Information Technology

Spring 23-24

Semester 4

- Web Technology

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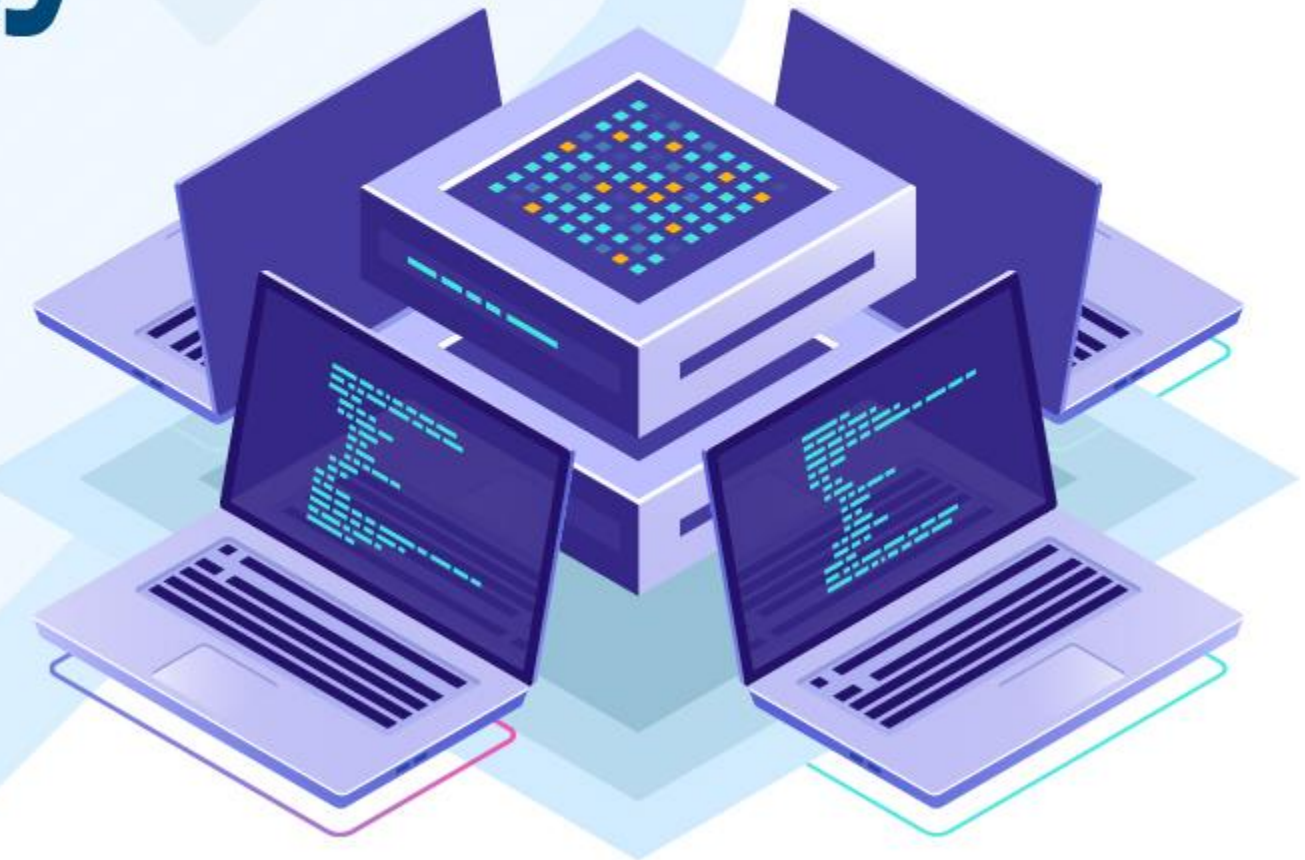

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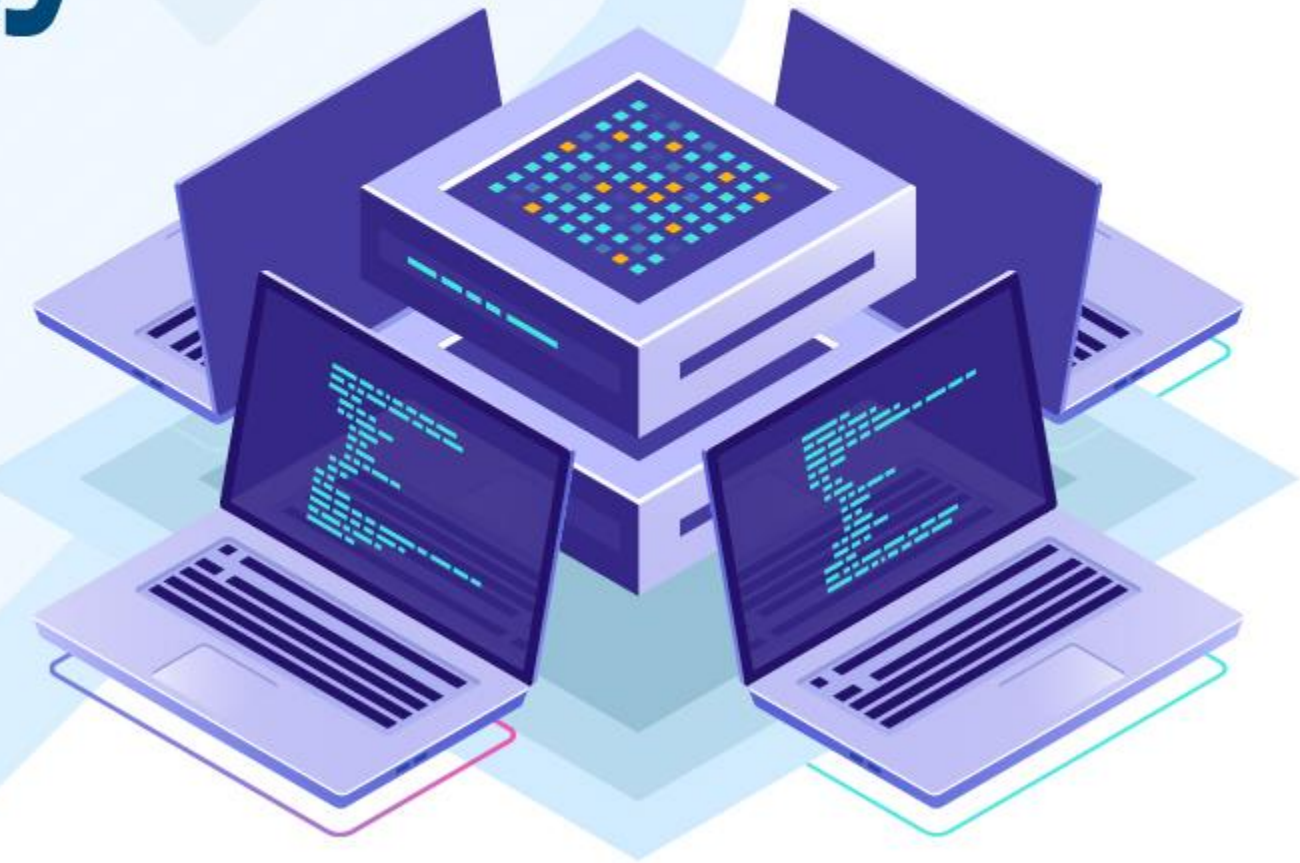
Information Technology

- Introduction to
- internet concepts



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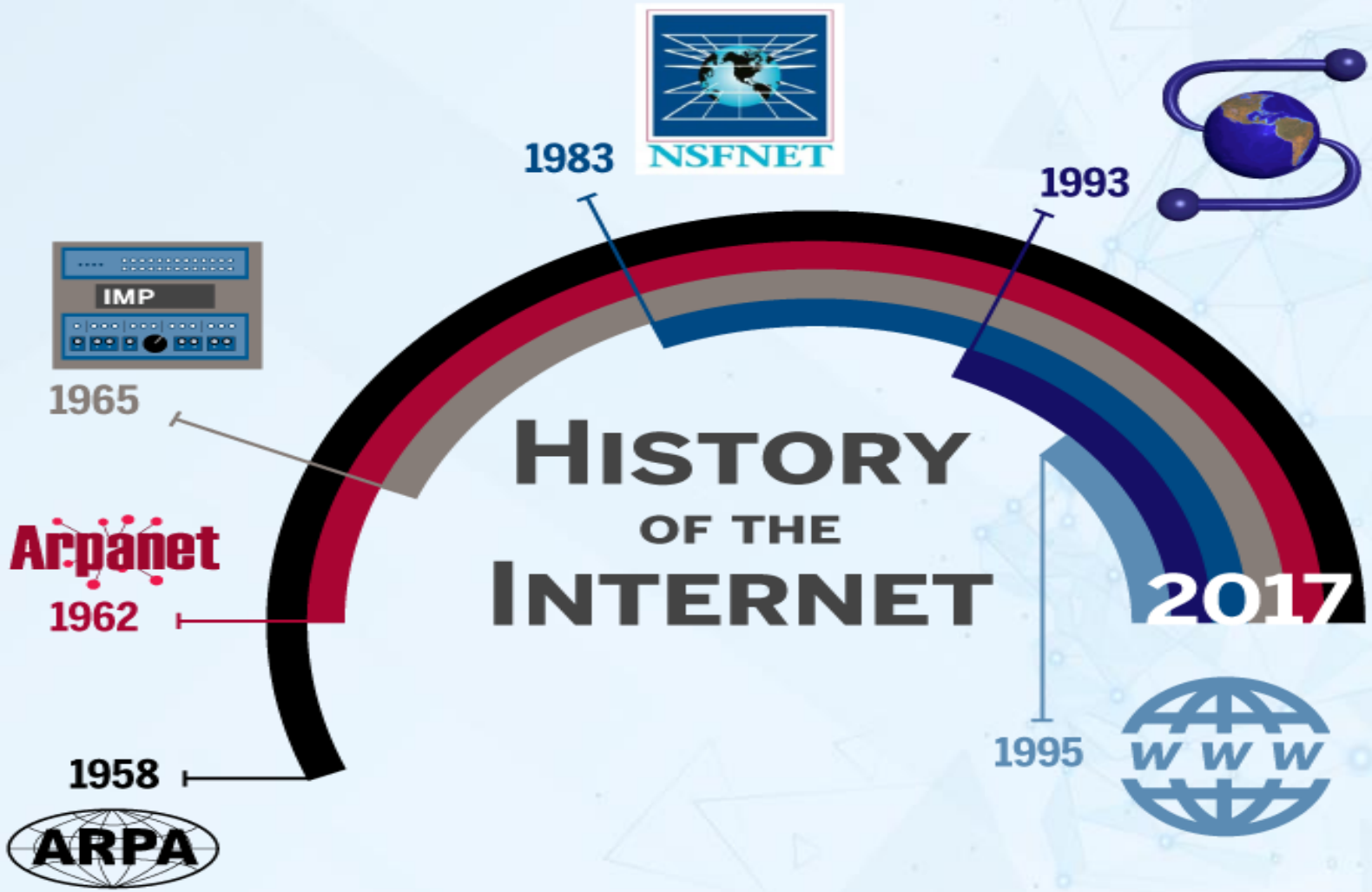
History of the Internet



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Evolution of the Internet

- The concept of a network connecting computers was under development by both government and university researchers looking for a better means to communicate and share research, so they collaborated together.

Evolution of the Internet

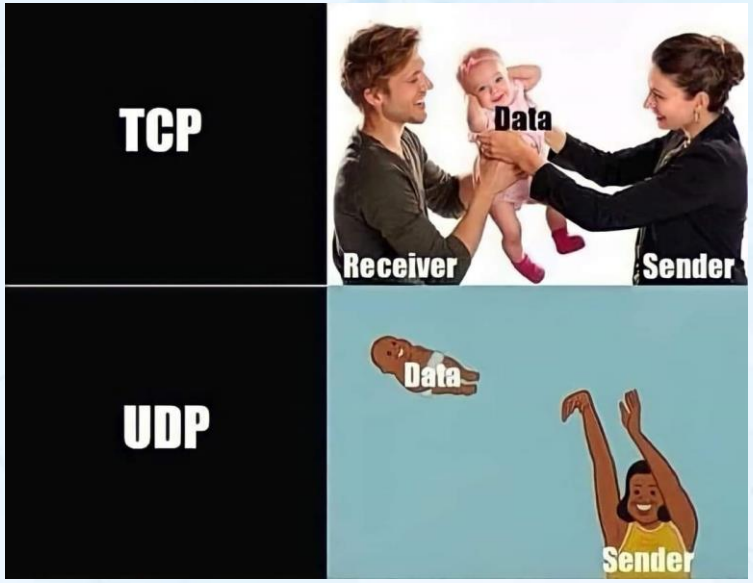
- In order to standardize the way networked systems communicated, the Transfer Control Protocol/Internetwork Protocol (TCP/IP) was created.
- TCP/IP is used for electronically addressing and transmitting information over the internet
- As various network systems migrated to this standard, they could then communicate with any network using the protocol.
- The Internet was born.

Evolution of the Internet

- Email was soon to follow, as users of the networks were interested in the timely transmission and notification of messages, this form of messaging fit one of their initial goals.

Evolution of the Internet

- As time progressed, additional protocols were developed to address particular tasks, like:
  - **FTP (File Transfer protocol)** for file transfers
  - **UDP (User Datagram Protocol)** is a communications protocol that is primarily used to establish low-latency and loss-tolerating connections between applications on the internet. UDP speeds up transmissions by enabling the transfer of data before an agreement is provided by the receiving party.



How has this network grown?

- Initially, ARPANET connected four nodes
- As the network grew, hundreds of colleges and universities networks were connected to ARPANET.
- These networks consisted of a mixture of DOS- based and Windows-based computers, Apple Macintosh computers, and UNIX workstations.
- Later, protocols were developed for tying this mix of computers and networks together.
- The first networking protocol used on the ARPANET was the Network Control Program. In 1983 it was replaced with the TCP/IP protocol which quickly became the most widely used network protocol in the world.

Addressing schemes

- **TCP/IP** (Transmission Control Protocol/Internet Protocol) is the standard set of rules for electronically addressing and transmitting data over the internet.
- TCP/IP includes an Internet addressing scheme that allows users and applications to identify a specific network or host with which to communicate.

Uniform Resource Locator (URL)

- A URL is needed to locate any resources on the Web.
- It could be thought of a URL as the name of a file on the World Wide Web because most URLs refer to a file on some machine on the network, however they can also point to other resources on the network, such as database queries and command output.
- A URL has two main components:
  - For example http://www.apple.com.
    - **The Protocol identifier** is http.
    - **The Resource name** is www.apple.com.
  - Note that the protocol identifier and the resource name are separated by a colon ":" and two forward slashes "// ".

Uniform Resource Locator (URL)

- **The protocol identifier** indicates the name of the protocol to be used to fetch the resource.
  - The example uses the Hypertext Transfer Protocol (HTTP), which is typically used to serve up hypertext documents.
  - Other protocols include File Transfer Protocol (FTP), Gopher, File, and News.

Addressing schemes

- Internet addressing is done by IP address
- A unique IP address identifies each device on a network; a computer, printer, or any other device on the Internet
- It is a 32 bit addressing scheme to identify the devices on a network, divided into four octets, of eight bits each.
- Each of these four octets is represented in a decimal form, and separated by a dot.
  - For example, 198.172.168.10

Domain Name system (DNS)

- Computers communicates with each other using numbers as addresses.
- For humans IP address is not easy to remember such long numbers, so words were used.
- Therefore, we need a system which translates those words into numbers; i.e. **the Domain Name System (DNS)**.
- It translates the easy to remember name “www.eelu.edu.eg” into the number 196.219.3.89 which is required by the computer.

Names & Addresses: Internet View

- **Addresses:**
  - Is how to reach an object and it has location semantics associated to it
  - It is in a format easy to process by computers
  - **Example:**
    - IP address: 192.123.12.2
- **Name:**
  - Doesn't have any location semantics associated to it
  - It is in a format easier to understand/read/remember by people
  - **Example:**
    - Name: www.yahoo.com

Web Browsers

- To access the World Wide Web you need an Internet connection and a web browser.
- A **web browser** is a software application for retrieving and displaying web pages and other resources on the World Wide Web.
  - Other resources could be “pdf” files, images, videos, audio files or others.

Web Browsers

- Each resource is identified by Uniform Resource Identifier (URI) which is a broader concept than URL.
- URI contains two subsets, URN, which tell the name, and URL, which tells the location. URL is the subset of URI, which tells the only location of the resource.
- Information resources may contain hyperlinks to other information resources.
- Each link contains the URI of a resource to go to. When a link is clicked, the browser navigates to the resource indicated by the link's target URI, and the process of bringing content to the user begins again.

Web Browsers

- Although **Web Browsers** are primarily intended to access the World Wide Web, they can also be used to access information provided by web servers in private networks or files in file systems.

- The major web browsers are Firefox, Google Chrome, Internet Explorer, Opera and Safari.

WWW Basics

- Web documents are formatted in a markup language called **HTML** (HyperText Markup Language)
  - **HTML** is a language that includes a set of tags attached to text. These tags describe the relationship between text elements.
  - HTML supports links that allows the user to quickly move from one document to another, even when the documents are stored in different computers, they may also have graphics, audio, and video files.
- A **Web site** is a collection of related Web pages.
- Once a web browser retrieves a web page, it passes it to the browser's layout engine to be transformed from HTML to an interactive document.

How Web Browsing Works

- First the user has to type a URL in the address bar of his web browser or click on a hyperlink in an already open web page.
- The web browser will extract the domain name and look it up in a domain name server (DNS)
- The domain name server returns the corresponding IP address if the domain name was correct. (A number of name servers may be involved in getting the right IP address.)
- Once the IP address is retrieved, the web browser sends a request to the target web server asking for the requested resource.
- The request travels through routers on the Internet until it reaches the web server. If the resource is available, it will be returned to the web browser to display for the user, otherwise 404 error will be returned. (404 is an HTTP standard response code indicating that the client was able to communicate with the server but the requested resource was not found.)

The History of web browser (1 of 15)

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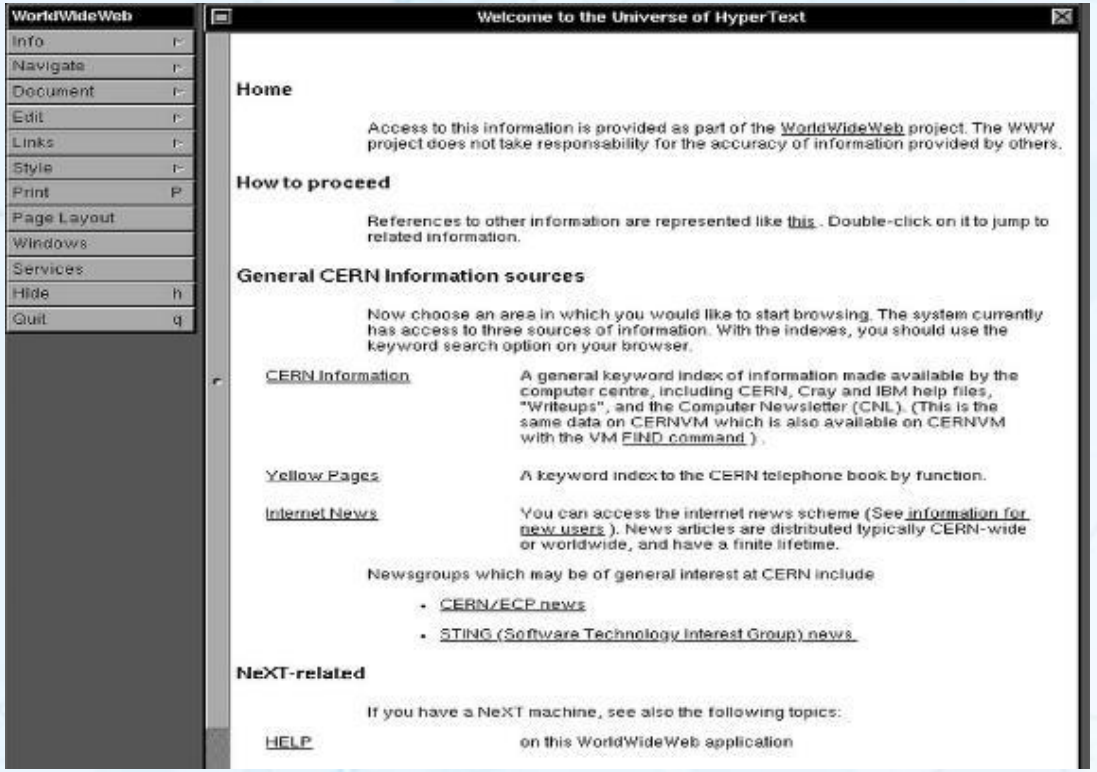
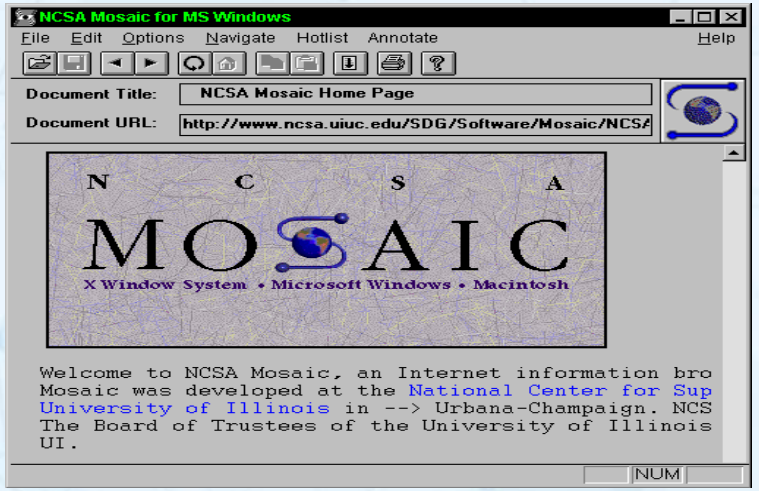
The History of web browser (2of 12)

- The first web browser was called *WorldWideWeb* was developed in 1990 using **NeXT** computer.
- To avoid confusion with *the* World Wide Web, it was renamed **Nexus**.
- Nexus was developed for **NeXTStep operating system**; both a browser and an editor, Nexus used a graphical user interface (GUI), with limited capabilities.
- The browser could not display web pages with embedded graphics but did allow users to connect to the internet.



The History of web browser (3 of 12)

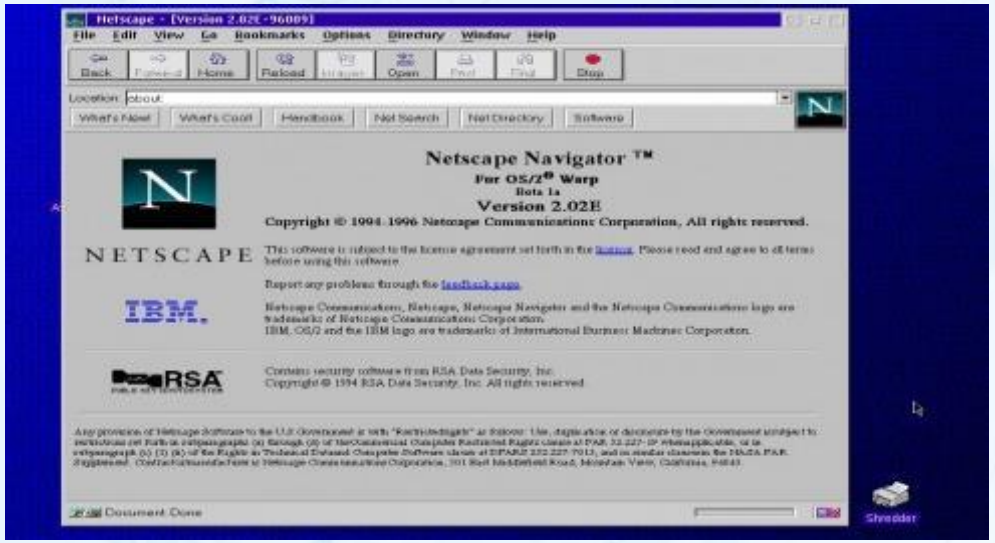
- **MOSAIC** web browser was developed in 1993, it was the first commercially available and the world's first popular internet browser.
- Mosaic incorporated the initial functionalities offered by Nexus and embedded graphics directly in web pages.



- It was compatible with Microsoft Windows, Macintosh, and Unix X Window System - the most commonly used operating systems at the time.
- Mosaic was the first browser to display images inline with text instead of displaying images in a separate window, while often described as the first graphical web browser.

The History of web browser (4 of 12)

- The Mosaic-influenced Netscape Navigator was developed in 1994, which quickly became the world's most popular browser, accounting for 90% of all web use at its peak.



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The History of web browser (5 of 12)

- The **Internet Explorer** 1.0 was released by Microsoft to challenge the Netscape navigator. In 1995, Bill gates launched Internet Explorer 2.0. His intentions were to dominate the market.
- Bundled with Windows, Internet Explorer 6.0 gained dominance in the web browser market; Internet Explorer usage share peaked at over 95% by 2002.

The History of web browser (6 of 12)

- The first publicly available version of **Opera** was released in 1996.
- It is a browser software which can be used on Windows, Linux, Android, iOS and macOS operating systems.
- In 1998 Opera Software started to develop a web browser for mobiles.
- Gaming devices such as the Nintendo DS and Nintendo Wii used it as their browser.

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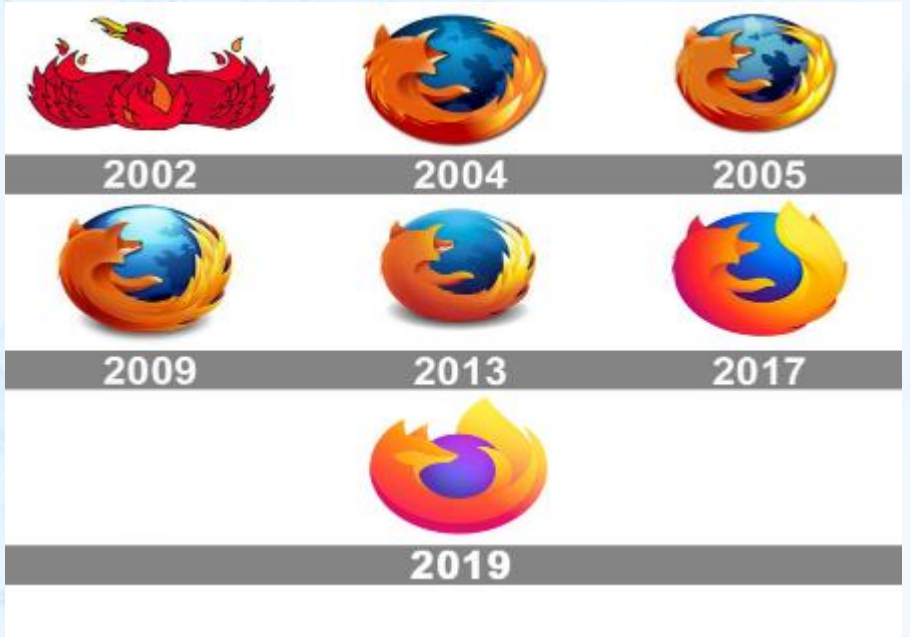
The History of web browser (7 of 12)

- The **Mozilla** project was created in 1998 with the release of the **Netscape browser** suite source code
- In 1998, Netscape launched what was to become the Mozilla Foundation in an attempt to produce a competitive browser using the open source software model.
- **Firefox 1.0** was released in 2004 and became a big success in less than a year, it was downloaded over 100 million times.



The History of web browser (8 of 12)

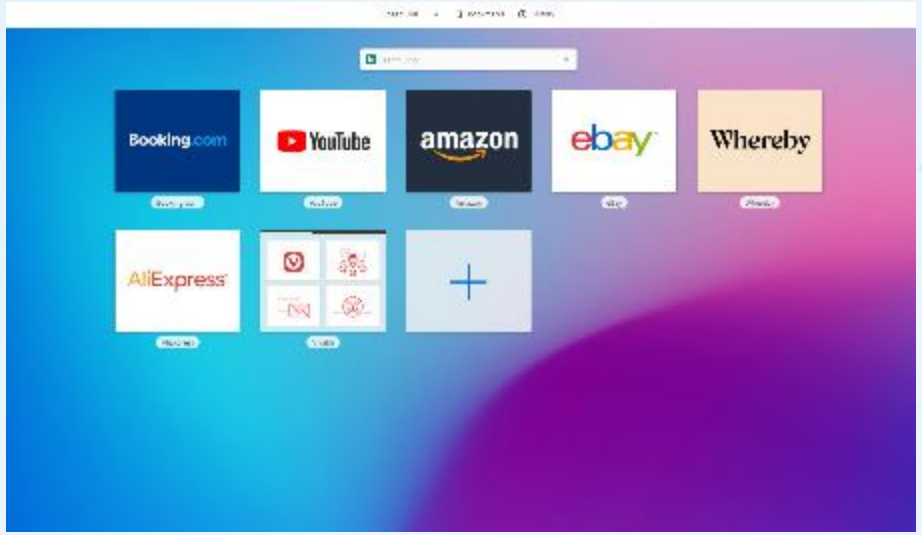
- **Apple's Safari** had its first beta release in January 2003; as of April 2011, on desktop with Mac OS X Panther, it has a dominant share of Apple based web browsing, accounting for just over 7.15% of the entire browser market.
- A mobile version has been bundled with iOS devices since the iPhone's introduction in 2007.
- **Safari** is the default browser on **Apple** devices.
- A **Windows** version was available from 2007 to 2012.

The History of web browser (9 of 12)

- **Google Chrome** was released in September 4, 2008, when Google was looking to create a better, more modern browser.
- The browser's source code was made available to the public via its open-source counterpart, the Chromium browser, and Google pulled components from Apple's WebKit and Firefox to develop it.
- Chrome's take-up has increased significantly year on year, by doubling its usage share from 7.7% to 15.5% by August 2011.

The History of web browser (10 of 12)

- On January 2015 **Vivaldi** was released, it is a PC browser with several unique features that provides users with a quick and safe surfing experience by removing ads and trackers.
- Android, Mac, Linux, and Windows users can use the browser.
- It can be used in **53 different languages**.
- Vivaldi offers an **adaptable UI** that adjusts the colors of the tabs and associated regions in real-time to match the website's color scheme. For example; if you visit a blog on Vivaldi, the tabs and theme color will change to Blue and Black, but if you visit Facebook.com, the theme color will vary to Blue.



The History of web browser (11 of 12)

- On April 2015 Microsoft released Microsoft **Edge** as the official **browser** that represents a total revolution with respect to the classic **Internet** Explorer.
- The Edge icon, a blue letter "e," is similar to the Internet Explorer icon, but **they are separate applications.**
- Microsoft Edge allows you to surf the internet while also giving you access to services such as personalizing and designing your home page, shopping while saving time and money, and being organized. Collecting, organizing, sharing, and exporting online material to **Word** or **Excel** in an easy manner.
- **Microsoft** Edge browser with Chromium at its core is the default browser on Windows OS, with iOS, Android, and Mac versions available.

The History of web browser (12 of 12)

- On January 2016 **Brave** was released**.**
- Brave is a free web browser that removes advertisements and trackers from websites. It runs on Windows, Mac OS, Linux, Android, and iOS.
- The browser is high-speed and gets regular, reliable upgrades because it is open source and chromium-based.

Review Questions

MCQ

1. A network that links many different types of computers all over the world.
   a. Intranet
   b. Internet
   c. Arpanet
   d. LAN

   B

2. Protocol used for electronically addressing and transmitting information over the internet.
   a. TCP/IP
   b. FTP
   c. UDP
   d. HTTP

   A

Review questions

3. Which of the following is not a web browser?
   a. Opera
   b. WWW
   c. Google chrome
   d. None of the above

B

4. …… was the first web browser to display images inline with text
   a. Internet Explorer
   b. Netscape Navigator
   c. Mozilla Firefox
   d. Mosaic

D

Review questions

5. A website is a collection of
    a. Webpages
    b. HTTP pages
    c. HTML pages
    d. All of the above

A

6. A _____ is a document commonly written and is accessible through the internet or other network using a browser?
    a. Accounts
    b. Data
    c. Web page
    d. Search engine

C

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Review Questions

T/F

1. The Internet is owned by the US government. F
2. Internet had evolved from the basic ideas of ARPANET. T
3. The first networking protocol used on the ARPANET was TCP/IP F
4. Cable companies define standards for internet F
5. An IP address is a unique number that's assigned to each device on a network T

How do you think the search engine works?

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THANK YOU FOR WATCHING

QUESTIONS?