CETPA

Master in **Full Stack MERN Development with AI**

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HTML

MODULE 1: WEB PROGRAMMING INTRODUCTION

- Architecture of a website
- Different technologies in making the website
- Web Development Introduction

MODULE 2: HTML-INTRODUCTION

- History of HTML
- What you need to do to get going and make your first HTML page
- What are HTML Tags and Attributes?
- HTML Tag vs. Element
- HTML Attributes

MODULE 3: HTML-HEADERS

- Title
- Base
- Link
- Styles
- Script
- Meta

MODULE 4: HTML-BASIC FORMATTING TAGS

- HTML Basic Tags
- HTML Formatting Tags
- HTML Color Coding

MODULE 5: HTML-GROUPING USING DIV SPAN

- Div Tag
- Span Tags

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HTML

MODULE 6: HTML SEMANTIC ELEMENTS

- <arcle>
- <aside>
- <details>
- <figure>
- <footer>
- <header>
- <main>
- <mark>
- <nav>
- <secon>
- <summary>
- <me>

MODULE 7: HTML-LISTS

- Unordered & Ordered Lists
- Definition list

MODULE 8: HTML-IMAGES

- Image and Image Mapping
- Background Images

MODULE 9: HTML-HYPERLINK

- Anchor Tag.
- URL - Uniform Resource Locator
- Relative and Absolute Address

MODULE 10: HTML-TABLE

- < table >
- < th >
- < tr >
- < td >
- < caption >
- < thead >
- < tbody >
- < tfoot >
- < colgroup >
- < col >

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HTML

MODULE 11: HTML-IFRAME

- Using Iframe as the Target

MODULE 12: HTML-FORM

- HTML Forms
- HTML Form Attributes
- HTML Form Elements
- HTML Input Types
- HTML Input Attributes
- HTML Input Form Attributes
- < textarea >
- < button >
- < select >
- < label >

MODULE 13: HTML GRAPHICS

- HTML Canvas Graphics
- HTML SVG Graphics

MODULE 14: HTML MEDIA

- HTML Media
- HTML Video
- HTML Audio
- HTML Plug-in
- HTML YouTube

MODULE 15: HTML APIS

- HTML Geolocation
- HTML Drag/Drop
- HTML Web Storage
- HTML Web Workers
- HTML SSE

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CSS

MODULE 1: CSS INTRODUCTION

- What is CSS?
- Why Use CSS?
- CSS Syntax

MODULE 2: CSS CORE PROPERTIES

- CSS Color
- CSS Backgrounds
- CSS Box Model
- CSS Borders
- CSS Margins
- CSS Paddings
- CSS Box Sizing

MODULE 3: CSS UNITS

- Absolute Units
- Relative Units
- Max-Width
- Min-Width

MODULE 4: CSS STYLING

- CSS Text
- CSS Fonts
- CSS Outline
- CSS Alignment
- Important

MODULE 5: STYLING ELEMENTS

- Links
- Lists
- Dropdowns
- Tables
- Images
- Image-Sprite
- Image-Filters
- Clip-Path
- Forms

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CSS

MODULE 6: NAVBAR
- Vertical-Navbar
- Horizontal-Navbar

MODULE 7: CSS SELECTORS
- Simple Selectors
- Combinator selectors
- Pseudo-class selectors
- Pseudo-elements selectors
- Attribute selectors

MODULE 8: CSS POSITIONS
- Position
- Z-Index
- Float
- Clear
- Overflow

MODULE 9: CSS LAYOUTS
- Display
- Block
- Inline
- Inline-Block
- Grid
- Flex-Box

MODULE 10: CSS TRANSFORMATION
- CSS 2D Transforms
- CSS 3D Transforms
- CSS Transition
- CSS Animations

MODULE 11: CSS RESPONSIVE
- Responsive Introduction
- Responsive Viewport
- Responsive Breakpoint
- Media Queries

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BOOTSTRAP 5

MODULE 1: INTRODUCTION

- Introduction
- Quick Styles Aer Dark
- Our First Web Page
- What's inside?
- Scripts & Styles
- Core concepts
- Summary

MODULE 2: LAYOUT WITH BOOTSTRAP

- Introduction
- Grid Layouts
- Simple Layout
- Fixed Grids
- Fluid Grids
- Responsive Design
- Responsive Utilities
- Inspiration
- Summary

MODULE 3: EVERYDAY BOOTSTRAP

- Introduction
- Typography
- Tables
- Forms
- Buttons
- Images & Icons
- Summary

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BOOTSTRAP 5

MODULE 4: BOOTSTRAP COMPONENT

- Introductions
- Drop Down Menu
- Buttons with Menus
- Tabs & Pill
- The Navbars
- Heros, Badgets, Labels and media
- Summary

MODULE 5: BOOTSTRAP AND JAVASCRIPT

- Introduction
- More Buttons
- Modals
- Tooltips and Popovers
- Carousel
- Summary

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Java Script

MODULE 1: INTRODUCTION

- What is JavaScript?
- Why Use JavaScript?
- Syntax
- Statements
- Comments

MODULE 2: LANGUAGE SYNTAX

- Data Types
- Variable Declarations
- Var vs. Let
- Constant
- Dynamic Type
- typeof
- Type Conversion
- Objects
- Arrays

MODULE 3: OPERATORS

- JavaScript Operators.
- Arithmetic Operators
- Assignment, Comparison Operators
- Equality Operators
- Ternary Operators
- Logical Operators
- Bitwise Operators

MODULE 4: CONTROL STATEMENT

- if
- else
- if/else
- switch/case

MODULE 5: LOOP STATEMENT

- for
- for/in
- for/off
- while
- do/while
- Infinite loop
- Break
- continue

MODULE 6: JAVASCRIPT HTML DOM

- HTML Document Object Model
- DOM Methods
- DOM Documents
- DOM Elements
- DOM HTML
- DOM Forms
- DOM CSS
- DOM Events
- DOM Event Listener
- DOM Navigation
- DOM Nodes
- DOM Collections
- DOM Node Lists

MODULE 7: JAVASCRIPT HTML BOM

- HTML Browser Object Model
- JS Window
- JS Screen
- JS Location
- JS History
- JS Navigator
- JS Popup Alert
- JS Timing
- JS Cookies

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Java Script

MODULE 8: ARRAY

- Array Introduction
- Adding Element
- Deleting Element
- Modifying Element
- Searching Element
- Emptying Element
- Combining Array
- Slicing Array
- Spread Operator
- Looping with Array
- Filtering with Array
- Mapping with Array
- Reducing an Array

MODULE 9: FUNCTIONS

- Function Declarations.
- Hoisting
- Arguments
- The Rest Operators
- Default Parameters
- Geer and Seers
- Try and Catch
- Local vs. Global Scope
- this keyword

MODULE 10: OBJECTS

- Basics
- Factory Functions
- Constructor
- Dynamic Nature of Object
- Functions are Objects
- Value vs. Reference Type
- Enumerating Properties of an Object
- Cloning an Object
- String
- Date

MODULE 11: BUILT-IN OBJECTS

- Number
- Math
- String
- Array
- Date
- Boolean
- Regex

MODULE 12: EVENTS

- Introduction
- Mouse Events
- Keyboard Events
- Form Events
- Document/Window Events

MODULE 13: INTRODUCTION TO OOP CONCEPT

- Prototype, Module pattern
- Argumenting type
- Closure
- ES6 Introduction
- Let & Const
- Arrow Functions
- Class and Inheritance
- Rest and Map Operators
- Export and Import
- Modules

MODULE 14: JAVASCRIPT WEB API

- API Introduction
- Forms API
- History API
- Storage API
- Worker API
- Fetch API
- Geolocation API

MODULE 15: JAVASCRIPT AJAX

- AJAX Introduction
- AJAX XMLHttp
- AJAX Request
- AJAX Response

MODULE 16: JAVASCRIPT JSON

- JSON Introduction
- JSON Syntax
- JSON Data Types
- JSON Parse
- JSON Stringify
- JSON Objects
- JSON Arrays

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JQUERY

- Getting started with jQuery
- Selecting elements
- Manipulating the page
- Traversing the DOM and chaining
- jQuery Utility Methods
- Handling events and event delegation
- AJAX, JSON and Deferred
- Enhancing with Animation effects
- Grids, Tables with AJAX, Pagination, JQuery UI
- jQuery Best Practices

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DSA

1. Introduction to Data Structures and Algorithms

- What is Data Structure
- Benefits of Data Structure
- Types of Data Structure
- What is algorithm
- Time and Space complexity

2. Introduction to Array

- Advantages of Arrays
- Disadvantages of Arrays
- Types of Arrays

3. Introduction to Linked List

- Advantages of Linked List
- Disadvantages of Linked List
- Types of Linked List

4. Introduction to Stack

- What is Stack?
- Basic operations on Stack
- Types of Stacks
- Implementation of Stacks using Array
- Implementation of Stacks using Linked List
- Applications of Stack

5. Introduction to Queue

- What is Queue?
- Basic operations on Queue
- Types of Queues
- Implementation of Queue using Array
- Implementation of Queue using Linked List
- Applications of Queue

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DSA

6. Introduction to Tree

- What is Tree Data Structure?
- Why Tree Data Structure
- Tree Terminologies
- Types of Trees
- Tree Traversal
- Tree Applications

7. Introduction to Graph

- What is Graph?
- Graph Terminologies
- Graph Representation
- BFS and DFS in Graph
- Cycles in Graph
- Shortest path in Graph
- Graph Operations

8. Searching Algorithms

- Linear Search
- Sentinel Linear Search
- Binary Search
- Meta Binary Search
- Ternary Search
- Jump Search
- Interpolation Search

9. Sorting Algorithms

- What is Sorting
- Selection Sort
- Bubble Sort
- Insertion Sort
- Merge Sort
- Quick Sort
- Heap Sort
- Shell Sort
- Many more

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DSA

10. Recursion Algorithms

- What is Recursion?
- Why Recursion?
- Types of Recursions
- Tail Recursion
- Implicit Recursion

11. Backtracking Algorithms

- What is Backtracking?
- How does a Backtracking Algorithm work?
- When to use Backtracking Algorithm?
- Types of Backtracking Algorithms
- Recursive Backtracking Algorithms
- Non-Recursive Backtracking Algorithms

12. Introduction to Hashing

- What is Hashing?
- Hash table
- Applications of Hashing

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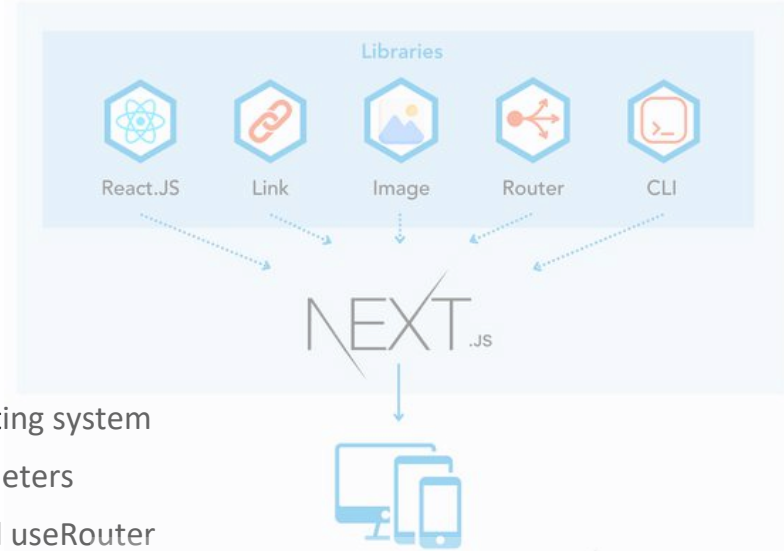
NEXT JS

Introduction and Fundamentals

- Overview of Next.js
  - Introduction to Next.js
  - Benefits of using Next.js
  - Comparison with other React frameworks (e.g., CRA, Gatsby)



- Setting Up the Environment
  - Installing Node.js and npm/yarn
  - Creating a Next.js project
  - Overview of the project structure

- Pages and Routing
  - Understanding the file-based routing system
  - Dynamic routing and route parameters
  - Customizing routing with Link and useRouter
  - Nested and dynamic routes

- Styling in Next.js
  - Using CSS, SASS, and CSS-in-JS
  - Styled JSX and global styles
  - Integrating third-party UI frameworks (e.g., Tailwind CSS)

- Data Fetching in Next.js
  - Understanding different data-fetching methods: getStaticProps, getServerSideProps, getStaticPaths
  - Client-side data fetching using React hooks
  - API Routes for serverless functions

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NEXT JS

Advanced Features and Best Practices

- Advanced Routing and Middleware
  - Middleware in Next.js
  - API Middlewares
  - Customizing 404 and error pages

- Authentication and Authorization
  - Implementing authentication with NextAuth.js or Firebase
  - Role-based access control
  - Securing pages and API routes

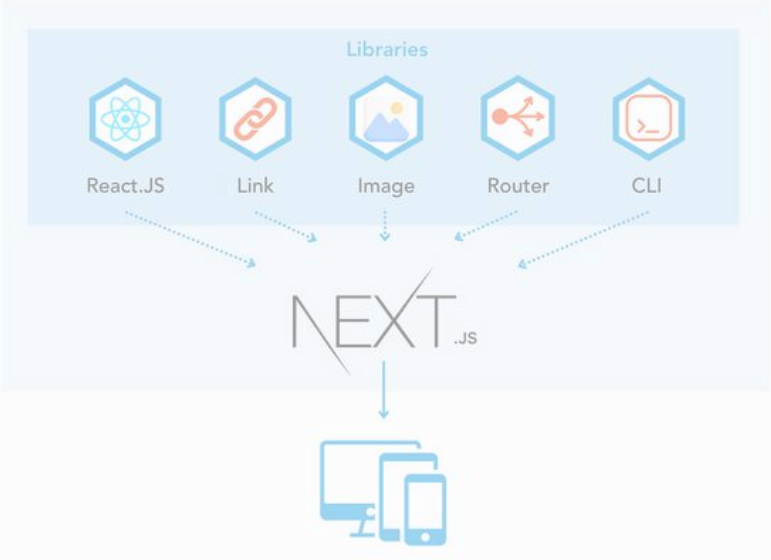
- API Routes and Serverless Functions
  - Creating and using API routes
  - Serverless functions and edge computing
  - Connecting to a database (e.g., MongoDB, PostgreSQL)

- Performance Optimization
  - Image optimization with next/image
  - Code splitting and lazy loading
  - Caching and Incremental Static Regeneration (ISR)
  - Analyzing and improving performance

Integrations and Real-World Applications

- Working with Headless CMS and APIs
  - Integrating with headless CMS (e.g., Contentful, Strapi)
  - Fetching data from REST and GraphQL APIs

- Deployment Strategies
  - Deploying to Vercel, AWS, Netlify, etc.
  - CI/CD pipelines for Next.js
  - Managing environment variables



- Localization and Internationalization
  - Setting up i18n in Next.js
  - Localizing routes and content

- Testing in Next.js
  - Unit testing with Jest
  - End-to-end testing with Cypress or Playwright
  - Testing API routes and components

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React JS

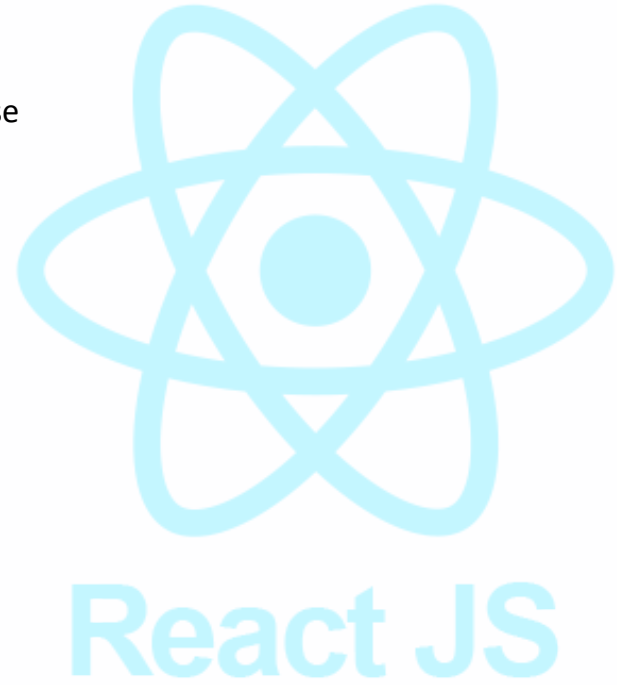
MODULE 1: INTRODUCTION OF JAVASCRIPT ES 5 AND Es6

- Basic Javascript
- Object Based Javascript
- Introduction to Es6
- JavaScript Helpers (for Each, filter, map, filter, every, some)
- String Literals
- DE structuring
- Rest parameters & spread operator
- Arrow function
- Default parameter
- Class: Inheritance, constructor, Promise

MODULE 2: INTRODUCTION TO REACTJS

- What React JS?
- Why use React JS?
- What is Single Page Application?
- Why SPA?
- React JS Version

REACT DOM
REACT VIRTUAL DOM
SET UP REACT JS ENVIRONMENT



- What is CLI: create-react-app project name
- Advantage using CLI
- How to debug React JS application.
- Installation CLI
- Install Node JS & React JS
- Create a hello world example
- Create React JS Project
- Understanding of Folder Structure
- How to debug React JS application
- Introduction of Babel

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React JS

MODULE 3: BASIC FEATURES OF REACTJS AND COMPONENTS

- React Concepts, JSX
- Render Elements
- Types of Components, Class Components
- Life Cycle Method of Class components
- Functional Components
- HOOKS in detail
- Use of HOOK
- What is state
- React Forms
- Components and Props
- State and Lifecycle Handling Events
- Practice on above topics

MODULE 4: ROUTING WITH REACT ROUTER

- Setting Up React router
- Install/Uninstall React router
- React Router Version 5 & 6
- Setting up react router
- Understand routing in single page applications
- Working with Browser Router components
- Configuring route with Route component
- Making routes dynamic using Route params
- Working with nested routes
- Navigating to pages using Link and Nav Link Component
- Redirect routes using Redirect Component

MODULE 5: KEY FEATURES OF REACTJS

- Conditional Rendering
- Lists and Keys
- Forms

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React JS

MODULE 6: EVENT HANDLING IN REACT

- Understanding React event system
- Passing arguments to event handlers

MODULE 7: WORKING WITH FORMS

- Controlled components
- Understand the significance to default Value
- Prop
- Using react ref prop to get access to DOM element

MODULE 8: INTRODUCTION TO REDUX

- What is React Redux
- Why React Redux
- Redux Install and setup
- Actions
- Reducers
- Store
- High Order Component
- Understanding map State to Props & map Dspatch to Props Usage

MODULE 9: REDUX ADVANCED

- Async Actions
- Middleware
- What is redux saga
- Install and set up redux saga
- Working with Saga helpers (Crud Operation)
- Sagas vs Promises

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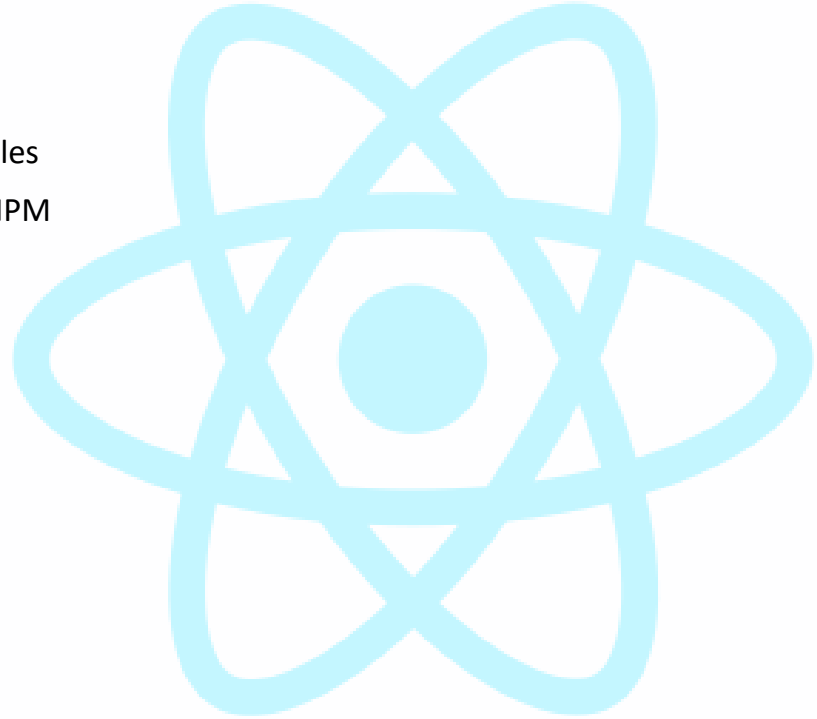
React JS

MODULE 10: REACT WITH DESIGN FRAMEWORK

- Material UI for design
- Formik Validation

MODULE 11: REACT API'S

- Introduction https Request
- The path Module
- Building a Web server
- HTTP Request Methods, Headers
- Response Codes and Headers
- Introduction Axios NPM
- Introduction Slider NPM
- Integration of any NPM modules
- Introduction of Google Map NPM



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NODE JS

MODULE 1: INTRODUCTION TO NODE.JS

- Introduction to Node.js
- History of Node.js
- Introduction to io.js
- What is Node.js Foundation
- V8 Java Script Engine
- Why Server Side Java Script?

MODULE 2: GETTING STARTED WITH NODE.JS

- Node.js Architecture
- JavaScript Event Loop
- Node.js vs. others Server-Side Frameworks
- Node.js Application Area
- Advantages of Node.js
- Limitations of Node.js

MODULE 3: JAVASCRIPT WITH NODE.JS

- Writing Asynchronous Code
- Blocking vs. Non-Blocking Code

MODULE 4: MODULES

- Understanding Modules
- Built-In Modules
- Creating Module
- Exporting Module
- Importing Modules Node.js CLI and NPM
- Understanding CLI
- Node's Package Manager: NPM
- Local Packages and Global Packages
- Installing, Updating and Removing Module using NPM
- Understanding package.json file

MODULE 5: NODE.JS PACKAGE AND PUBLISHING

- Creating a Node Package
- Publishing Package
- Using published package

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NODE JS

MODULE 6: PACKAGES

- Introduction of NPM Package
- Express NPM Package
- Multer NPM Package
- Node Mail NPM Package
- Boot Stripe NPM Package integration
- JSONWEBTOKEN NPM Integration
- Introduction of crypto-JS

MODULE 7: CODE DEBUGGING

- Built-In Debugger
- IDE Debuggers
- Node Inspector

MODULE 8: EXCEPTIONS HANDLING

- Try. Catch
- Call back
- Event Emitters

MODULE 9: EVENTS

- Understanding Events
- Event Emitter class
- Emitting Event
- Listening Event

MODULE 10: STREAMS

- Creating streams
- Streams types
- Readable Stream
- Writable Stream
- Stream Pipe
- Creating Buffer
- Buffer decoding

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NODE JS

MODULE 11: FILE SYSTEM AND PATH MODULE

- Introduction to fs Module
- The fs modules operations
- Manipulating Files Create, Open, Read, Write, Close, Rename, Delete
- Manipulating Directives Create, Read, Remove

MODULE 12: EXPRESS FRAMEWORK

- Understanding Express
- Installing Express
- Creating Express App
- Express App
- Running Express App

MODULE 13: ROUTING AND VIEW ENGINES

- Router Object & Router Object Methods
- View Engine-Handlebars
- Response Methods

MODULE 14: MIDDLEWARE AND REQUEST PROCESSING

- Middleware & Express Middleware
- Express Request Processing

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MongoDB

MODULE 1:

- Understanding NoSQL DB
- NoSQL vs. SQL DB
- Understanding Mongo DB
- Introduction of mongoose Atlas
- MongoDB Data types
- MongoDB Shell Commands
- Understanding db, collection & document
- Understanding Embedded documents
- Querying database Tools & API
- MongoDB Tools
- Introduction to Mongo Chef
- Mongo Chef for database operations

MODULE 2: INDEXING AND RELATIONSHIPS

- Types of Indexes
- Creating an Indexes
- Dropping an Indexes
- Defining Relationships between Documents

MODULE 3: MONGO DB ODM –MONGOOSE AND POSTMAN

- Introduction to Mongoose
- Exploring fundamentals of Mongoose
- Mongoose Models
- Mongoose Data Types
- Mongoose Relationships
- Mongoose CRUD operations

MODULE 4: GITHUB

- Real-me environmental setup with GitHub

- **REST API WITH MONGOOSE, MONGODB AND POSTMAN**
- **CREATING REST API USING EXPRESS AND MONGOOSE**
- **IMPLEMENTING THE PROJECT**
- **DEPLOYMENT OF MEAN APPLICATION**

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My SQL

1. Introduction to MySQL
- o What is a database?
- o What is SQL?
- o Differences between SQL and NoSQL databases
- o Overview of MySQL
- o Downloading and installing MySQL Server and Workbench
- o Understanding MySQL components (MySQL Server, MySQL Workbench)
- o Connecting to MySQL Server
- o Navigating MySQL Workbench
- o Creating a connection
- o Using SQL editor

2. Basic SQL Queries
- o Introduction to SQL syntax
- o SELECT, FROM, WHERE
- o Filtering and sorting data (ORDER BY, LIMIT)
- o Introduction to MySQL data types

Data Definition Language (DDL) & Data Types

1. Creating Databases and Tables
- o Database creation
- o Creating tables with different data types (INT, VARCHAR, DATE, etc.)

2. Modifying and Dropping Tables
- o Adding, modifying, and deleting columns
- o Dropping tables and databases
- o Altering table structure

3. Primary Keys, Foreign Keys, and Constraints
- o Understanding primary keys and unique constraints
- o Foreign keys and relationships between tables
- o Enforcing constraints in MySQL

4. Data Types in MySQL
- o Overview of numeric, string, date, and time data types
- o Choosing the right data type for columns

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My SQL

Data Manipulation Language (DML)

1. Inserting Data
- o INSERT statement
- o Inserting multiple rows
- o Auto-incrementing fields

2. Updating Data
- o UPDATE statement
- o Using WHERE with UPDATE
- o Handling NULL values

3. Deleting Data
- o DELETE statement
- o Difference between DELETE and TRUNCATE
- o Cascading delete with foreign keys

4. Using Functions in SQL
- o String functions (e.g., CONCAT, SUBSTRING)
- o Numeric functions (e.g., ROUND, ABS)
- o Date and time functions (e.g., NOW, DATE_FORMAT)

Advanced SQL Queries

1. Joins in MySQL
- o Inner joins, outer joins (LEFT, RIGHT)
- o Cross joins and self joins
- o Practical examples of joining tables

2. Grouping Data with Aggregate Functions
- o GROUP BY clause
- o Aggregate functions (COUNT, SUM, AVG, MIN, MAX)
- o Using HAVING with GROUP BY

3. Subqueries and Nested Queries
- o Introduction to subqueries
- o Using subqueries in SELECT, FROM, and WHERE
- o Correlated vs non-correlated subqueries

4. Unions and Intersections

- o Using UNION and UNION ALL
- o Combining results from multiple queries
- o Performance considerations

Indexing, Views, and Performance Optimization

1. Indexes and Keys

- o Creating and using indexes for optimization
- o Clustered vs non-clustered indexes
- o Index maintenance and performance tips

2. Views in MySQL

- o Creating views
- o Using views to simplify complex queries
- o Updating and managing views

3. Stored Procedures and Functions

- o Introduction to stored procedures
- o Creating and executing stored procedures
- o Creating and using user-defined functions

4. Optimizing Queries for Performance

- o Query optimization tips
- o Using EXPLAIN to analyze query performance
- o Indexing strategies

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My SQL

Database Administration and Security

1. User Management and Privileges

- o Creating and managing MySQL users
- o Granting and revoking privileges
- o Role-based access control

2. Database Backups and Restoration

- o Backup strategies: full, incremental, and binary logs
- o Using mysqldump for backups
- o Restoring data from backups

3. Security Best Practices

- o Securing MySQL installations
- o Protecting against SQL injection
- o Using SSL for secure connections

4. Replication and Clustering in MySQL

- o Overview of MySQL replication
- o Setting up master-slave replicatio

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GIT/GITHub

1. Introduction to Git

- What is Git?
- Version Control Systems: Centralized vs. Distributed
- Benefits of using Git
- Git vs. other version control tools (like SVN)

2. Setting Up Git

- Installing Git (Windows, Mac, Linux)
- Configuring Git (username, email, default editor)
- Understanding the .gitconfig file
- Basic Git commands: git --version, git help

3. Basic Git Operations

- Creating a Repository: git init, git clone
- Understanding the Working Directory, Staging Area, and Repository
- Staging Changes: git add
- Committing Changes: git commit
- Viewing Commit History: git log, git show

4. Working with Branches

- What is Branching?
- Creating and Deleting Branches: git branch
- Switching Between Branches: git checkout, git switch
- Merging Branches: git merge
- Handling Merge Conflicts

5. Remote Repositories

- Understanding Remotes
- Adding and Removing Remotes: git remote
- Pushing Changes to a Remote Repository: git push
- Fetching and Pulling Changes: git fetch, git pull

6. Advanced Git Concepts

- Stashing Changes: git stash
- Rebasing: git rebase
- Cherry-picking Commits: git cherry-pick
- Using Tags: git tag
- Resetting and Reverting Changes: git reset, git revert

7. Collaboration and Best Practices

- Workflow Models: Centralized, Feature Branch, GitFlow
- Code Reviews and Pull Requests
- Best Practices for Commit Messages
- Handling Large Files and Repositories

8. Git Tools and Integration

- Using Git GUI Tools (GitKraken, SourceTree)
- Integrating Git with IDEs (VS Code, IntelliJ)
- Working with GitHub, GitLab, Bitbucket

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HOSTING & DEPLOYMENT

AWS Hosting

Module 1: Introduction to AWS Hosting & Deployment

1. Overview of AWS infrastructure and services
2. Hosting vs. Deployment in AWS
3. AWS Global Infrastructure: Regions, Availability Zones, and Edge Locations
4. Key Services: EC2, S3, Route 53, RDS, Elastic Beanstalk, and Lambda

Azure Hosting

Module 1: Introduction to Azure Cloud Services

1. Overview of Microsoft Azure
2. Key benefits of using Azure for hosting and deployment
3. Introduction to Azure Resource Manager (ARM)
4. Types of hosting services in Azure:
5. Azure App Service
6. Azure Virtual Machines (VMs)
7. Azure Kubernetes Service (AKS)
8. Use cases for different hosting services

Digital Ocean

Module 1: Introduction to Digital Ocean

1. Overview of Cloud Hosting
2. What is cloud hosting?
3. Comparison with other cloud providers (AWS, Azure, Google Cloud)
4. Getting Started with Digital Ocean
5. Creating a Digital Ocean account
6. Understanding the Digital Ocean dashboard
7. Understanding key components: Droplets, Volumes, and Spaces
8. Digital Ocean Pricing Plans
9. Understanding pricing and cost management
10. Choosing the right Droplet size

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AI Fundamentals for Developers

Topics Covered:

- What is AI, ML, DL? (from a dev perspective)
- Supervised, Unsupervised Learning — Code examples
- APIs vs. Custom ML models
- Model lifecycle and integration points in web apps
- AI ethics, data privacy (GDPR basics for devs)

Introduction to AI-Powered Web Applications

Topics Covered:

- Use cases: Chatbots, recommendations, voice/image processing
- Architecture of AI-enhanced web apps
- Understanding client/server division for AI processing
- Real-world case studies (e.g., Netflix, Google Lens, Grammarly)

Integrating AI APIs (OpenAI, Google Vision, etc.)

Topics Covered:

- OpenAI API (ChatGPT, Whisper, DALL·E)
  - Key-based authentication
  - Prompt engineering basics
  - Creating an AI chatbot in React
- Google Cloud Vision API
  - Image labeling and OCR
  - API calls with Axios/Fetch
  - Node.js handling of image upload
- Other APIs: HuggingFace, IBM Watson, AssemblyAI
- Handling errors, rate limits, and pricing tiers

Machine Learning with JavaScript (TensorFlow.js)

Topics Covered:

- Intro to TensorFlow.js
- Pretrained models (face detection, sentiment analysis)
- Data collection and normalization in JS
- Training simple models (e.g., linear regression)
- Hosting and using browser-based models

AI in Frontend Personalization & UX

Topics Covered:

- Dynamic UI changes with ML (language, content)
- Predictive input/autocomplete using local models
- A/B testing optimization with AI
- User tracking + session data for personalization (ethical concerns)
- Creating intelligent chatbots (Dialogflow, OpenAI Assistants)

Software Testing (AI + Traditional Approaches)

Topics Covered:

- Manual vs. Automated testing overview
- Unit testing (Jest for React, Mocha/Chai for Node)
- Integration Testing (Postman, Thunder Client, Supertest)
- AI in testing:
  - Visual regression testing (Applitools)
  - Bug prediction using AI
  - Selenium + AI plugins for UI testing
- CI/CD pipelines with test automation

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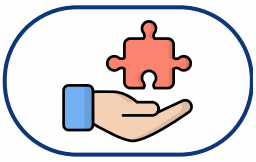

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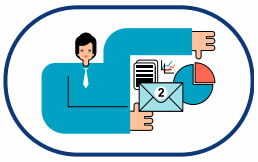

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