

Introduction

ONE LOVE. ONE FUTURE.

Contents

1. Web Developer Roadmap
2. Internet and Web
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4. DNS, Web Hosting, HTTP, URI

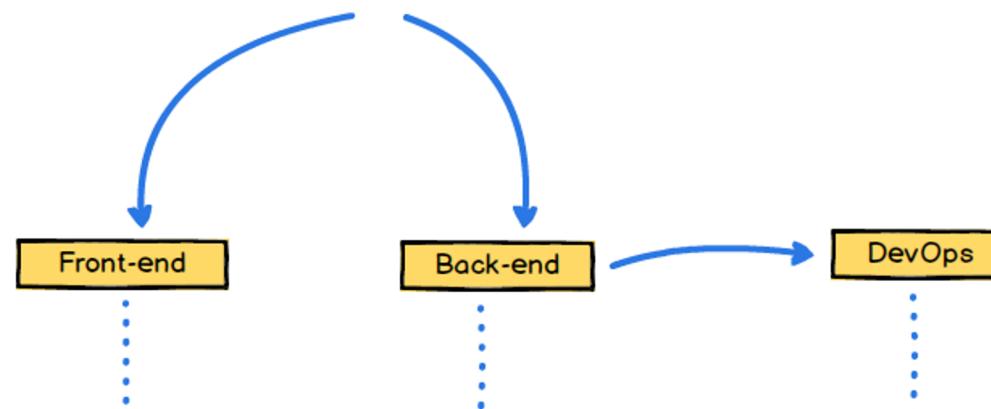
1. Web Developer Roadmap

Required for any path

- Git - Version Control
- Basic Terminal Usage
- Data Structures & Algorithms
- SOLID, KISS, YAGNI
- GitHub
- Licenses
- Semantic Versioning
- SSH
- HTTP/HTTPS and APIs
- Design Patterns
- Character Encodings

Web Developer

Choose your path



Legends

- Personal Recommendation!
- Available Options

<https://roadmap.sh/>

Frontend



Related Roadmaps

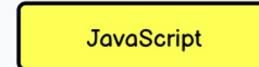
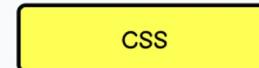
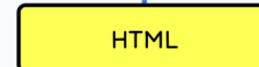
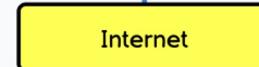
- ✓ JavaScript Roadmap
- ✓ React Roadmap
- ✓ TypeScript Roadmap
- ✓ Node.js Roadmap

HTML, CSS and JavaScript are the backbone of web development. Make sure to practice by building lots of projects.

Beginner Project Ideas

- ✓ React
- ✓ Vue.js
- ✓ Angular

Front-end



At this point, you should be able to build modern vanilla JS frontend applications.

Intermediate Project Ideas

How does the internet work?

What is HTTP?

What is Domain Name?

What is hosting?

DNS and how it works?

Browsers and how they work?

✓ npm

✓ yarn

✓ pnpm

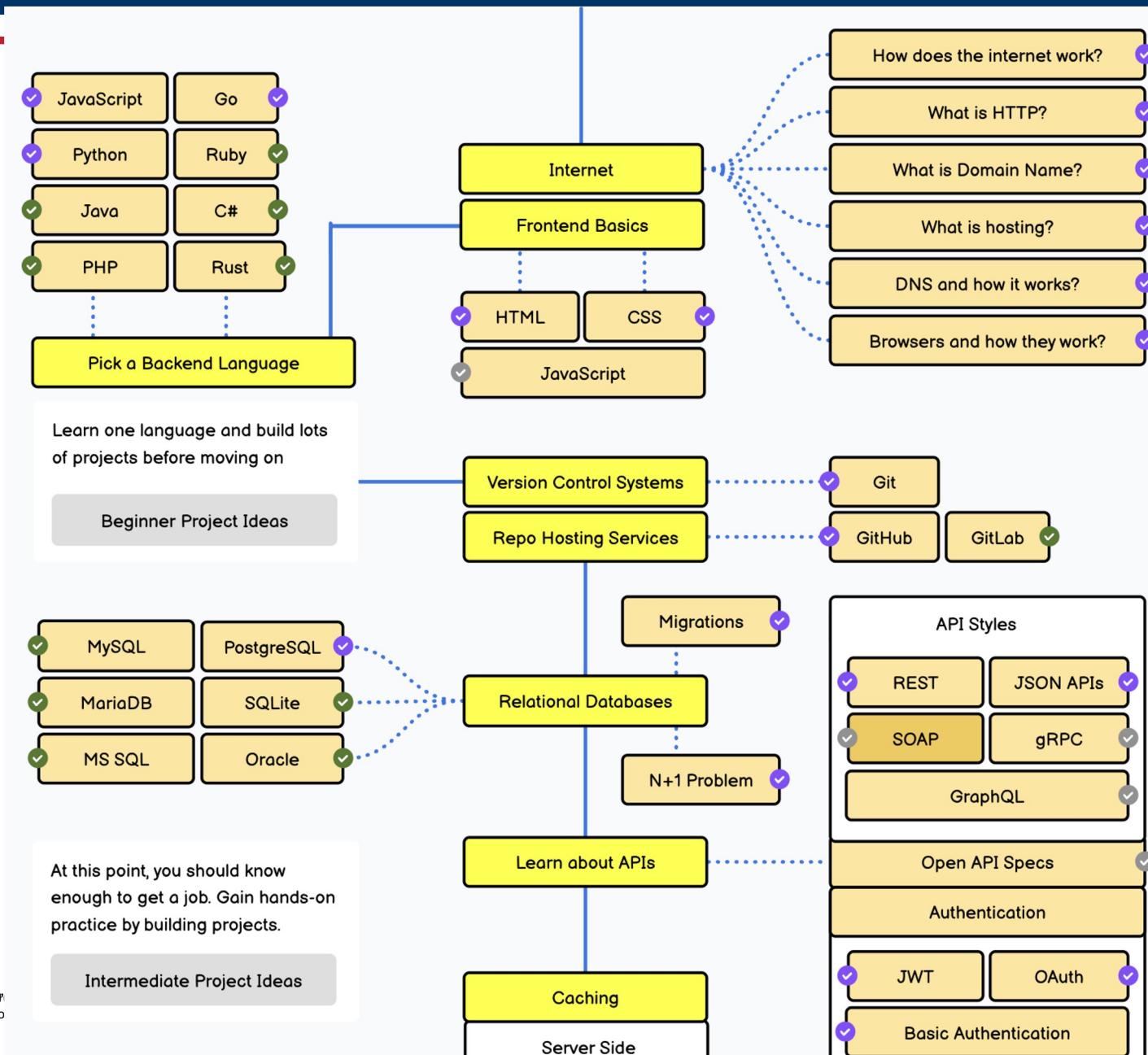
✓ Bun

Package Managers

CSS Frameworks

✓ Tailwind

Backend



Web Development

Tiêu chí	🌐 Web Development	🤖 AI / Machine Learning	📈 Data Science	🔗
Cơ hội nghề nghiệp tại VN	Rất nhiều, dễ xin việc ở startup, outsource, thương mại điện tử, fintech	Ít hơn, chủ yếu ở tập đoàn lớn, viện nghiên cứu, startup AI	Đang tăng mạnh, ngân hàng, bán lẻ, logistics, healthtech đều cần	
Cơ hội quốc tế / remote	Nhiều job freelance, remote dev (React, Node.js, Next.js)	Cao, nhưng cạnh tranh toàn cầu, yêu cầu nền tảng toán vững	Rất cao, mọi công ty data-driven đều tuyển (Data Analyst/Engineer/Scientist)	
Lương VN (2025)	Fresher: 8–12tr Junior: 15–20tr Senior: 30–60tr+	Fresher: khó xin việc Junior: 20–30tr Senior: 40–80tr+	Data Analyst: 12–20tr Data Scientist: 25–50tr+	
Lương quốc tế / remote	~1.200–3.000 USD/tháng	~2.000–6.000 USD/tháng	~1.500–4.000 USD/tháng	
Thuận lợi	- Dễ tiếp cận, nhanh đi làm - Nhu cầu ổn định	- Lương cao nếu giỏi - Làm việc ở Big Tech/du học dễ	- Ứng dụng rộng (mọi ngành) - Job tăng nhanh	
Khó khăn	- Cạnh tranh nhiều - Công việc cơ bản dễ bị AI hỗ trợ thay thế	- Yêu cầu toán cao - Ít job entry-level VN	- Cần cả code + business - Yêu cầu giao tiếp dữ liệu tốt	

Job Opportunity



Frontend Developer

CÔNG TY CỔ PHẦN DỊCH VỤ VÀ GIẢI PHÁP CÔNG NGHỆ GIÁO DỤC PHX

Hà Nội 2 năm

18 - 25 triệu

Frontend Developer | IT - Phần mềm | Nghỉ thứ ... | +1

Đăng 1 tuần trước



Frontend Developer - Thu Nhập Gross Upto 32 Triệu (Hỗ Trợ Ăn Trưa) Tại

22 - 32 triệu

Hà Nội ✓

OPEN REACH TECH HANOI

Hà Nội 2 năm

Frontend Developer | IT - Phần mềm

Đăng 4 tuần trước



(Middle, Senior) BackEnd Engineer (Java, Spring Boot) - Khối Công Nghệ

15 - 30 triệu

Thông Tin (HOLT.11) ✓

Pro NGÂN HÀNG THƯƠNG MẠI CỔ PHẦN QUÂN ĐỘI

Hà Nội 2 năm

Backend Developer | IT - Phần mềm

Đăng 5 ngày trước



Middle Java Developer

15 - 30 triệu

CÔNG TY CỔ PHẦN GOGROUP

Hà Nội 2 năm

Fullstack Developer | Ngân hàng | Nghỉ thứ 7 | Tu... | +1

Đăng 1 tuần trước



TRƯỜNG CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN
TINH
School of Information and Communication Technology

LLM and Web Developer

2. Vì sao Web Dev chưa bị đào thải

- Doanh nghiệp cần người hiểu yêu cầu thực tế: AI không tự biết business logic, luật pháp, nghiệp vụ ngành.
- Web = nền tảng của mọi dịch vụ online (ngân hàng, thương mại điện tử, giáo dục, chính phủ điện tử). Không thể biến mất.
- AI chỉ hỗ trợ code, còn việc thiết kế hệ thống, bảo mật, tối ưu, tích hợp API, trải nghiệm người dùng vẫn cần con người.
- Các công ty cần dev biết cách dùng AI để làm nhanh hơn, chứ không phải thay thế hoàn toàn dev.

3. Xu hướng kỹ năng Web Developer cần để không bị "thua AI"

- Chuyển từ "coder" → "problem solver": không chỉ code, mà hiểu business, đưa giải pháp.
- Biết AI-assisted development: dùng ChatGPT/Grok để tăng tốc, chứ không sợ bị thay thế.
- Fullstack & Cloud: biết cả frontend + backend + triển khai cloud (AWS, GCP, Azure).
- Bảo mật, tối ưu, kiến trúc hệ thống: AI khó tự động hóa hoàn toàn.
- UX/UI & tư duy sản phẩm: thiết kế trải nghiệm người dùng tốt là lợi thế lâu dài.

2. Internet and Web

Questions:

- What is the World Wide Web?
- Is it the same thing as the Internet?
- Who invented it?
- How does it work?

Web ≠ Internet

- Internet: a physical network connecting millions of computers using the same protocols for sharing/transmitting information (TCP/IP)
- World Wide Web: a collection of interlinked multimedia documents that are stored on the Internet and accessed using a common protocol (HTTP)
- Many other Internet-based applications exist e.g., email, telnet, ftp, usenet, instant messaging services, file-sharing services, ...

(A Very Brief) History of the Internet

- The idea of a long-distance computer network traces back to early 60's
 - Joseph Licklider at M.I.T. (a "time-sharing network of computers")
 - Paul Baran at Rand (tasked with designing a "survivable" communications system from a nuclear attack)
 - Donald Davies at National Physics Laboratory in U.K.
- In particular, the US Department of Defense was interested in the development of distributed, decentralized networks
 - survivability (i.e., network still functions despite a local attack)
 - fault-tolerance (i.e., network still functions despite local failure)
 - contrast with phone system, electrical system which are highly centralized services

The Internet

- In 1969, Advanced Research Project Agency funded the ARPANET
 - Connected computers at UC Los Angeles, UC Santa Barbara, Stanford Research Institute, and University of Utah
 - Allowed researchers to share data, communicate
- Technical origin
 - One of earliest attempts to network heterogeneous, geographically dispersed computers
 - Email first available on ARPANET in 1971 (and quickly very popular!)

Vietnam's Internet History



Stage	Timeline	Characteristics
Trial and Initial Phase	Before 1997	IOIT - AUS (1994), VDC - Sprintlink (1996)
Official Launch	19/11/1997	VNPT, Netnam, FPT..
Growth	Present	80% of the population

(A Very Brief) History of the Web

- In 1989, Tim Berners-lee designed a hypertext system for linking documents over the internet
 - Designed a (non-wysiwyg) language for specifying document content => Evolved into hypertext markup language (HTML)
 - Designed a protocol for downloading documents and interpreting the content => Evolved into hypertext transfer protocol (HTTP)
 - Implemented the first browser -- text-based, no embedded media

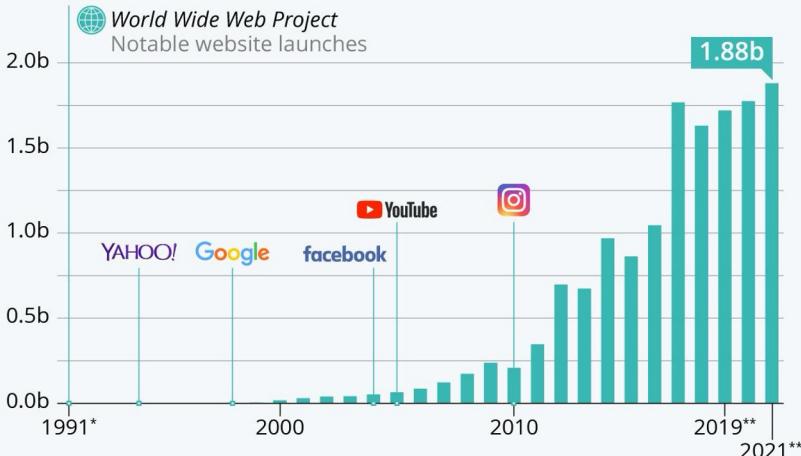
3. Web Browser

- The Web was an obscure, European research tool until 1993
- In 1993, Marc Andreessen and Eric developed Mosaic, one of the early graphical Web browsers
- Andreessen left NCSA to found Netscape in 1994
- 1995, Microsoft came out with Internet Explorer
- 1996, Opera web browser
- 2004, Firefox web browser, version 1.0
- 2008, Google Chrome
- Today, the Web is the most visible aspect of the Internet

Web Growth

How Many Websites Are There?

Number of websites online from 1991 to 2021



statista

Year	Computers on the Internet	Web Servers on the Internet
2011	~605,000,000	~250,000,000
2008		172,338,726
2006	439,286,364	85,541,228
2004	285,139,107	56,923,737
2002	162,128,493	33,082,657
2000	93,047,785	18,169,498
1998	36,739,000	4,279,000
1996	12,881,000	300,000
1994	3,212,000	3,000
1992	992,000	50

Google Chrome →

Firefox →

Safari →

IE, Opera →

Netscape →

Mosaic →

Web Browsers

- Primary tasks:
 - Convert web addresses (URL's) to HTTP requests
 - Communicate with web servers via HTTP
 - Render (appropriately display) documents returned by a server

Web Browsers - History



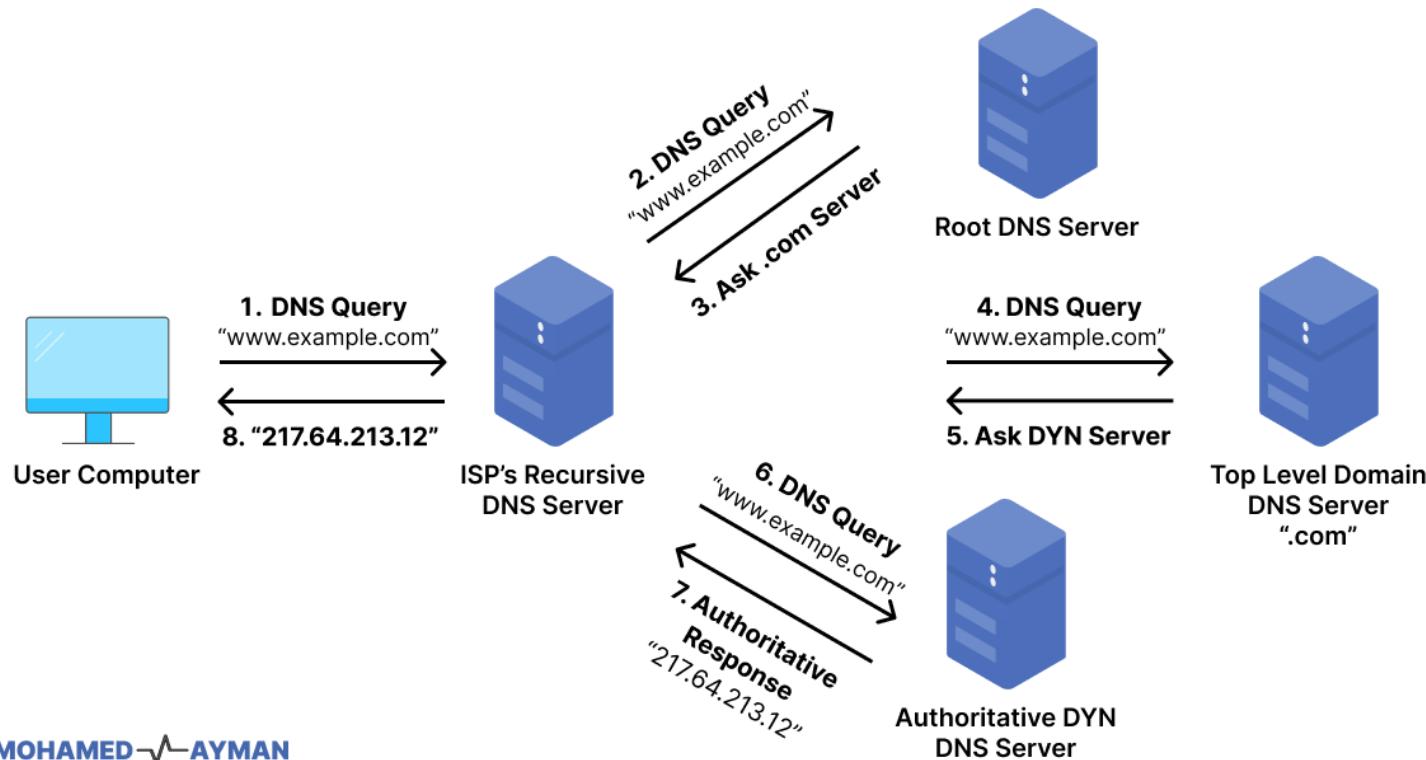
IE crew in front of Netscape building
IE 4.0, 1997



The next day

4. DNS, Web Hosting, HTTP, URI

- DNS: Domain Name System



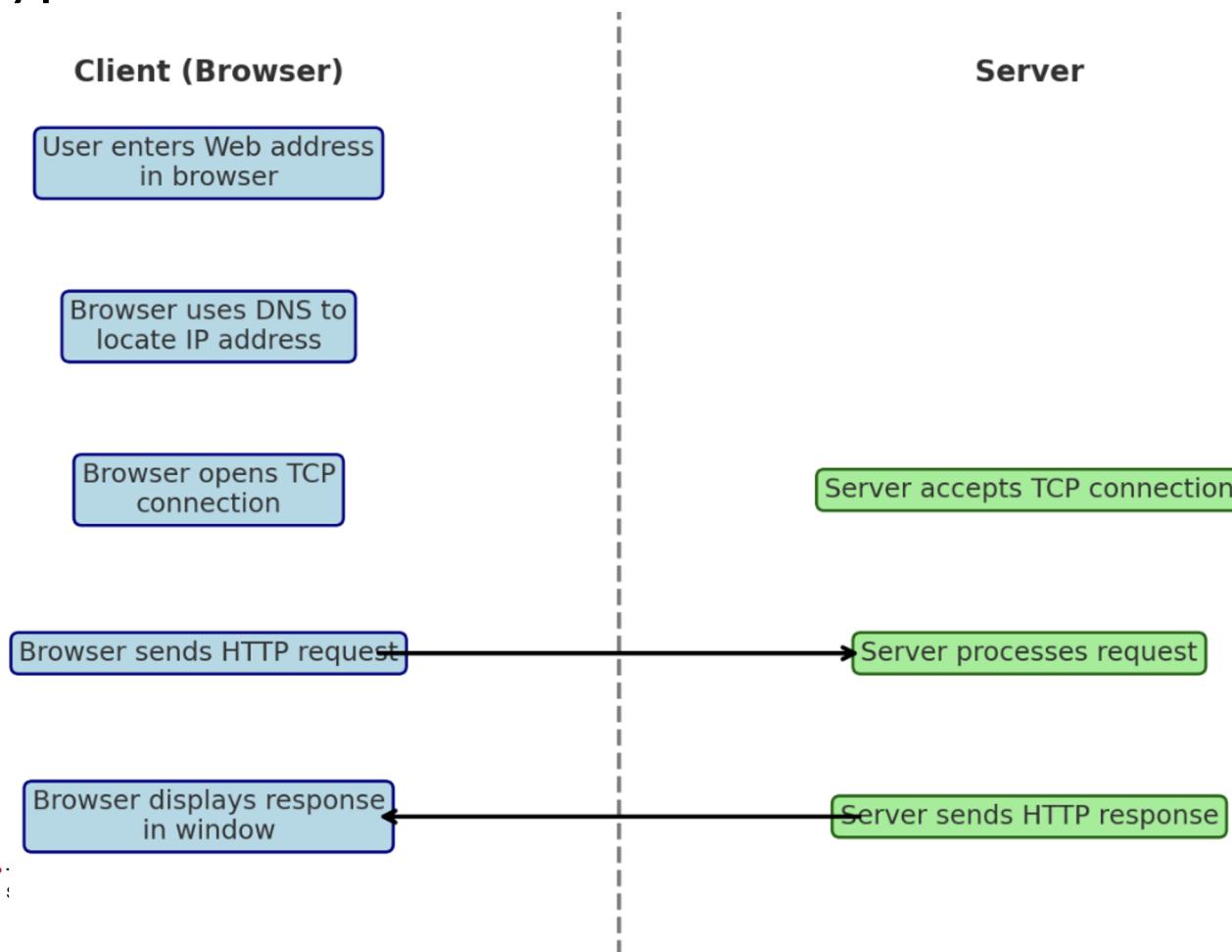
MOHAMED AYMAN

Hypertext Transport Protocol (HTTP)

- HTTP is based on the request-response communication model:
 - Client sends a request
 - Server sends a response
- HTTP is a stateless protocol:
 - The protocol does not require the server to remember anything about the client between requests.

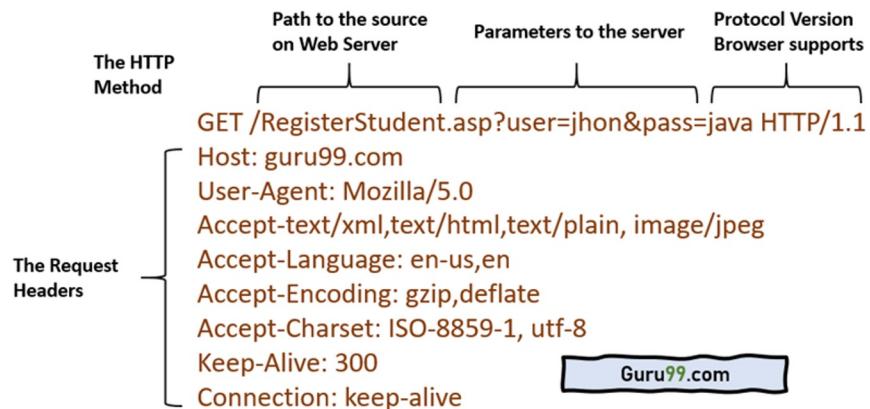
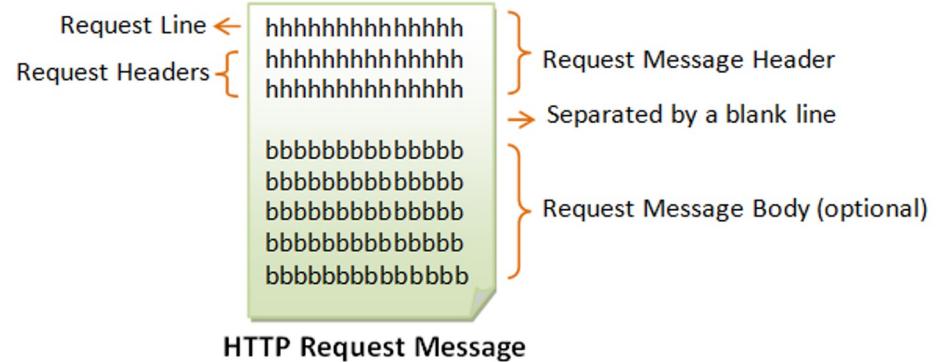
HTTP

- Normally implemented over a TCP connection (80 is standard port number for HTTP)
- Typical browser-server interaction:



HTTP Request

- Structure of the request:
 - request line
 - request headers
 - blank line
 - optional request body



HTTP Request

- Request line
 - GET /test.html HTTP/1.1
 - POST /index.html HTTP/1.1
- Three space-separated parts:
 - HTTP request method
 - Request-URI ([Uniform Resource Identifier](#))
 - HTTP version

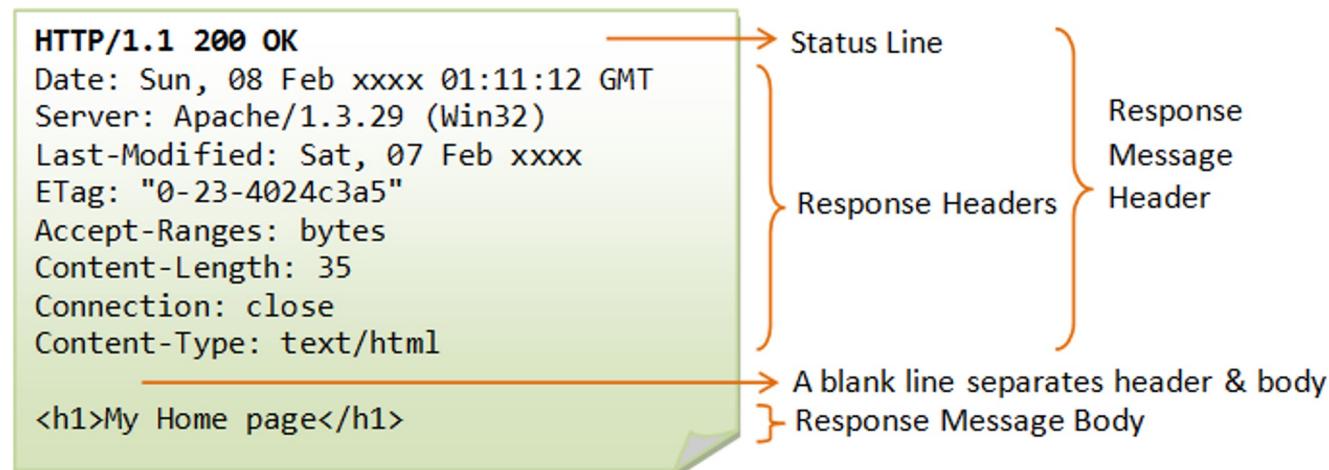
HTTP Request

- Request line
 - GET /test.html HTTP/1.1
 - POST /index.html HTTP/1.1
- Three space-separated parts:
 - HTTP request method
 - Request-URI
 - **HTTP version**
 - 1.1: 1997
 - 2: 2015
 - 3: 2022

- URI's are of two types:
- Uniform Resource Name (URN)
 - Can be used to identify resources with unique names, such as books (which have unique ISBN's)
 - Scheme is urn
- Uniform Resource Locator (URL)
 - Specifies location at which a resource can be found
 - In addition to http, some other URL schemes are https, ftp, mailto, and file

HTTP Response

- Structure of the response:
 - status line
 - header field(s)
 - blank line
 - optional body



HTTP Response

- Status line
 - Example: HTTP/1.1 200 OK
- Three space-separated parts:
 - HTTP version
 - status code
 - reason phrase (intended for human use)

HTTP Response

- Status code
 - Three-digit number
 - First digit is class of the status code:
 - 1=Informational
 - 2=Success
 - 3=Redirection (alternate URL is supplied)
 - 4=Client Error
 - 5=Server Error
 - Other two digits provide additional information
 - See <http://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html>

HTTP Response

- Common header fields:
 - **Connection**, **Content-Type**, **Content-Length**
 - **Date**: date and time at which response was generated (required)
 - **Location**: alternate URI if status is redirection
 - **Last-Modified**: date and time the requested resource was last modified on the server
 - **Expires**: date and time after which the client's copy of the resource will be out-of-date
 - **ETag**: a unique identifier for this version of the requested resource (changes if resource changes)

HTTP Request/Response Examples

```
Connect    { $ telnet www.example.org 80
              Trying 192.0.34.166...
              Connected to www.example.com
              (192.0.34.166).
              Escape character is '^]'.
Send      Request { GET / HTTP/1.1
                      Host: www.example.org
Receive   Response { HTTP/1.1 200 OK
                      Date: Tue, 11 Oct 2022 20:30:49 GMT
                      ...
```

Web Hosting

Web Hosting: a cloud service stores all the files that comprise a website on a server and makes the website accessible on the internet.

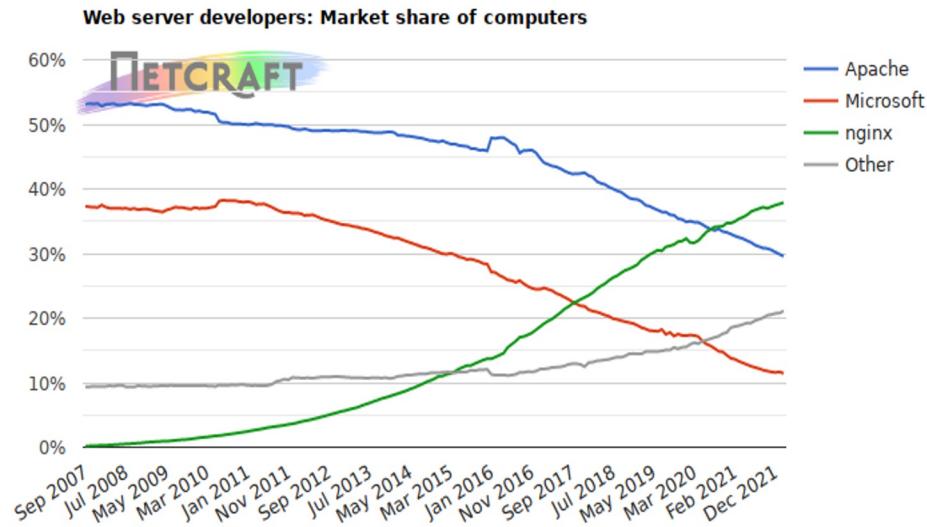


Web Hosting: main types

1. Shared hosting: multiple websites are stored on a same server
2. Virtual Private Server (VPS) hosting: a physical server is split into many VPS servers, each with its dedicated resources and OS.
3. Dedicated hosting: rents an entire physical server for your website
4. Cloud hosting: utilizes a network of interconnected servers to host a website.
5. Free web hosting: free service

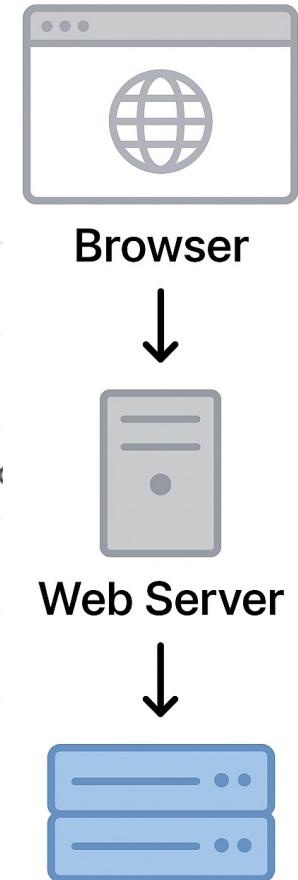
Web Servers

- Software or hardware responsible for handling HTTP/HTTPS requests from browsers and sending responses (usually web pages) back to users.
- Main Functions:
 - Receive requests from clients (browsers).
 - Process web files (HTML, CSS, JS, PHP...).
 - Return responses (web pages, data) to clients.
- Software Examples:
 - Apache HTTP Server
 - Nginx
 - Microsoft IIS



Web Servers vs Web Hosting

Criteria	Web Server	Web Hosting
Definition	Software/device serving web	Service for storing website online
Main Function	Handle HTTP/HTTPS requests	Store and maintain websites online
Includes Software	Apache, Nginx, IIS	Often includes web server pre-installed
Includes Hardware	Physical or virtual server	Server + management + services
Users	Developers, SysAdmins	Website owners, businesses
Examples	Nginx on a private VPS	Shared Hosting on Hostinger





Exercises

- Register a free domain name
 - <https://www.pavietnam.vn/vn/tin-tuc-uu-dai-so-huu-mien-phi-ten-mien-id-vn.html>
 - <https://www.matbao.net/ten-mien/ten-mien-mien-phi.html>
- Git - GitHub
 - <https://codelearn.io/sharing/git-github-tu-co-ban-den-nang-cao-p1>
 - <https://docs.github.com/en/get-started/start-your-journey/about-github-and-git>

