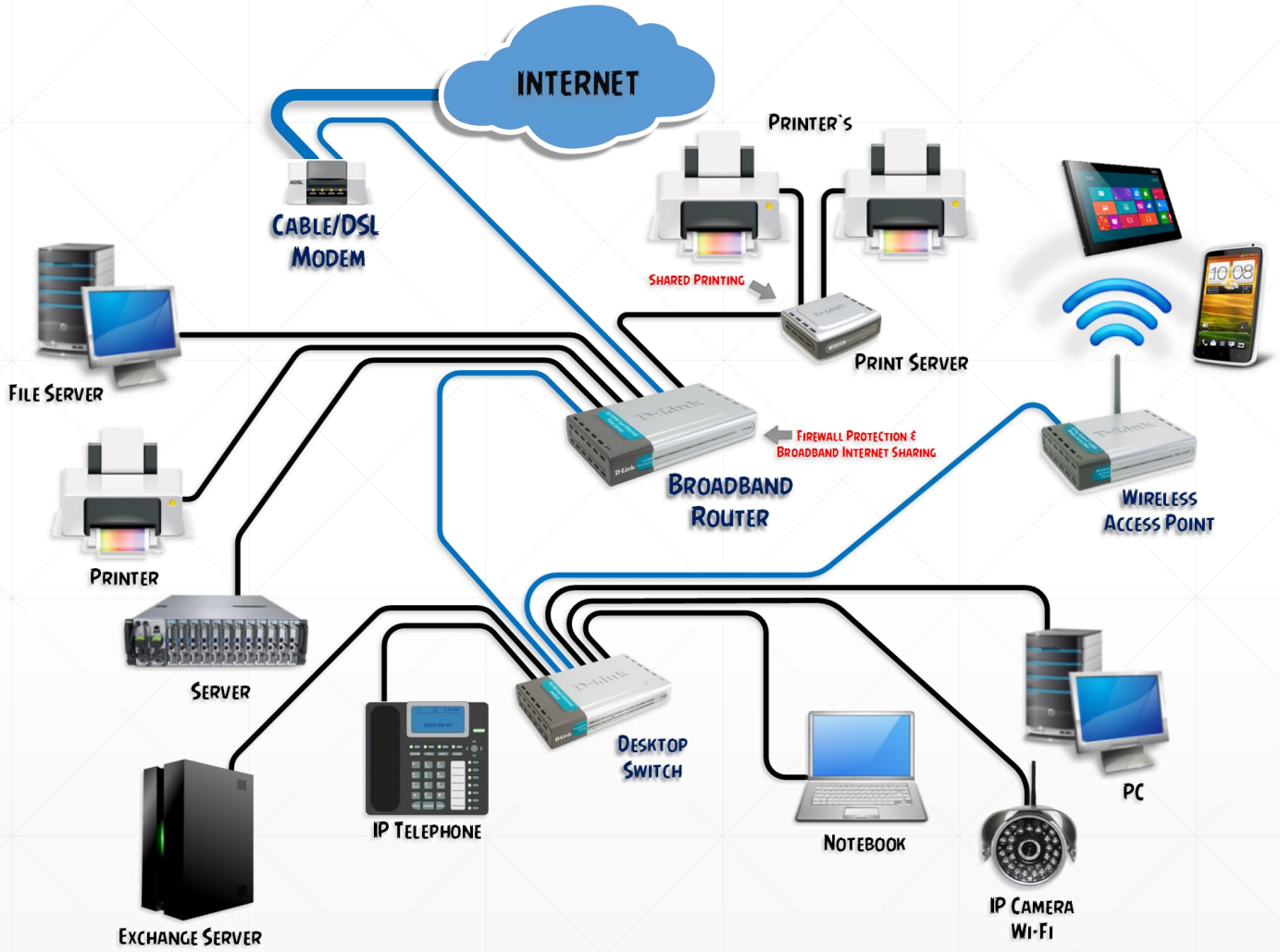


Types of Networks – nature of the usage

- Telecommunication networks
- Television or radio networks
- Transport networks
- Social networks
- **Computer or data networks**

Computer or Data Networks

- A computer or data network is,
  - A **digital** telecommunications network, which allows **nodes** to share **resources.**
  - In computer networks, **computing devices** exchange data with each other using connections between nodes **(data links).**
  - These **data links** are established over **cable media** such as wires or optic cables, or **wireless media** such as Wi-Fi



Networks are used to...

- Facilitate communication via email, video conferencing, instant messaging, etc.
- Enable multiple users to share a single hardware device like a printer or scanner.
- Enable file (data) sharing across the network.
- Allow for the sharing of software or operating programs on remote systems.
- Make information easier to access and maintain among network users

Advantages and Disadvantages of Network

Advantages

- Share files
- Share internet connection and devices
- Communication
- Roaming profile

Disadvantages

- Reliance on networked resources
- Expensive hardware
- Risk of viruses and hacking
- Specialist staff often required

Types of Data Networks

- Intranet
  - A private computer network
  - Information is securely transferred among group of people
    - E.g. Share organizational information among employees
- Extranet
  - Same as Intranet but,
  - Share part of internal information or operations with outsiders
    - E.g. Share part of organizational info. with vendors, supplier

https://study.com/academy/lesson/intranet-and-extranet-comparing-information-and-data-dissemination.html#lesson

Internet

- The Internet is a **worldwide collection of computer networks, cooperating with each other**, to **exchange data using a common software**
- It is a **network of networks**
- Consists of private, public, academic, business, and government networks of local to **global scope.**
- Linked by a broad array of electronic, wireless, and optical networking technologies.

Internet

Advantages

- Faster Communication
- Rich Information Resources
- Infinite Education
- Entertainment for Everyone
- Social Networking and Staying Connected
- Online Services and E-commerce

Disadvantages

- Theft of Personal Information
- Spamming
- Malware Threats
- Age-inappropriate Content
- Social Isolation, Obesity, and Depression

Introduction to WWW

What is WWW?

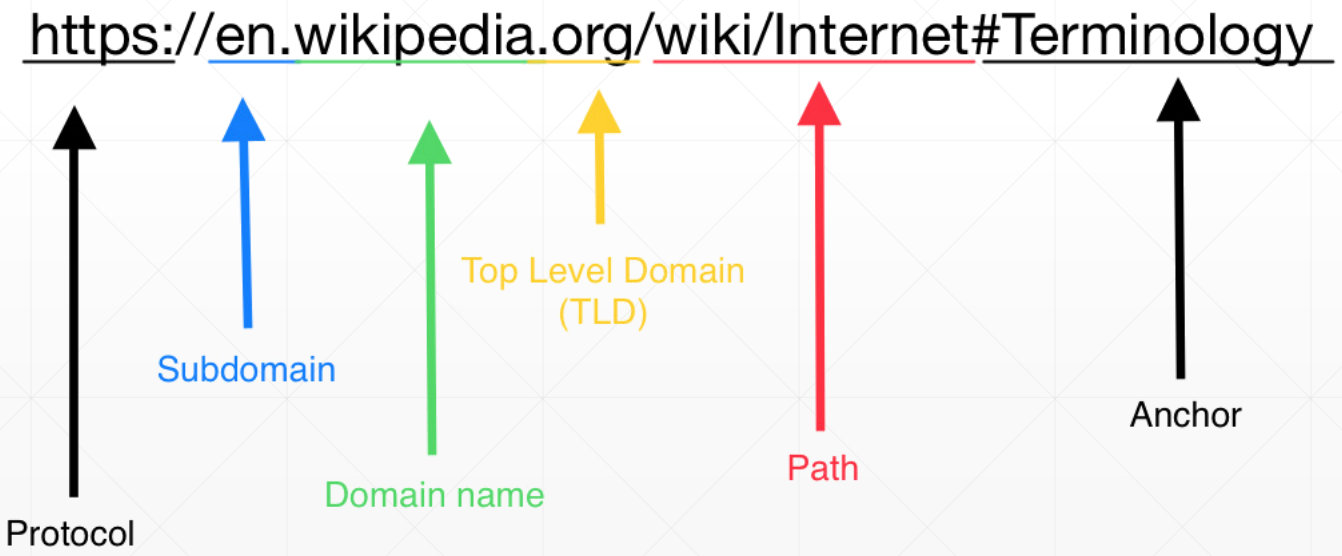
- The World Wide Web (WWW) is an information space that allows for the sharing of data and documents across the Internet.
- The Web was invented in 1989 by Tim Berners-Lee while he was working at CERN, the European Organization for Nuclear Research in Switzerland.
- Berners-Lee envisioned the Web as a tool for sharing scientific information among researchers, but it quickly grew to become a platform for communication, commerce, and entertainment around the world

Keywords

- **WWW and Web Sites** : a website is a specific entity that exists on the Web and contains a set of web pages and other resources, while the Web is the larger network that connects all of these resources together.
- **Web Server :** A web server is a software application that runs on a computer and is responsible for serving content, such as web pages, to clients over the World Wide Web
- **Web Browser :** A software application that is used to access and view content on the WWW. provide users with a graphical user interface (GUI) for accessing and navigating web content.
- **Search Engine** : A software program that allows users to search for information on the World Wide Web. It enables users to enter keywords or search terms and then displays a list of relevant web pages, documents, images, and other types of content that match those search terms

URL (Uniform Resource Locator)

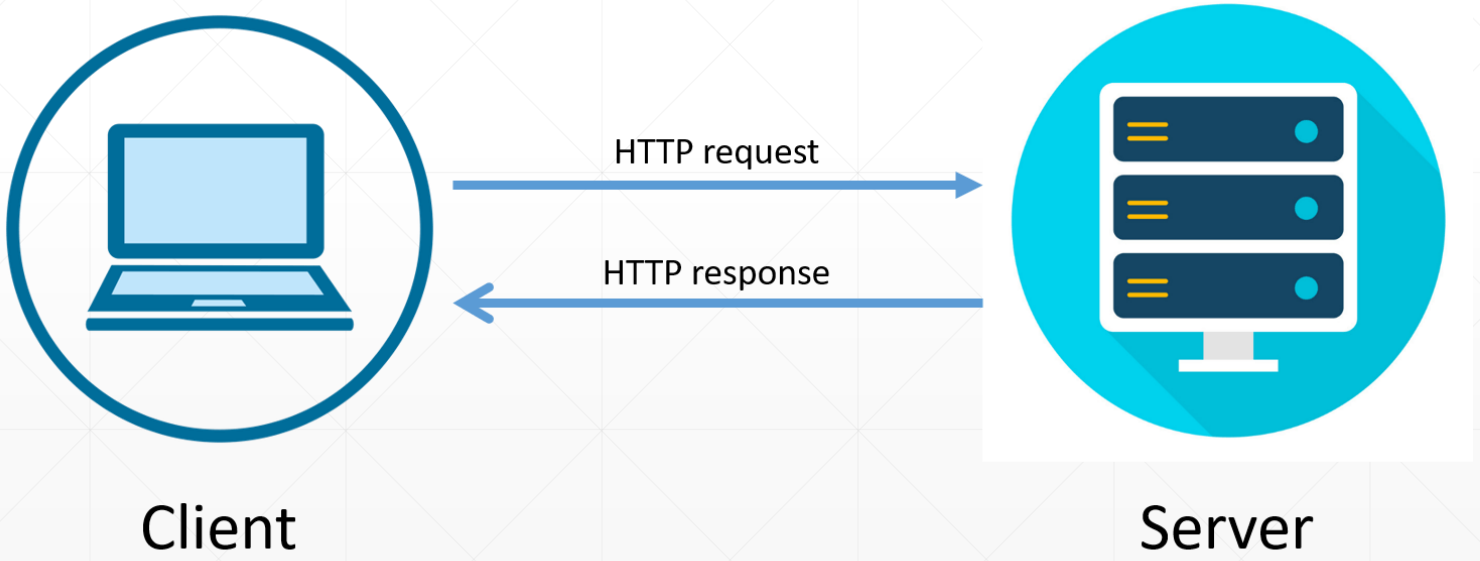
- A string of characters that is used to identify and locate resources on the World Wide Web. A URL typically consists of several parts, including the protocol, the domain name, the path, and any parameters or queries.



- **Protocol** :The method used to access the resource, such as “http” or “https”
- **Subdomain** : Indicates which particular webpage of your website the web browser should serve up
  - en -> could be used for English content
  - fr -> French content
  - us -> content specific to the United States
- **Domain Name** : Name of the website
- **Top Level Domain (TLD)** : What type of entity your organization registers as on the internet
  - com -> commercial (websites)
  - org -> organization
  - edu -> education
- **Path** : Location of the file or resources that the user wants to access
- **Anchor:** A specific location or target within a webpage. Also know as ‘fragment identifier’ or ‘hash'

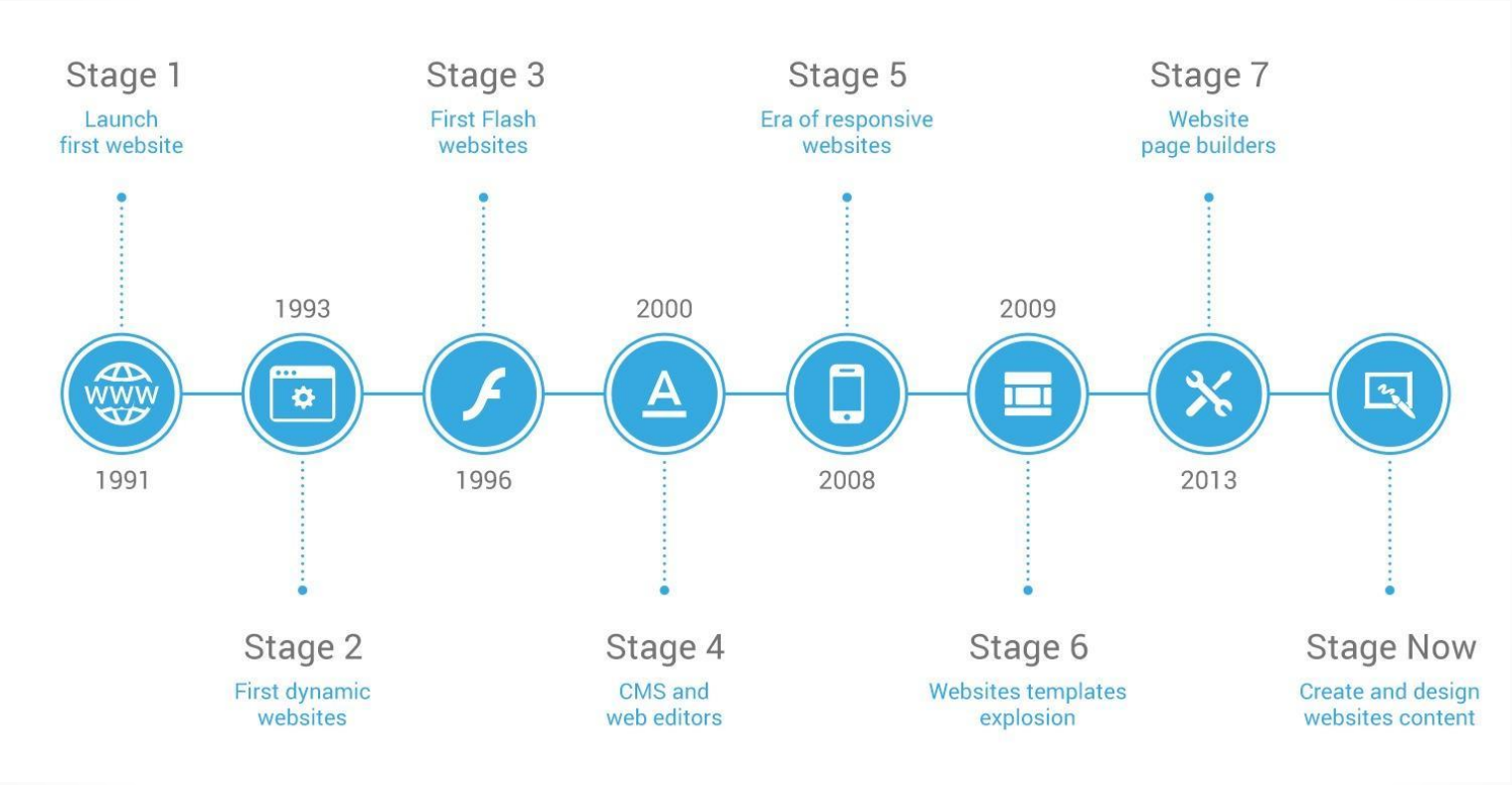
How does web work?

- The web is based on a client-server model, where a client (such as a web browser) sends requests to a server for resources, and the server responds with the requested content.

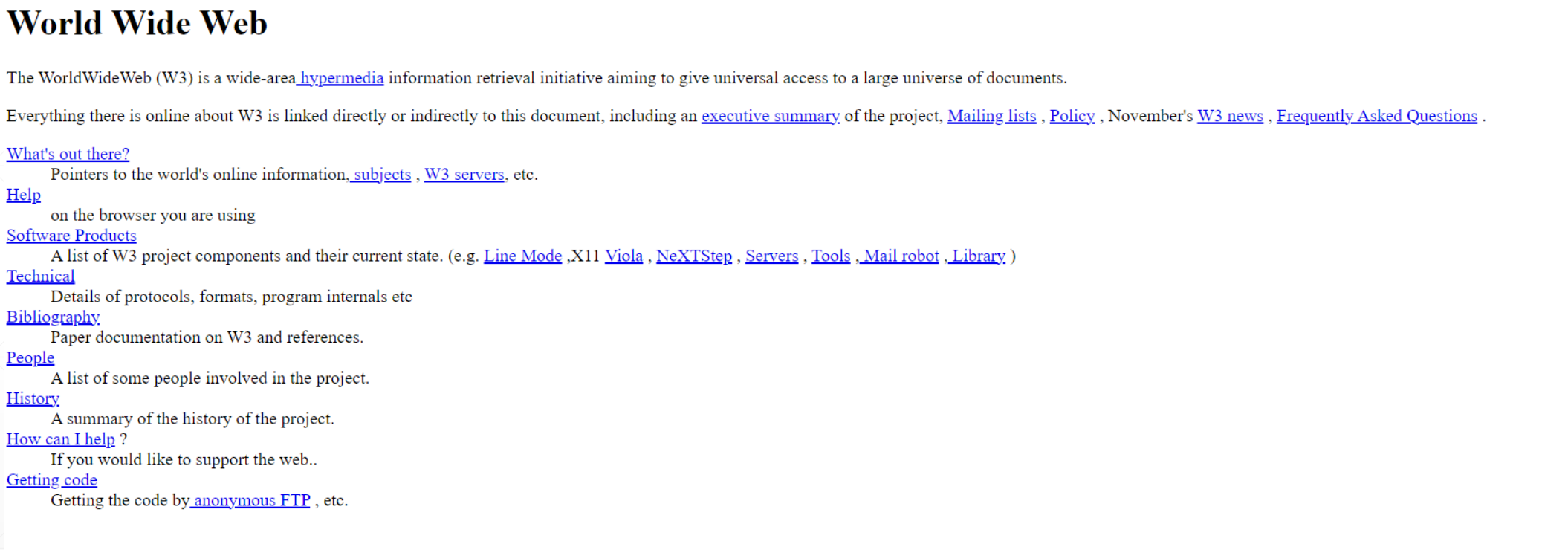


1. The user types a URL into the address bar of their web browser, or clicks on a hyperlink that points to a URL.
2. **The web browser parses the URL and extracts the domain name**, which is used to look up the IP address of the server that hosts the website.
3. The browser sends a request to the server, using the HTTP protocol. The request includes the method (such as GET or POST), the path of the resource being requested, and any additional headers or data.
4. The server receives the request and processes it.
5. The server sends a response back to the browser, using the HTTP protocol.
6. The browser receives the response and processes it. This may involve rendering HTML, executing scripts, or displaying media files

Bit of History



The 1st ever website



World Wide Web

The WorldWideWeb (W3) is a wide-area hypermedia information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an executive summary of the project, Mailing lists , Policy , November's W3 news , Frequently Asked Questions .

What's out there?
Pointers to the world's online information, subjects , W3 servers, etc.
Help
on the browser you are using
Software Products
A list of W3 project components and their current state. (e.g. Line Mode ,X11 Viola , NeXTStep , Servers , Tools , Mail robot , Library)
Technical
Details of protocols, formats, program internals etc
Bibliography
Paper documentation on W3 and references.
People
A list of some people involved in the project.
History
A summary of the history of the project.
How can I help ?
If you would like to support the web..
Getting code
Getting the code by anonymous FTP , etc.

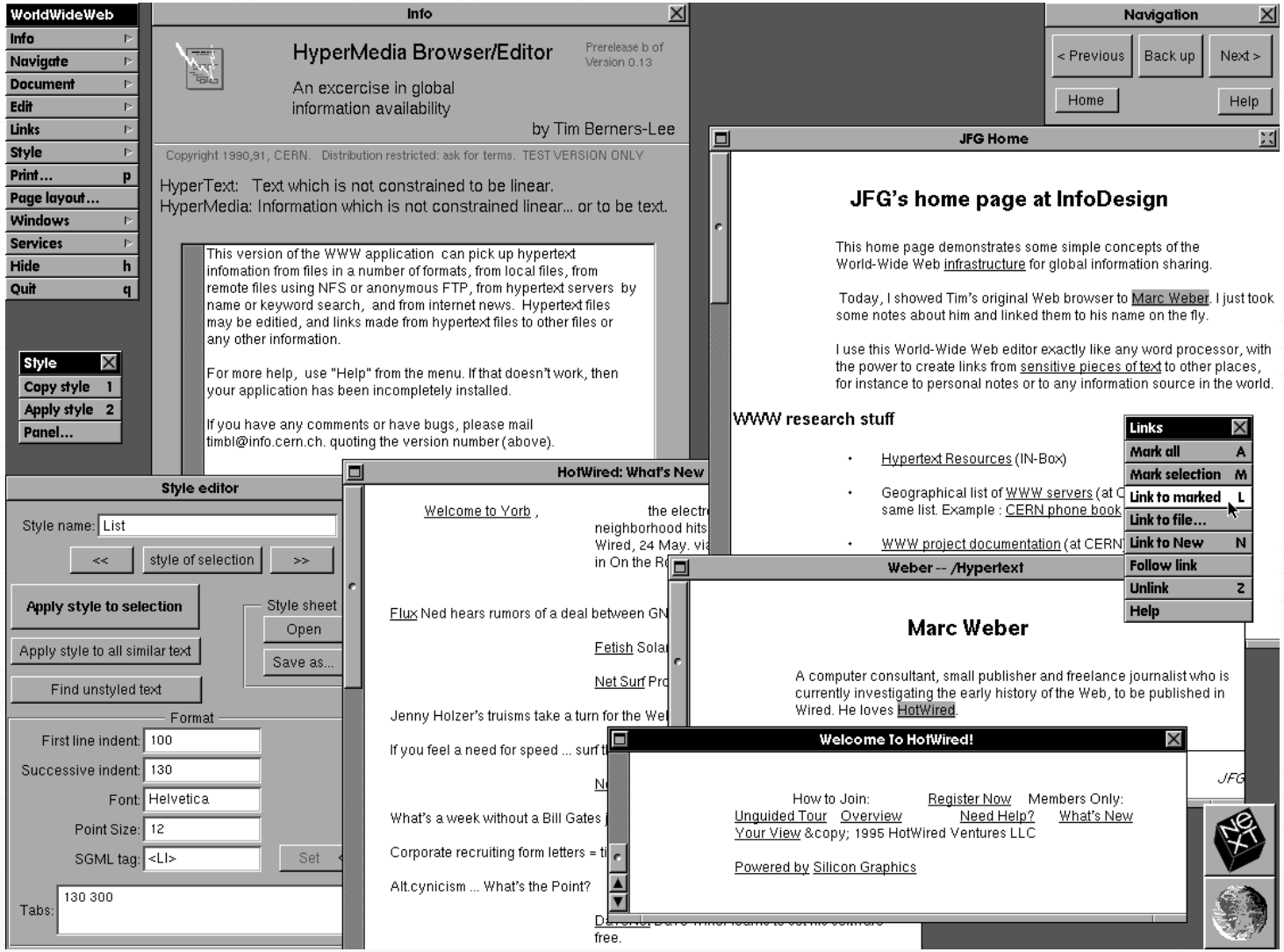
The World Wide Web project (w3.org)

In 1991, Berners-Lee published the first website, which provided information about the Web and how to use it.

He also created the first Web browser, which was called World Wide Web.

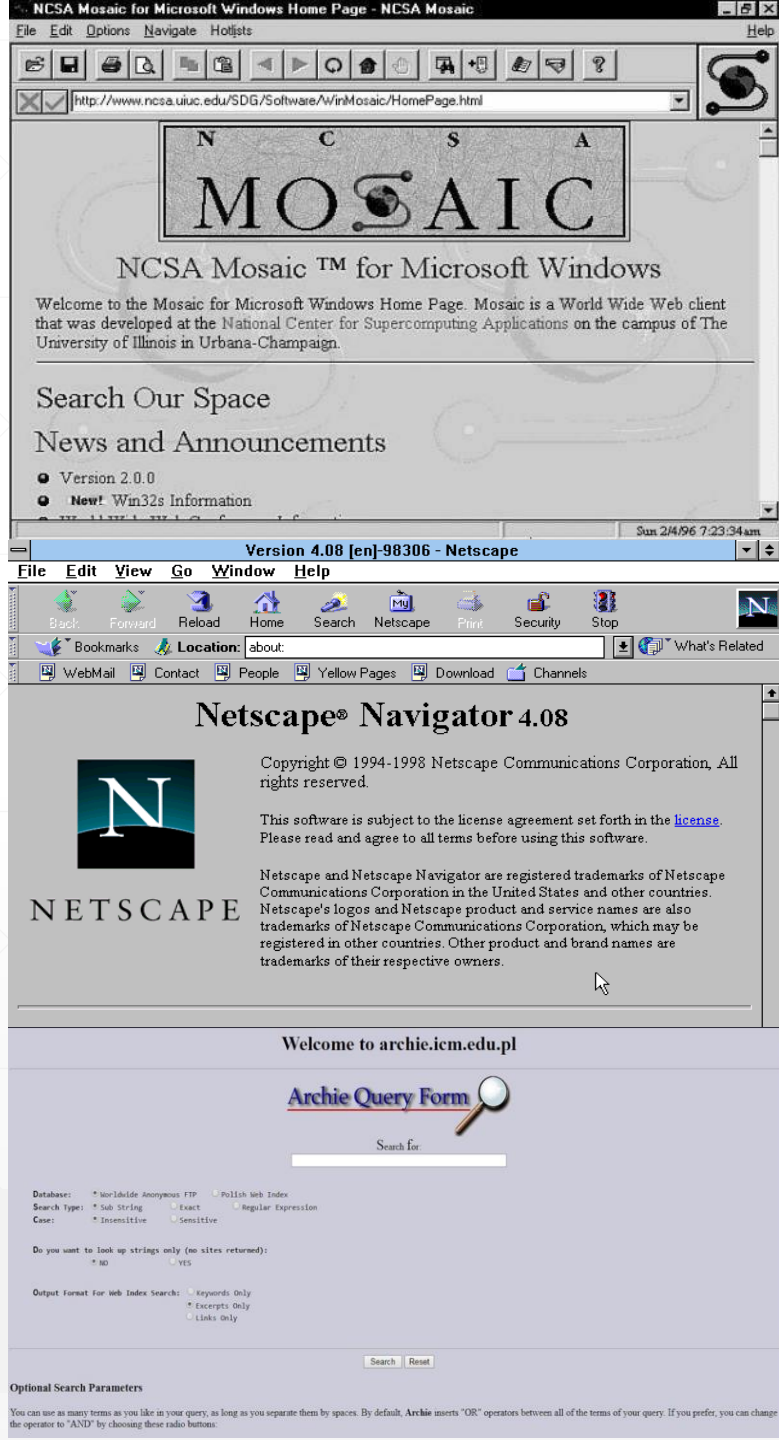
The first website contained basic information about the Web, including instructions on how to use a browser and create a Web page.

The 1st ever web browser



tims_editor (1120×832) (w3.org)

- In 1993, **the Mosaic browser** was released, which featured a user-friendly graphical interface and helped to popularize the Web.
- The Mosaic browser was developed by Marc Andreessen and his team at the National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign.
- Andreessen went on to found Netscape Communications Corporation, which developed **the first commercial Web browser, Netscape Navigator.**
- The creation of the first search engine, **Archie** in 1990 and popular engines like Yahoo!, in 1994, made it easier to find information on the Web.
- The introduction of e-commerce in the mid-1990s allowed businesses to sell products and services online, and the rise of social networking sites in the early 2000s transformed the Web into a platform for personal communication and community building.



Static and Dynamic Web Pages

- **Content:** Static pages have fixed content, while dynamic pages can display different content based on user input or other factors.
- **Speed:** Static pages are typically faster to load than dynamic pages, since there is no processing required on the server.
- **Maintenance:** Static pages are easier to maintain, since they do not require server-side processing or dynamic content generation.
- **Interactivity:** Dynamic pages allow for more interactivity and user engagement, with features such as forms, search bars, and social media integration.

Web 1.0 vs Web 2.0 vs Web 3.0

1.0	2.0	3.0
• Early days of the WWW • Static web pages that provided information to users • One-way flow of information, with website owners providing content that users could read, but not interact with • Websites were mostly simple and consisted of text and static images	• Current stage of the World Wide Web, with greater interactivity and user participation • Dynamic, interactive platforms that allow users to create, share, and interact with content • Web 2.0 technologies include social media, wikis, blogs, and other interactive web applications that allow users to collaborate and share information	• Also known as the Semantic Web • The next generation of the World Wide Web • Goal is to make the web more intelligent and useful by enabling machines to understand and interpret web content.

Protocols governing the Web

1. **Hypertext Transfer Protocol (HTTP):** HTTP is the protocol used for transferring data over the web. It defines the format of the request and response messages that are exchanged between the client and the server.

2. **Transmission Control Protocol (TCP):** TCP is a protocol that provides reliable, ordered, and error-checked delivery of data between applications running on different hosts. It works together with IP (Internet Protocol), which provides the routing mechanism to ensure that data is delivered to the correct destination.

3. **Domain Name System (DNS):** DNS is a protocol that translates domain names into IP addresses. It allows users to access websites using a memorable name (such as www.example.com) instead of a numerical IP address (such as 192.168.1.1).

4. **Secure Sockets Layer (SSL) and Transport Layer Security (TLS):** SSL and TLS are protocols used for secure communication over the web. They provide encryption and authentication to ensure that sensitive data is transmitted securely

Web Programming Technologies

- Front-end languages: HTML, CSS, JavaScript
- Back-end languages: PHP, python, Java
- Front-end frameworks and libraries: Angular.js, React.js, jQuery, SASS, and Flutter.
- Back-end frameworks and libraries: Laravel, Express, Spring, and Django.
- Full Stack development: This includes front-end and back-end as well as databases

Questions

1. What are the differences between the web browser and the search engine?
2. Does every internet-based application use the web?
3. What is the difference between WWW vs Website?
4. Do we need the internet to access the WWW?
5. Before the WWW, how was the internet used to share information? What was the aim of developing the WWW?
6. Why do we need URLs? Why can't we use IP addresses instead?
7. Is the internet the same as the web?

Thank you