Mastering Angular: A Complete Roadmap

1. Fundamentals of Angular

TypeScript Basics

- Interfaces, classes, decorators, modules, and async/await.

Angular Core Concepts

- Modules (NgModule)

- Components (@Component)

- Templates & Directives (ngIf, ngFor, ngClass, ngStyle)

- Data Binding (Interpolation, Property Binding, Event Binding, Two-way Binding)

Dependency Injection

- Services (@Injectable())

- Dependency Injection (DI) & Hierarchical Injectors

Routing & Navigation

- RouterModule, route parameters, query parameters

- Lazy loading modules

- Route guards (CanActivate, CanDeactivate)

Forms Handling

- Template-driven forms

- Reactive forms & Form validation

- Custom validators & form groups

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2. Advanced Angular Concepts

Component Communication

- Input & Output decorators (@Input(), @Output())

- ViewChild & ContentChild

- Services with RxJS for shared state

RxJS & Reactive Programming

- Observables & Subjects

- Operators like map, filter, switchMap, mergeMap

- Handling async data with async pipe

State Management

- Services for state management

- NgRx (Redux pattern)

- BehaviorSubject vs. Store

HTTP Client & APIs

- HttpClientModule, CRUD operations

- Interceptors for request handling

- Error handling & retry strategies

Performance Optimization

- Lazy loading & code splitting

- Change Detection (OnPush strategy, trackBy in ngFor)

- Optimizing bundle size with Webpack

Testing in Angular

- Unit Testing with Jasmine & Karma

- End-to-End (E2E) testing with Protractor / Cypress

- Mocking services & HTTP requests

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3. Expert-Level Topics

Custom Directives & Pipes

- Structural & Attribute Directives

- Custom Pipes & Pure vs Impure Pipes

Monorepo & Micro Frontends

- Using Nx for Monorepos

- Module Federation for Micro Frontends

Angular Universal & SSR

- Server-side rendering with Angular Universal

- Pre-rendering & SEO best practices

Progressive Web Apps (PWA)

- Service workers & caching strategies

- Offline support & push notifications

Security Best Practices

- Preventing XSS & CSRF attacks

- Securing Angular APIs with JWT

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4. Full-Stack Integration

Angular with Backend Frameworks

- REST API integration (Node.js, PHP, .NET, etc.)

- GraphQL with Apollo Angular

Database Connectivity

- Firebase integration

- Real-time data updates with WebSockets

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5. Hands-on Projects & Best Practices

Real-World Projects to Build

- E-commerce platform

- Admin dashboard

- Social media app

- Task management system

Code Quality & Best Practices

- Linting with ESLint & Prettier

- CI/CD pipeline for Angular

- Code reviews & refactoring