Angular Advanced Topics (4+ Years Experience)

1. Change Detection (VERY IMPORTANT)

- Default vs OnPush change detection strategies and when to use each
- How Angular runs change detection using component tree traversal
- Role of zone.js in triggering change detection
- markForCheck() vs detectChanges() and real-world use cases
- Common performance mistakes causing excessive change detection

2. RxJS Advanced

- Subject vs BehaviorSubject vs ReplaySubject with use cases
- switchMap vs mergeMap vs concatMap differences and scenarios
- shareReplay for caching HTTP calls
- Error handling using catchError and retry
- Memory leaks, subscriptions, and unsubscribe strategies

3. State Management

- Component state vs shared service state
- NgRx basics: Store, Action, Reducer, Effect
- When NgRx is overkill and should be avoided
- Signals vs RxJS for state management (Angular 16+)
- Decision guidelines: Signals vs NgRx

4. Angular Signals

- signal(), computed(), and effect() fundamentals
- Signals vs Observables comparison
- Using Signals with OnPush change detection
- Migration strategy from RxJS to Signals
- Signals expectations in Angular 21+

5. Performance Optimization

- Using trackBy with *ngFor
- Lazy loading feature modules
- Preloading strategies for better UX
- Avoiding function calls in templates
- Virtual scrolling for large lists

6. Advanced Dependency Injection

- Hierarchical injectors and provider scopes
- providedIn: root vs module-level providers

- Multi-providers and real-world examples
- useClass, useValue, and useFactory patterns

7. Angular Routing (Advanced)

- Lazy loading routes for performance
- Route guards: CanActivate, CanLoad
- Resolvers for pre-fetching data
- Preloading strategies
- Route reuse strategy

8. Standalone Components (Angular 15+)

- Concept of standalone components
- Standalone directives and pipes
- Migration from NgModules
- Reasons Angular moved to standalone APIs

9. Forms (Advanced)

- Reactive vs template-driven forms comparison
- Custom synchronous validators
- Asynchronous validators
- Dynamic forms generation
- FormArray usage scenarios

10. Micro Frontend

- Module Federation basics
- Independent deployments
- Shared dependencies management
- When micro frontend architecture is unnecessary

11. SSR & Hydration

- Angular Universal overview
- Server-side rendering flow
- Hydration in Angular 16+
- SEO benefits of SSR

12. Security

- XSS prevention techniques
- Using DomSanitizer safely
- CSRF basics
- Auth guards and token handling

13. Testing (Senior Expectation)

- Unit testing with Jasmine and Jest
- Component testing strategies
- Service mocking and dependency isolation
- E2E testing basics using Cypress or Playwright
- Practical test coverage strategy

14. Build & Deployment Knowledge

- Angular build optimization techniques
- Environment configuration management
- CI/CD awareness for Angular apps
- Docker basics for frontend developers

15. Project Architecture

- Recommended folder structure
- Feature module-based design
- Core and shared modules
- Smart vs dumb (container-presenter) components

16. Design Patterns in Angular

- Facade pattern usage
- Singleton service pattern
- Observer pattern with RxJS
- Container–Presenter pattern