1. Core Web Development (HTML, CSS, JavaScript)

Low-level:

HTML:

Basic structure: <html>, <head>, <body>, <meta>, <title>.

Common tags: Heading tags (<h1> to <h6>), paragraphs (<p>), links (<a>), lists (<ul>, <ol>, <li>), images (<img>), division ( ), and sections (<section>, <footer>, <header>).

Form tags: <form>, <input>, <textarea>, <button>, <label>, <select>, <option>.

HTML5 semantic elements: <header>, <footer>, <article>, <nav>, <section>.

CSS:

Basic styling: Text properties (color, font-size, font-family), box model (margin, padding, border, width, height).

CSS selectors: Element, class (.class), ID (#id), attribute selectors (input[type="text"]), pseudo-classes (:hover, :active).

Colors, background properties, and borders.

JavaScript:

Variables: let, const, var (and the differences).

Functions: Function declaration, function expressions, arrow functions.

Conditional statements (if, else, switch).

Loops: for, while, forEach().

Basic data types: String, Number, Boolean, Array, Object.

Medium-level:

HTML:

Forms with input validation: <input type="email">, <input type="password">, <input type="number">, <input type="text">.

Using HTML5 input types for accessibility (email, tel, date).

Embedding media: <audio>, <video>, <iframe>.

CSS:

Layout techniques: Flexbox (alignment, centering), Grid (creating rows and columns).

Styling responsive designs: Media queries to create mobile-first layouts.

Positioning: static, relative, absolute, fixed, sticky.

Pseudo-elements (::before, ::after) and pseudo-classes for styling interactive elements.

Transitions and animations: Basic CSS animations for hover effects or page transitions.

JavaScript:

DOM Manipulation: Selecting elements with querySelector(), modifying content (innerHTML, textContent), handling events (addEventListener()).

Arrays: Methods like map(), filter(), reduce(), array destructuring, spreading and cloning.

Object manipulation: Object destructuring, Object.keys(), Object.values(), Object.entries().

Asynchronous JavaScript: Basic introduction to Promises, and the fetch() API for API requests.

Hard-level:

HTML:

Forms with custom validation (using pattern attribute), complex form elements (<datalist>, <output>, <progress>).

Accessibility features: ARIA roles (role="navigation", role="button"), aria-label, aria-hidden.

Web components: Introduction to custom elements and shadow DOM.

CSS:

Advanced layout with Flexbox and Grid, managing complex layouts like masonry grids, complex form layouts.

Responsive typography: Using rem and em for scalable and flexible fonts, vw/vh units.

CSS animations: Keyframe animations, transitions on hover or focus, animation performance optimizations.

Using calc() for responsive layout math.

JavaScript:

Asynchronous JavaScript: Mastering async/await with try/catch, handling real-time data.

Object-oriented programming: Classes, inheritance, and polymorphism.

Advanced array methods: Deep diving into reduce(), map() with complex operations.

Event delegation, and debouncing/throttling events.

Local storage, cookies, and session storage.

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2. Git & Version Control

Low-level:

Git Basics:

Setting up a repository: git init, git clone.

Staging and committing changes: git add, git commit.

Pushing code to GitHub: git push, creating remote repositories.

Pulling changes from the remote: git pull.

GitHub Basics:

Creating a GitHub repository, pushing code, forking, and cloning.

Basic usage of .gitignore to ignore unwanted files.

Viewing and navigating commit history: git log.

Medium-level:

Branching and Merging:

Branching: git branch, git checkout, git merge.

Merging conflicts: When conflicts arise, manually resolving and committing.

Rebasing vs. merging: Understanding the differences and use cases.

Collaboration:

Using pull requests in GitHub for code reviews and merging branches.

Forking a project and creating pull requests to contribute.

Managing versioning with tags: git tag, git push origin --tags.

Hard-level:

Advanced Git:

git rebase and git cherry-pick: Advanced workflows for modifying commit history.

Rewriting commit history: git commit --amend, interactive rebase (git rebase -i).

Submodules: Adding and managing submodules within projects.

Collaboration Workflows:

Setting up Git hooks to automate checks before commits.

Setting up Git workflows for large teams (GitFlow, trunk-based development).

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3. Node.js & Express.js

Low-level:

Node.js:

Setting up a simple Node.js HTTP server using the http module.

Introduction to require() for including modules and creating a server.

Express.js:

Installing and setting up Express (npm install express).

Creating routes (app.get(), app.post()).

Handling static files using express.static().

Medium-level:

Node.js:

Working with asynchronous file reading/writing using fs module.

Introduction to events and EventEmitter for custom events in Node.js.

Using dotenv for environment variables.

Express.js:

Middleware: Custom middleware for logging requests, error handling.

Understanding REST API structure, creating different HTTP methods (POST, PUT, DELETE).

Error handling: Using try/catch, next() for passing errors to middleware.

Hard-level:

Node.js:

Building a RESTful API using Express and integrating it with a database (MongoDB/PostgreSQL).

Handling concurrency, file uploads (using multer), and streams.

Using child processes and clusters for scaling in Node.js.

Express.js:

Authentication: Using JWT tokens, Passport.js, and middleware for secure routes.

Performance: Implementing caching strategies with Redis or other caching tools.

Error handling: Advanced error handling with centralized error handling middleware.

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4. MongoDB & Mongoose

Low-level:

MongoDB:

Introduction to NoSQL concepts, databases, collections, documents.

Performing basic CRUD operations (db.collection.insertOne(), db.collection.find(), etc.).

Mongoose:

Creating a Mongoose schema (new Schema({})), defining models.

Basic validation in Mongoose schemas (required, unique).

Medium-level:

MongoDB:

Querying with filters: $eq, $gt, $lt, $in, and logical operators.

Aggregation: Using $match, $group, $sum, $avg, $count.

Mongoose:

Schema relationships: Embedding documents vs. referencing with ObjectId.

Population: Using Model.populate() for working with referenced documents.

Hard-level:

MongoDB:

Aggregation pipelines: Complex queries with $unwind, $lookup, and $facet.

Indexing: Creating indexes for optimization (db.collection.createIndex()).

Replica sets for fault tolerance.

Mongoose:

Advanced schema features: Virtuals, middleware, hooks (pre/post save).

Complex validations (custom validators, regex).

Caching and optimizing queries with Mongoose.

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5. MySQL/PostgreSQL (Relational Databases)

Low-level:

SQL Basics:

Understanding tables, rows, and columns in relational databases.

Writing basic SQL queries: SELECT, INSERT, UPDATE, DELETE.

Filtering with WHERE and ORDER BY.

Medium-level:

SQL:

Joins: INNER JOIN, LEFT JOIN, RIGHT JOIN.

Aggregate functions: COUNT(), SUM(), AVG(), MIN(), MAX().

Grouping results with GROUP BY and filtering with HAVING.

PostgreSQL/MySQL:

Data types in PostgreSQL/MySQL (VARCHAR, TEXT, INTEGER, DATE).

Primary and foreign keys, constraints for data integrity.

Hard-level:

SQL:

Subqueries and nested queries.

Transactions: Handling multi-step operations and ensuring consistency.

Indexing: Using CREATE INDEX, UNIQUE, and performance tuning queries.

PostgreSQL/MySQL:

Advanced optimization: Query execution plans, indexing for performance.

Normalization and denormalization strategies.

Stored procedures, triggers, and views.

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6. React.js

Low-level:

React Basics:

Setting up a React project (create-react-app).

Understanding JSX syntax and creating functional components.

Passing props from parent to child components.

Medium-level:

React:

Using state in components (useState), handling input events (form inputs).

Conditional rendering and mapping through arrays with JSX.

Using useEffect for handling side effects (API calls, local storage).

Hard-level:

React:

Context API for managing global state.

Creating custom hooks for reusable logic.

Using React Router for multi-page applications with navigation

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1. Core Web Development (HTML, CSS, JavaScript)

Low-level Project:

Basic Portfolio Website: Create a personal portfolio website using HTML and CSS. Use basic structure, styling, and common tags.

Skills: HTML structure, basic CSS styling, form elements.

Medium-level Project:

Landing Page: Build a responsive landing page using Flexbox or Grid. Implement a contact form with input validation.

Skills: Responsive design, form validation, Flexbox/Grid.

Hard-level Project:

Interactive Web App (To-Do List): Build a dynamic To-Do List application with task addition, completion, and deletion functionalities. Implement local storage to save tasks.

Skills: DOM manipulation, event handling, asynchronous JavaScript, local storage.

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2. Git & Version Control

Low-level Project:

Git Basics Practice: Set up a project in GitHub, create repositories, clone them, and push some initial files.

Skills: Basic Git commands, using GitHub, pushing commits.

Medium-level Project:

Collaborative Project: Collaborate with others by creating branches, committing changes, resolving conflicts, and submitting pull requests.

Skills: Branching, merging, resolving conflicts, pull requests.

Hard-level Project:

Git Workflow with Multiple Developers: Work on a multi-branch Git flow using GitFlow or other strategies for a larger, more complex project. Integrate with CI/CD pipelines.

Skills: Advanced Git commands, managing a large project, CI/CD setup.

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3. Node.js & Express.js

Low-level Project:

Basic REST API: Build a simple API using Express that returns static JSON data when accessed via HTTP requests (e.g., list of products).

Skills: Setting up Express, creating basic routes.

Medium-level Project:

CRUD API for Blog: Create a full CRUD API (Create, Read, Update, Delete) for managing blog posts using Express, with validation and error handling.

Skills: Express routing, RESTful API design, middleware, handling requests.

Hard-level Project:

Authentication System: Build a RESTful API that supports user registration, login, and JWT-based authentication.

Skills: JWT, user authentication, password hashing, error handling.

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4. MongoDB & Mongoose

Low-level Project:

Basic CRUD Application: Create a simple web app (e.g., a contact manager) that allows users to add, view, and delete contact information stored in a MongoDB database.

Skills: MongoDB CRUD operations, Mongoose models, basic routing.

Medium-level Project:

Blog with MongoDB: Build a blogging platform where users can create posts, edit them, and delete posts. Use Mongoose for schema and data validation.

Skills: Mongoose, MongoDB CRUD, basic form handling, validation.

Hard-level Project:

E-commerce Product Management: Create an e-commerce backend with product management (categories, tags, pricing). Implement pagination, searching, and sorting.

Skills: Advanced MongoDB queries, pagination, data validation, aggregation.

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5. MySQL/PostgreSQL (Relational Databases)

Low-level Project:

Simple User Database: Create a simple user database where you can add, update, and delete users from the database.

Skills: SQL basics, INSERT, SELECT, UPDATE, DELETE.

Medium-level Project:

Product Inventory System: Build a product inventory system with categories, product details, and stock levels. Implement relationships between tables (e.g., one-to-many).

Skills: SQL joins, database normalization, foreign keys.

Hard-level Project:

Order Management System: Design an e-commerce backend with order management and product relationships. Use transactions for handling orders and payments.

Skills: Complex SQL queries, transactions, multi-table joins, foreign keys.

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6. React.js

Low-level Project:

Static Personal Website: Create a static personal website with React. Use React components for different sections (header, footer, body).

Skills: React components, JSX, basic React rendering.

Medium-level Project:

Weather App: Build a weather app that fetches data from a public API and displays weather information. Use useState and useEffect hooks for managing data and API calls.

Skills: React hooks (useState, useEffect), API integration.

Hard-level Project:

Task Management App: Build a fully functional task management app with authentication and authorization. Users can create, update, delete, and track tasks. Implement Redux for state management.

Skills: Redux, React Router, authentication, state management.

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7. Authentication & Authorization

Low-level Project:

Simple Authentication: Build a simple login system with user authentication using JWT. Store tokens in local storage and display login/logout functionality.

Skills: JWT, authentication, token management.

Medium-level Project:

Login/Signup System: Implement a login and signup system with password hashing and validation. Use JWT for session management and store the token in cookies.

Skills: JWT, bcrypt (password hashing), cookie management.

Hard-level Project:

Role-Based Access Control: Build an admin dashboard where users have different roles (admin, user, guest). Implement role-based access control to restrict access to certain parts of the app.

Skills: Role-based authentication, middleware, session management.

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8. Deployment

Low-level Project:

Deploy Basic Web App to Heroku: Deploy a simple static site or backend API to Heroku or Netlify.

Skills: Deployment basics, working with Heroku/Netlify.

Medium-level Project:

Full Stack Deployment: Deploy a MERN stack application (front-end on Netlify/Vercel, backend on Heroku) with environment variables for different environments (development, production).

Skills: Full-stack deployment, managing environment variables, working with cloud platforms.

Hard-level Project:

CI/CD Pipeline: Set up a CI/CD pipeline for automatic testing and deployment using GitHub Actions or other CI/CD services. Use Docker to containerize the application.

Skills: CI/CD, Docker, automated testing, GitHub Actions.

After completing the core MERN stack path, you'll have a solid foundation in web development. Now, it's time to take your skills further by exploring additional tools and services that will help you build scalable and efficient SaaS products. The following topics will prepare you to develop faster and more efficiently in a real-world production environment:

Here's what to focus on next:

1. Tailwind CSS:
Learn Tailwind CSS, a utility-first CSS framework that allows you to build custom designs quickly and efficiently without writing custom CSS. It's highly popular in the developer community for its speed and ease of use.

2. ShadCN:
Explore ShadCN for pre-built, customizable UI components that can streamline your development process and help you create polished UIs with minimal effort.

3. NestJS:
Start working with NestJS, a powerful framework for building efficient and scalable server-side applications with TypeScript. It’s an excellent choice for building robust APIs for large-scale apps.

4. AWS (Amazon Web Services):
Familiarize yourself with AWS services commonly used in startups for building, deploying, and scaling applications:

IAM (Identity and Access Management): Securely manage access to AWS resources.

Elastic Beanstalk: Easily deploy and manage applications in the cloud.

S3 (Simple Storage Service): Store and retrieve any amount of data with high availability.

EC2 (Elastic Compute Cloud): Launch and manage virtual servers.

SNS (Simple Notification Service) and SQS (Simple Queue Service): Enable communication between services and decouple your application architecture.

VPC (Virtual Private Cloud): Create a private, secure network for your app's resources and control traffic flow.

Lambda: Run code in response to events without managing servers. Great for serverless computing.

RDS (Relational Database Service): Managed relational databases like MySQL or PostgreSQL for your app.

DynamoDB: Managed NoSQL database for high-performance, scalable applications.

Elastic Load Balancer (ELB): Distribute incoming application traffic across multiple EC2 instances for better scalability and fault tolerance.

API Gateway: Create, deploy, and manage APIs, enabling your app to interact with other services securely and efficiently.

5. Cron Jobs:
Learn how to implement scheduled tasks (cron jobs) for actions like sending automated emails, cleaning up databases, or performing maintenance tasks at regular intervals.

6. Additional Concepts:

Microservices: Understand how to break down an application into smaller, manageable services that can scale independently.

API Rate Limiting and Throttling: Learn how to manage traffic to your APIs and protect them from overload.

WebSockets: Implement real-time features like chat systems or live notifications.

Docker: Containerize your application to ensure consistency across different environments.

CI/CD: Set up continuous integration and deployment pipelines to automate testing and deployment processes.

By learning these advanced tools and services, you will be able to create SaaS products more efficiently and with greater scalability. These services are essential for startups and large-scale applications, helping you manage complex workflows, monitor system health, and securely handle your infrastructure.