# Web Application Development

CS3193

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**Lecture 01: Web Introduction**

# Course Overview

- This course gives you the overview about:

  - What is <u>Web Application Programming</u>?

  - What are different technologies for Web?

  - What are the fundamental architectural elements of web programming to produce dynamic content?

# Course Policies

# Attendance Policy

- Attendance can be held first 5 minutes

- Students present in the class, will only be marked as PRESENT

- Make good use of the allowed absentees

# Cell Phone Policy

- It is strictly prohibited to use phone in the class.

- Keep it in your bag/pocket
- keep it in SILENT mode.

- A penalty could be imposed if any violation found during.



NO CELL PHONE USE IN THIS CLASSROOM

# Reference Material

- **Recommended Books**

  - "Learning React" by Alex Banks & Eve Porcello

  - "MongoDB: The Definitive Guide" by Kristina Chodorow

  - "Node.js Design Patterns" by Mario Casciaro

- **Various Web Resources**

  - w3schools.com

# Grading Policy

| Assessment | Marks | Total Weight |
| --- | --- | --- |
| Quizzes | 20 | 20% |
| Assignment * | 20 | 20% |
| 1 Midterm | 20 | 20% |
| 1 Final | 40 | 40% |
| * Viva may be conducted for assignments | | |

# Makeup Policy

- No makeup for <u>Assignment</u>, <u>Quizzes</u>, <u>Presentations</u> or <u>Exam</u> – **No exceptions**

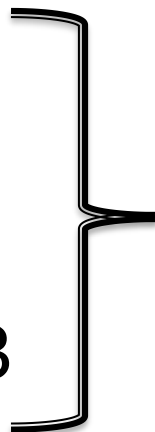- Late Submissions of Assignments will be accepted with penalty.

# Contact

- Feel free to contact me for any issues that you may face regarding this course:

  - **Muhammad Zeeshan Sabir**

  - **Email: muhammad.zeeshan@cust.edu.pk**

  - **Office: C Block 2nd floor**

# Online Course Resources

- All the lecture related material will be uploaded on <span style="color:red">zeeshan.help</span>
- Visit to get updated lectures.

- **https://zeeshan.help/wad**

# Topics to be Covered

- HTML
- CSS
- Bootstrap
- JavaScript
- React
- Node
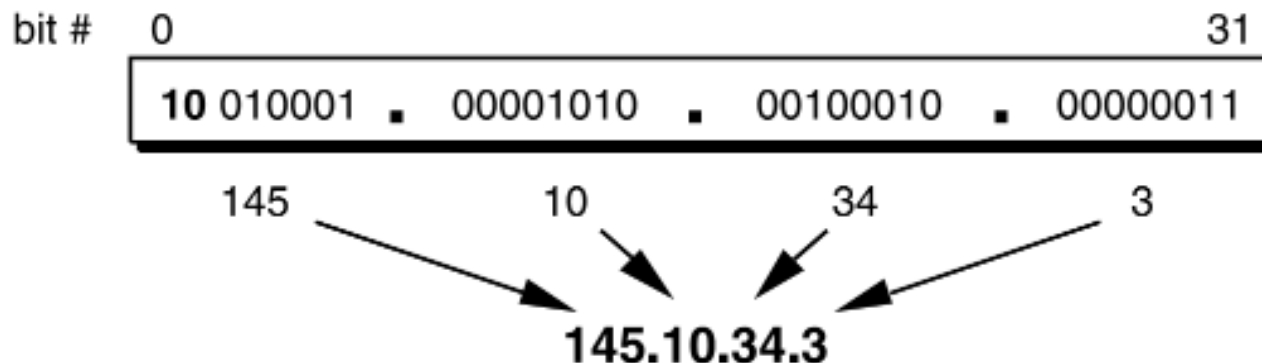- Express
- MongoDB

MERN Stack

# The Internet

The Internet is a **network of networks** that uses the standard **Internet Protocol Suite (TCP/IP)** to serve billions of users worldwide.



**Wikipedia:** http://en.wikipedia.org/wiki/Internet
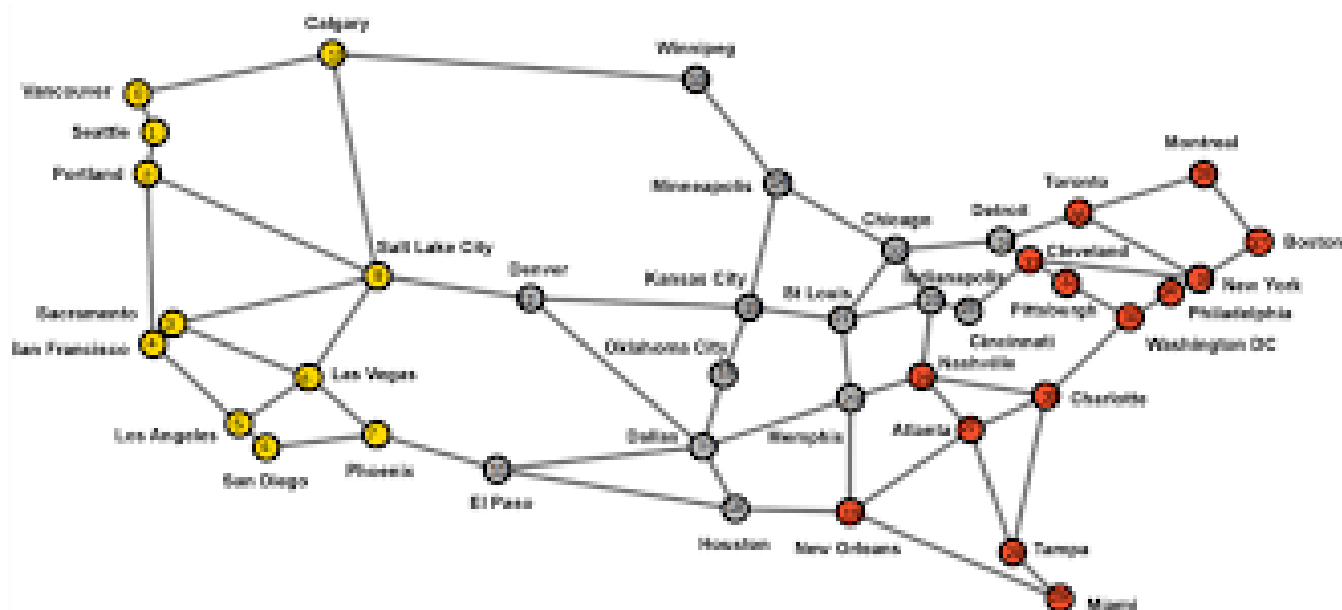
# TCP/IP

- The Transmission Control Protocol (**TCP**) is one of the core protocols of the Internet Protocol Suite.

- IP protocol used to locate devices/computers on interent

- Each device has an IP address

bit #    0                                                                    31

**10** 010001  .  00001010  .  00100010  .  00000011

145              10              34              3

**145.10.34.3**

# Domain Name System (DNS)

- Set of servers that translate names to IP addresses

  - Example: www.**facebook.com** → **174.123.78.18**

**Wikipedia:** http://en.wikipedia.org/wiki/Domain_Name_System

# World Wide Web

# World Wide Web ≠ The Internet

- The Internet is a **hardware and software infrastructure** that provides connectivity between computers.

- In contrast, **World Wide Web is one of the services that run on the Internet**.

**Wikipedia:** http://en.wikipedia.org/wiki/World_Wide_Web

# Web Server

- Computer running web server software that listens for web page requests on TCP port 80

- Popular web server software:

  - Apache

  - Microsoft Internet Information Server (IIS)

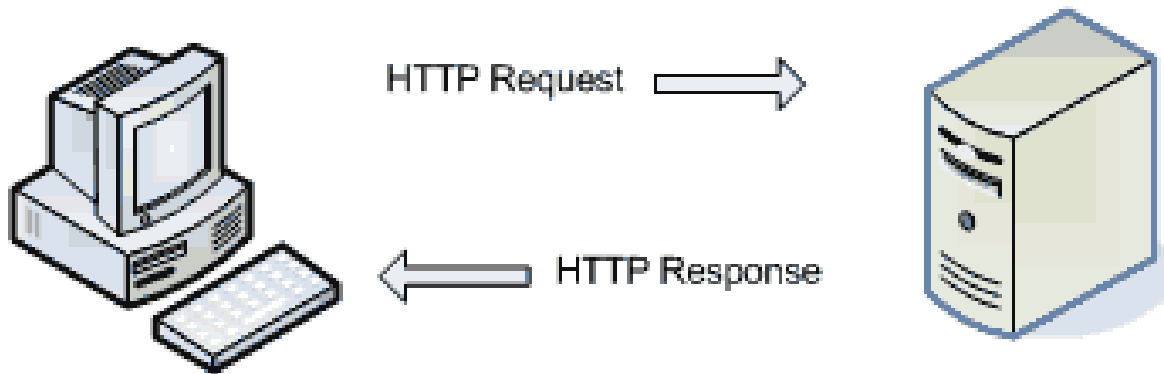**Wikipedia:** http://en.wikipedia.org/wiki/Web_server

# Web Browser

- Software application that displays web pages

- Popular Web Browsers:
    - Mozilla Firefox
    - Microsoft Internet Explorer (IE): part of Windows
    - Apple Safari: part of Mac OS
    - Opera
    - Google Chrome

**Wikipedia:** http://en.wikipedia.org/wiki/Web_browser

# Hypertext Transport Protocol (HTTP)

- HTTP is the foundation of data communication for the World Wide Web.

- HTTP functions as a **request-response protocol** in the **client-server** computing model.



**Wikipedia:** http://en.wikipedia.org/wiki/Http_protocol

# HTTP Error Codes

- The web server returns a special "**error code**" number to the browser, possibly followed by an HTML document

- Common Status Codes:

  - 200       OK
  - 301       Page has moved
  - 403       You are forbidden to access this page
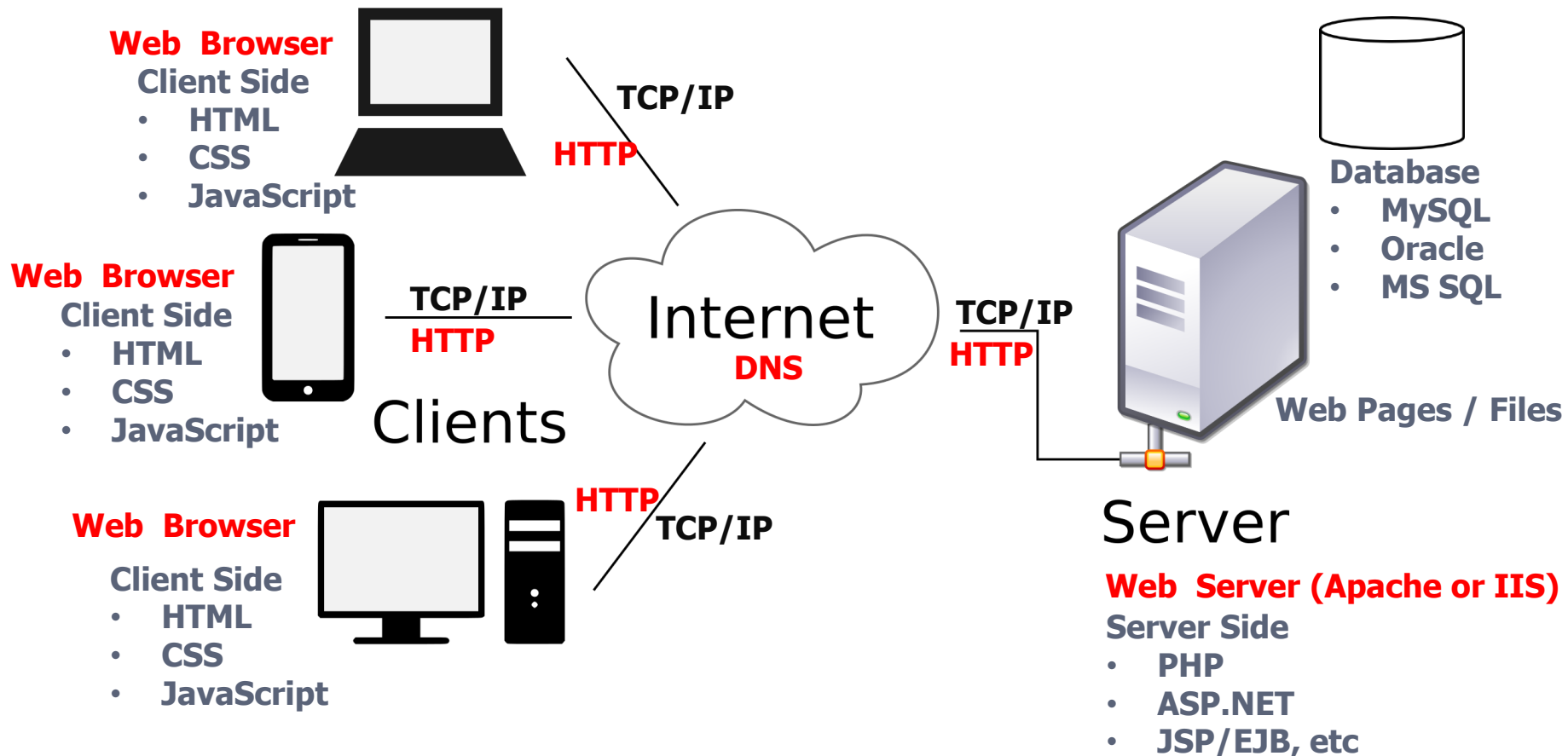  - 404       Page not found
  - 500       Internal server error

**Wikipedia:** http://en.wikipedia.org/wiki/Http_error_codes

# Uniform Resource Locator (URL)

- Uniform Resource Locator (URL) is an identifier for the location of a resource on the Internet.

- Basic URL:
  *http://www.cust.edu.pk/Faculties/tabid/56/Default.aspx*

- Upon entering this URL into the browser, it would:

  - ask the **DNS** server for the **IP address** of *www.cust.edu.pk*
  - connect to that IP address at **port 80**
  - ask the server to **GET** */Faculties/tabid/56/Default.aspx*
  - display the resulting page on the screen

**Wikipedia:** http://en.wikipedia.org/wiki/Url

# How Does Web Work?

**Web Browser**

**Client Side**
- **HTML**
- **CSS**
- **JavaScript**

**TCP/IP**

**HTTP**

**Web Browser**

**Client Side**
- **HTML**
- **CSS**
- **JavaScript**

**TCP/IP**

**HTTP**

Clients

**Web Browser**

**Client Side**
- **HTML**
- **CSS**
- **JavaScript**

**HTTP**

**TCP/IP**

Internet

**DNS**

**TCP/IP**

**HTTP**

**Database**
- **MySQL**
- **Oracle**
- **MS SQL**

**Web Pages / Files**

Server

**Web Server (Apache or IIS)**

**Server Side**
- **PHP**
- **ASP.NET**
- **JSP/EJB, etc**

# Other Dynamics

- **Multidisciplinary**
  - Programming
  - Domain Expertise
  - Usability
  - Graphic Design
  - Multimedia / Animation
  - Typography
  - Translation & Languages
  - Content Writing
  - Search Engine Optimzation

- **Hosted Solution**
  - Recurring Cost
  - Software is upgraded on the server and all users get latest version
- **Integration**
  - Integration with Existing/Legacy Systems
  - Integration with other Web Based Systems

# Static Web Page

- Static Content

- Content is added by Publisher

- Content is embedded with code

- User can consume all content in a single visit

# Dynamic Web Pages

- Dynamic Content

- Conent is dymaically generated through Data Source/DB

- Content is added by Users

- User can use it numerous times

- Also called Web Applicaitons

# Client Side / frontend

- **HTML:** Describe structure (contents) of a page

- **CSS:** Controls presentation (layout, typographic ,colors, etc.)

- **JavaScript:** Can add interactivity & functionality

## Frameworks/Libraries:

Bootstrap, Tailwind CSS, Angular, jQuery ,, React, Vue

# Server Side / backend

- **PHP, Python, Node, ASP.NET**

Create dynamic content, process forms, use other server resources

- Database: MySQL, MongoDB

# Any Questions?