UNIT – 2 🌐 WEB TECHNOLOGIES

POINTS TO BE COVERED IN THIS TOPIC

- ➤ INTRODUCTION TO HTML 📝
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📝 INTRODUCTION TO HTML

HTML (HyperText Markup Language) is the standard markup language used to create web pages and web applications. It provides the basic structure and content of web pages through the use of elements and tags.

DEFINITION AND PURPOSE

- HTML is a markup language that uses tags to define elements within a document
- It structures content on the World Wide Web

- HTML documents are interpreted by web browsers to display formatted web pages
- It provides the foundation for all web-based applications and websites

HTML STRUCTURE AND COMPONENTS

Basic HTML Document Structure:

- DOCTYPE declaration - specifies the HTML version
- HTML element - root element that contains all other elements
- HEAD section - contains metadata, title, and links to external resources
- BODY section - contains the visible content of the web page

HTML ELEMENTS AND TAGS

Common HTML Elements:

- **Heading tags** - H1, H2, H3, H4, H5, H6 for different heading levels
- **Paragraph tag** - P for text paragraphs
- **List tags** - UL (unordered list), OL (ordered list), LI (list items)
- **Link tag** - A for hyperlinks
- **Image tag** - IMG for embedding images
- **Table tags** - TABLE, TR, TD, TH for creating tables
- **Form tags** - FORM, INPUT, TEXTAREA, SELECT for user input

HTML ATTRIBUTES

- HTML attributes provide additional information about elements
- They are specified within the opening tag of an element
- Common attributes include ID, CLASS, SRC, HREF, ALT, and STYLE
- Attributes enhance functionality and provide styling capabilities

Element Type	Tag	Purpose
Structure	DIV, SPAN	Container elements
Text Formatting	STRONG, EM, U	Text emphasis
Media	IMG, VIDEO, AUDIO	Multimedia content
Navigation	NAV, A	Website navigation

🗂️ INTRODUCTION TO XML

XML (eXtensible Markup Language) is a markup language that defines rules for encoding documents in a format that is both human-readable and machine-readable.

XML FUNDAMENTALS

- XML is designed to store and transport data
- It is self-descriptive and uses custom tags
- XML is platform-independent and software-independent
- It provides a standard way to structure data across different systems

XML SYNTAX AND RULES

Well-formed XML Requirements:

- XML documents must have a root element
- All tags must be properly closed
- XML tags are case-sensitive
- Attribute values must be quoted
- Elements must be properly nested

XML COMPONENTS

Key XML Elements:

- **XML Declaration** - specifies XML version and encoding
- **Elements** - building blocks of XML documents
- **Attributes** - provide additional information about elements
- **CDATA Sections** - contain character data that should not be parsed
- **Comments** - provide documentation within XML files

XML APPLICATIONS

- Data interchange between different systems
- Configuration files for software applications
- Web services and APIs
- Document storage and management systems
- Database integration and data migration

🎨 INTRODUCTION TO CSS

CSS (Cascading Style Sheets) is a stylesheet language used to describe the presentation and formatting of HTML documents.

CSS OVERVIEW

- CSS separates content from presentation
- It controls layout, colors, fonts, and visual appearance
- CSS enables responsive design for different devices
- It improves website maintainability and consistency

CSS SYNTAX AND STRUCTURE

CSS Rule Components:

- **Selector** - identifies which HTML elements to style
- **Property** - specifies what aspect to style
- **Value** - defines how the property should be styled
- **Declaration** - combination of property and value
- **Rule Set** - complete CSS rule with selector and declarations

CSS SELECTORS

Types of CSS Selectors:

- **Element Selector** - targets HTML elements by tag name
- **Class Selector** - targets elements with specific class attributes
- **ID Selector** - targets elements with specific ID attributes
- **Pseudo Selectors** - target elements in specific states

- **Attribute Selectors** - target elements based on attributes

CSS PROPERTIES

Common CSS Properties:

- **Typography** - font-family, font-size, font-weight, color
- **Layout** - margin, padding, border, width, height
- **Background** - background-color, background-image
- **Positioning** - position, top, left, right, bottom
- **Display** - display, visibility, float, clear

CSS Category	Properties	Function
Text Styling	font-family, color, text-align	Control text appearance
Box Model	margin, padding, border	Define element spacing
Layout	display, position, float	Control element positioning

💻 PROGRAMMING LANGUAGES

Programming languages are formal languages used to create instructions for computers to execute specific tasks and operations.

WEB PROGRAMMING LANGUAGES

Client-Side Programming Languages:

- **JavaScript** - dynamic scripting language for interactive web pages
- **HTML** - markup language for content structure

- **CSS** - stylesheet language for presentation
- **TypeScript** - superset of JavaScript with static typing

Server-Side Programming Languages:

- **PHP** - server-side scripting language for web development
- **Python** - versatile programming language with web frameworks
- **Java** - object-oriented language for enterprise applications
- **C#** - Microsoft's programming language for web applications
- **Node.js** - JavaScript runtime for server-side development

DATABASE PROGRAMMING LANGUAGES

- **SQL** - Structured Query Language for database operations
- **PL/SQL** - Oracle's procedural extension to SQL
- **T-SQL** - Microsoft SQL Server's extension to SQL
- **MySQL** - specific SQL implementation for MySQL databases

PROGRAMMING PARADIGMS

Object-Oriented Programming:

- Encapsulation, inheritance, and polymorphism
- Code reusability and maintainability
- Class-based structure and object instantiation

Procedural Programming:

- Sequential execution of instructions

- Function-based code organization
- Top-down approach to problem solving

🖥️ WEB SERVERS AND SERVER PRODUCTS

Web servers are computer programs that serve content over the World Wide Web in response to client requests.

WEB SERVER FUNCTIONALITY

- Web servers process HTTP requests from clients
- They serve static content like HTML, CSS, images, and files
- Modern web servers support dynamic content generation
- They handle security, authentication, and access control

POPULAR WEB SERVERS

Apache HTTP Server:

- Open-source web server software
- Cross-platform compatibility
- Modular architecture with extensive plugin support
- Widely used for hosting websites and web applications

Microsoft Internet Information Services (IIS):

- Microsoft's web server for Windows platforms
- Integrated with Windows Server operating systems
- Supports ASP.NET and Microsoft technologies

- Enterprise-level security and management features

Nginx:

- High-performance web server and reverse proxy
- Efficient handling of concurrent connections
- Load balancing and caching capabilities
- Popular for high-traffic websites

SERVER PRODUCTS AND SERVICES

Application Servers:

- **Apache Tomcat** - Java servlet container
- **Node.js** - JavaScript runtime environment
- **IIS Express** - lightweight version of IIS

Database Servers:

- **MySQL Server** - open-source relational database
- **Microsoft SQL Server** - enterprise database solution
- **Oracle Database** - high-performance database system

Server Type	Product	Platform	Use Case
Web Server	Apache	Cross-platform	General web hosting
Application Server	Tomcat	Java	Java web applications
Database Server	MySQL	Cross-platform	Web application databases

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🗃️ INTRODUCTION TO DATABASES

A database is an organized collection of data that is stored and accessed electronically from a computer system.

DATABASE CONCEPTS

- Databases provide structured storage for information
- They enable efficient data retrieval and manipulation
- Databases support multiple users and concurrent access
- They ensure data integrity and security

DATABASE MANAGEMENT SYSTEMS (DBMS)

- Software systems that manage database operations
- Provide interfaces for database creation and maintenance
- Handle data storage, retrieval, and security
- Support backup and recovery operations

RELATIONAL DATABASE MODEL

Key Concepts:

- **Tables** - structured collections of related data
- **Rows** - individual records in a table
- **Columns** - fields or attributes of data
- **Primary Keys** - unique identifiers for records
- **Foreign Keys** - references to primary keys in other tables

DATABASE OPERATIONS

CRUD Operations:

- **Create** - adding new data to the database
- **Read** - retrieving and querying existing data
- **Update** - modifying existing data records
- **Delete** - removing data from the database

DATABASE DESIGN PRINCIPLES

- Normalization to eliminate data redundancy
- Proper indexing for improved query performance
- Referential integrity to maintain data consistency
- Security measures to protect sensitive information

MYSQL DATABASE

MySQL is an open-source relational database management system based on Structured Query Language (SQL).

MYSQL OVERVIEW

- MySQL is one of the most popular database systems
- It supports multiple storage engines
- Cross-platform compatibility with various operating systems
- Widely used for web applications and online publishing

MYSQL FEATURES

Core Features:

- **ACID Compliance** - ensures reliable transaction processing
- **Replication** - supports master-slave database replication
- **Partitioning** - divides tables into smaller, manageable pieces
- **Security** - comprehensive user authentication and authorization
- **Performance** - optimized query execution and indexing

MYSQL STORAGE ENGINES

InnoDB Storage Engine:

- Default storage engine for MySQL
- Supports foreign key constraints
- ACID-compliant transactions
- Row-level locking for concurrent access

MyISAM Storage Engine:

- Fast storage engine for read-heavy applications
- Table-level locking
- Compact storage format
- Full-text indexing capabilities

MYSQL ADMINISTRATION

Database Administration Tasks:

- User account management and privileges
- Database backup and recovery procedures
- Performance monitoring and optimization
- Server configuration and maintenance

MYSQL IN WEB DEVELOPMENT

- Integration with PHP, Python, and Java applications
- Support for web frameworks like Laravel, Django
- RESTful API development and data services
- E-commerce and content management systems

📊 MS ACCESS DATABASE

Microsoft Access is a database management system that combines a relational database engine with a graphical user interface.

MS ACCESS OVERVIEW

- Part of Microsoft Office suite
- Desktop database application for small to medium businesses
- Visual database design and development environment
- Integration with other Microsoft Office applications

MS ACCESS COMPONENTS

Database Objects:

- **Tables** - store data in rows and columns

- **Queries** - retrieve and manipulate data
- **Forms** - provide user interface for data entry
- **Reports** - present formatted data for printing
- **Macros** - automate repetitive tasks
- **Modules** - contain VBA code for advanced functionality

MS ACCESS FEATURES

Key Capabilities:

- **Relationship Management** - visual relationship designer
- **Data Validation** - built-in data validation rules
- **Import/Export** - connectivity with various data sources
- **Security** - user-level security and access control
- **Templates** - pre-built database templates

MS ACCESS LIMITATIONS

- Limited concurrent users (typically 10-15 users)
- File size restrictions (2GB maximum)
- Not suitable for web-based applications
- Performance limitations with large datasets

MS ACCESS VS OTHER DATABASES

Feature	MS Access	MySQL	SQL Server
User Interface	Visual GUI	Command Line/GUI tools	Management Studio

Feature	MS Access	MySQL	SQL Server
Concurrent Users	Limited (10-15)	Unlimited	Enterprise level
Platform	Windows only	Cross-platform	Windows/Linux
Cost	Part of Office	Open source	Commercial license

💊 PHARMACY DRUG DATABASE

Pharmacy drug databases are specialized information systems that store comprehensive data about pharmaceutical products, medications, and drug-related information.

DRUG DATABASE OVERVIEW

- Comprehensive repositories of pharmaceutical information
- Support clinical decision-making and patient safety
- Provide drug interaction checking and dosage guidelines
- Essential tools for healthcare professionals and pharmacists

DRUG DATABASE COMPONENTS

Core Data Elements:

- **Drug Identification** - generic and brand names, NDC numbers
- **Dosage Information** - strength, form, route of administration
- **Clinical Data** - indications, contraindications, side effects

- **Pharmacokinetics** - absorption, distribution, metabolism, excretion
- **Drug Interactions** - drug-drug, drug-food interactions
- **Pricing Information** - wholesale and retail pricing data

TYPES OF DRUG DATABASES

Commercial Drug Databases:

- **Lexicomp** - comprehensive drug information system
- **Micromedex** - clinical decision support tools
- **First Databank** - drug database and clinical modules
- **Wolters Kluwer** - integrated drug information solutions

Government and Regulatory Databases:

- **FDA Orange Book** - approved drug products information
- **NDC Directory** - National Drug Code database
- **RxNorm** - standardized nomenclature for medications

PHARMACY MANAGEMENT SYSTEMS

Integrated Pharmacy Systems:

- **Prescription Processing** - electronic prescription handling
- **Inventory Management** - drug stock control and ordering
- **Patient Profiles** - medication history and allergies
- **Insurance Claims** - automated claims processing
- **Clinical Monitoring** - drug utilization review

DATABASE APPLICATIONS IN PHARMACY

Clinical Applications:

- Drug interaction screening
- Dosage calculation and verification
- Allergy and contraindication checking
- Therapeutic equivalence determination
- Adverse drug reaction monitoring

Administrative Applications:

- Inventory control and procurement
- Insurance claim processing
- Regulatory compliance reporting
- Financial management and billing
- Quality assurance and audit trails

DATABASE DESIGN FOR PHARMACY SYSTEMS

Key Database Tables:

- **Drug Master** - comprehensive drug information
- **Patient Records** - patient demographics and medical history
- **Prescriptions** - prescription details and status
- **Inventory** - stock levels and supplier information
- **Insurance** - coverage and billing information

Data Relationships:

- Patient-to-prescription relationships
- Drug-to-interaction relationships
- Prescription-to-inventory relationships
- Patient-to-insurance relationships

REGULATORY COMPLIANCE

HIPAA Compliance:

- Patient data privacy and security requirements
- Access controls and audit trails
- Data encryption and secure transmission
- Employee training and policy enforcement

FDA Regulations:

- Drug labeling and identification requirements
- Adverse event reporting obligations
- Quality control and validation procedures
- Documentation and record-keeping standards