Web Programming

CS-406

Class & Office Hours

- Class Hours:
    - Monday 2:00 PM – 3:30 PM
    - Tuesday 2:00 PM – 3:30 PM

- Office Hours:
    - Monday & Wednesday 11:00 AM – 12:00 PM

About Me

- Mashal Khan

- BS Computer Systems Engineering (UET Peshawar)

- MS Information Security (NUST Islamabad)

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Books and Relevant Content

- Web Technologies – A Computer Science Perspective by Jaffrey C. Jackson (Pearson)
- W3Schools
- Reading materials and Articles
- Reference Slide at the end of every lecture to make your life easier ^^

Evaluations

Assessment	Weightage (%age)
Assignments / Case Studies	10
Quizzes	10
Project	10
Sessional 1	15
Sessional 2	15
Finals	40

Introduction

- Why Web Programming?
- What is Web?
- Major areas of Application
- Industry Application/usage
- Technologies Used
- Major Research Areas.

- What do you think about web programming?
- What is your motivation/objective to be in this class?
- What are your expectations from this course?
- Ever heard about any web technology?
- Why is web development/designing important?
- What should we consider while developing any website or web application?
- Market value/ Industrial Importance?

History

- Internet (1960s)
- World Wide Web- WWW (1991) CERN
- First Web Browser- 1994 Netscape
- Google- 1998
- FaceBook- 2004
- Smartphones and Tablets
- Mobile Games

What is Web?

- www
- Source of information and Web resources located by URLs
- Vast Domain
- Multiple technologies and applications
- Data accessed over internet.

Layers of Web

3 Layers:

- Surface Layer
- Deep Web
- Dark Web

- Top Most Layer –WWW visible to all ,maximum access
- Dark Web- Torr, Onion Routing

Surface Layer

- Top Most layer
- Data Readily accessible using search engines
- News articles, blog posts, and general information found on websites
- Google and Bing index these links which makes searching easier.
- Indexing process relies on the links on each page and the connections between them
- Google Page Ranking – Higher the quality higher is the rank

Deep Web: A Goldmine of Information

- Layer below Surface Layer, Not indexed by Search Engines

- Doesn't require special Software, accessible via normal links.

It Often Requires:

- Login Access to the site

- Authenticating user identity and access rights

- Typing in information that allows you to search the contents of a database.

- Contains restricted content like data of state of federal databases etc, web pages not linked to other sites or have specific coding to prevent search engine crawls, achieved content.

- valuable for businesses, technical,legal and organizations, since it's hundreds of times larger than the surface web and the content it serves up is often a more authoritative source of information.

When your browsing the deep web and you see you're on sale

Dark Web

- Bottom Layer
- Accessible using special software
- Highest level of encryption and anonymity
- Used for niche purposes and sometimes criminal activities
- Only accessible through certain browsers like Tor
- Protocols that provide anonymity- Onion Routing
- Access encrypted sites outside the control of government censors

When you're browsing the dark web and see yourself live on the hitman's sniper cam

SURFACE WEB

Google

Bing

Wikipedia

DEEP WEB

Academic Information

Multilingual Databases

Medical Records

Financial Records

Contains 90% of the information on the Internet, but is not accessible by Surface Web crawlers.

Legal Documents

Government Resources

Scientific Reports

Competitor Websites

Social Media

Organization-specific Repositories

Subscription Information

(DARK WEB)

A part of the Deep Web accessible only through certain browsers such as Tor designed to ensure anonymity. **Deep Web Technologies has zero involvement with the Dark Web.**

- You have probably heard the term "web development technologies" before, but did you ever think about what it actually means?

- Since computers can't communicate with each other the way people do, they require codes instead. Web technologies are the markup languages and multimedia packages computers use to communicate.

Web Technologies/ Terminologies

- Web Browsers
- Web Servers
- Web Clients
- Web Applications
- URLs
- Web Hosting
- Websites
- Web Portals
- Web Protocols
- Plugins
- APIs
- Cloud Computing/ Cloud Services
- Blockchain
- Cookies and Caches

Browsers

Browsers request information and then they show us in the way we can understand. Think of them as the interpreters of the web. Here are the most popular ones:

- Google Chrome – Currently, the most popular browser brought to you by Google
- Safari – Apple's web browser
- Firefox – Open-source browser supported by the Mozilla Foundation
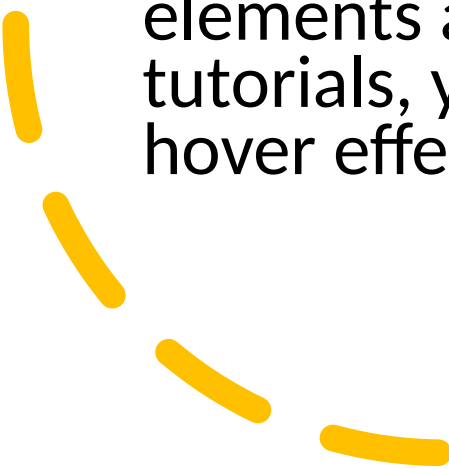- Internet Explorer – Microsoft's browser
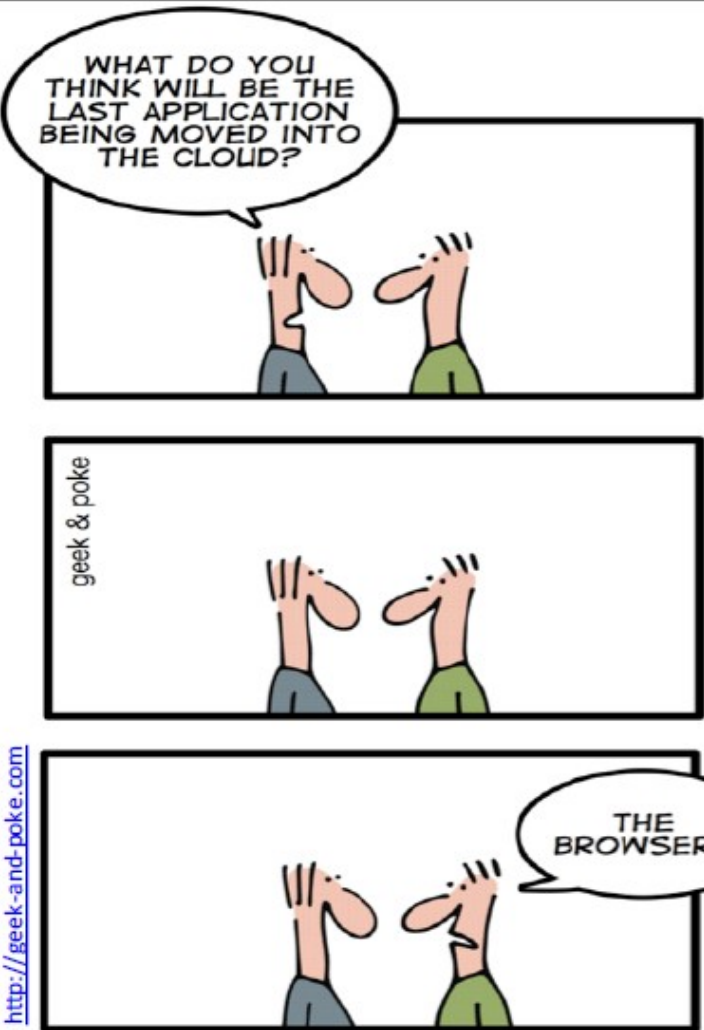
HTML & CSS

- HTML is one of the first you should learn. Thanks to HTML, the web browsers know what to show once they receive the request. If you want to better understand how HTML works, you also need to know what CSS is.

- CSS stands for Cascading Style Sheets and it describes how HTML elements are to be displayed on the screen. If you browse enough tutorials, you'll soon create CSS text effects, page transitions, image hover effects, and more

Web Frameworks WF
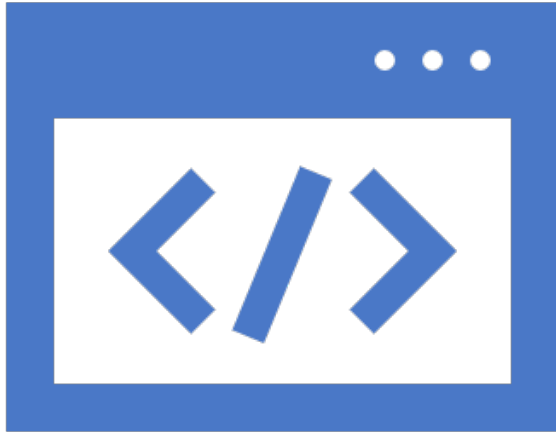
- A web framework (WF) or web application framework (WAF) is a software framework that is designed to support the development of web applications including web services, web resources, and web APIs.

- Web frameworks provide a standard way to build and deploy web applications on the World Wide Web.

- Most famous are:

  AngularJS

  Laravel

  Django

  Express js

  Ruby on Rails and many more

Programming Languages

- JavaScript
- Java
- Ruby
- Python
- PHP
- Go

Protocols

- HTTP: Request-Response in web browsers

- DDP: Real-time updates using websockets

- REST: Exchange info between applications mostly used by APIs

Application Programming Interface-API

- An API (application programming interface) allows other developers to use some of the app's functionality without sharing the code.

- The endpoints are exposed by the developers while the API can control access with an API key.

- Examples of well-made APIs are those created by Facebook, Twitter, and Google for their web services.

Data Formats

Data is stored in a structure called a data format.

- JSON – JavaScript Object Notation is a syntax for storing and exchanging data (just like XML). It is currently becoming the most popular data format out there.
- XML – Predominantly used by Microsoft systems, it used to be the most popular data format
- CSV – is data formatted by commas; for example Excel data

Client- Server

- **Client (or Client-side):** Each user of an application is called a client. Clients can be computers, mobile devices, tablets etc. Usually, multiple clients are interacting with the same app stored on a server.

- **Server (or Server-side):** The application code is usually stored on the server. The clients make requests to the servers. The servers then respond to those requests after gathering the requested information.

Web Architecture

Internet Explorer

Chrome

Firefox

Opera

Safari

Client

Web Browser

HTML   CSS   JavaScript
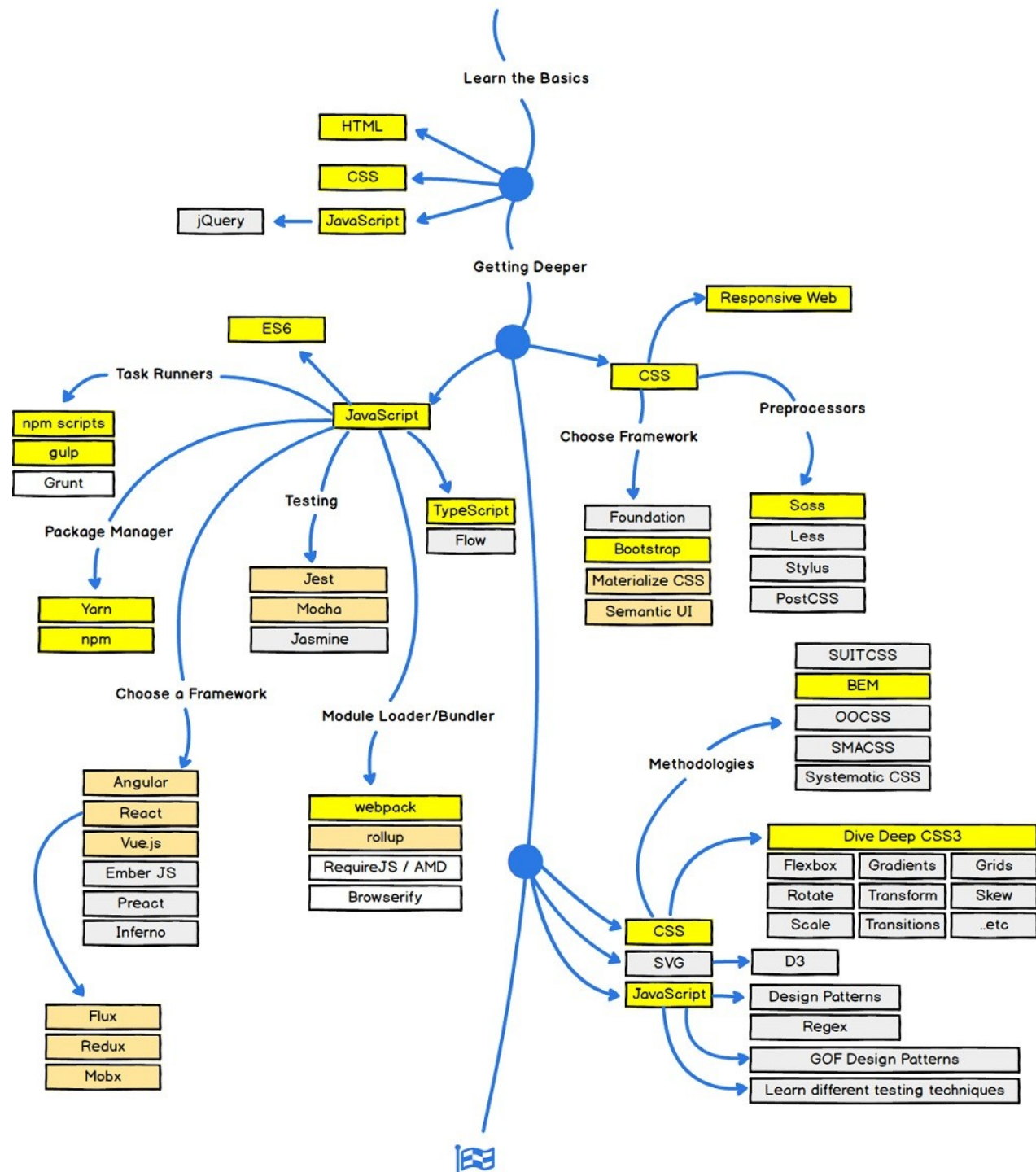
Server-side

Web Server

Web Programming

Web Development

- Frontend

- Backend

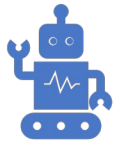- DevOps

Frontend Development

- Front end development is the part of web development that codes and creates front end elements of a website, which are features that are directly viewable and accessible by the end-user or client.

- Essentially, a front-end developer is responsible for everything you see and works to enhance the user experience to ensure it is seamless.

- They help create the overall design and aesthetic, in addition to debugging and using static code analysis.

- Front-end programming languages

- Create a responsive design

- A knowledge of testing and debugging

- An understanding of front-end development tools and features like automation, content management systems, version control systems, APIs, and frameworks.

Learn the Basics

HTML

CSS

jQuery ← JavaScript

Getting Deeper

Responsive Web

ES6

Task Runners

npm scripts
gulp
Grunt

JavaScript

CSS

Choose Framework

Preprocessors

Package Manager

Testing

TypeScript
Flow

Foundation
Bootstrap
Materialize CSS
Semantic UI

Sass
Less
Stylus
PostCSS

Yarn
npm

Jest
Mocha
Jasmine

SUITCSS
BEM
OOCSS
SMACSS
Systematic CSS

Choose a Framework

Module Loader/Bundler

Methodologies

Angular
React
Vue.js
Ember JS
Preact
Inferno

webpack
rollup
RequireJS / AMD
Browserify

Dive Deep CSS3

Flexbox	Gradients	Grids
Rotate	Transform	Skew
Scale	Transitions	..etc

CSS

SVG → D3

JavaScript → Design Patterns

Regex

GOF Design Patterns

Learn different testing techniques

Flux
Redux
Mobx

🗔 Backend Development

- Back end development is aptly named for web development that occurs at the back end of programs.

- In contrast to front end development, which focuses on customer-facing products and programs, back end development addresses server-side web application logic and integration.

- Back end developers write code to help a database and application communicate.

- Essentially, a back end developer handles what you don't see; they are in charge of the back end of a website, which includes servers, databases, and applications.

- Database management

- Framework utilization

- Programming

- Knowledge of accessibility and security compliance

DevOps

- DevOps is a set of practices that combines software development (Dev) and IT operations (Ops).

- It aims to shorten the systems development life cycle and provide continuous delivery with high software quality.

The 7 key practices of DevOps are:

- Configuration Management

- Continuous Integration

- Automated Testing

- Infrastructure as Code

- Continuous Delivery

- Continuous Deployment

- Continuous Monitoring

Web related Concerns

- Performance
- Correctness
- Compatibility
- Reliability
- Security
- Data Integrity
- Usability
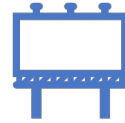- Recoverability

Impact of Websites

Major Source of Information

Business

Marketing

Advertising

Commerce

Education

Social Networking

News

- Are websites important?

- Do they have any impact on its users?

- Should we consider the client behavior and traditions while developing a website?

- Do you think the regional values, norms and culture should be taken into account while developing a webpage? Why?

- What should we consider while developing any website or web application?

- Should a developer think about User's Device and its computational power?

References

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- https://xtreamwayz.com/importance-of-a-website/

- https://www.webfx.com/web-design/why-is-web-design-important.html

- https://www.forbes.com/sites/forbesagencycouncil/2019/10/04/the-role-of-a-website-today/?sh=979024741e89

- https://en.wikipedia.org/wiki/Web_2.0

- https://www.freecodecamp.org/news/2019-web-developer-roadmap/

- https://www.w3schools.com/whatis/