**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

**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

**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

**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

**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