Software Engineer Interview Topics

1. Frontend (React.js, Next.js, JS/TS, Tailwind)

React basics

- **State:** Data that determines how a component renders.
- **Props:** Pass data from parent to child components.
- **Lifecycle methods:** Functions called at specific stages (now largely replaced by hooks).
- **Hooks:**
  - `useState`: Adds state to a functional component.
  - `useEffect`: Handles side effects after rendering.
  - `useContext`: Provides a way to share data globally.
  - `useReducer`: Manages complex state logic.

Next.js

- **SSR:** Renders on the server for better SEO.
- **SSG:** Generates HTML at build time for speed.
- **ISR:** Regenerates static pages incrementally.
- **API routes:** Create a backend API within your app.
- **Routing:** File-system based routing.
- **Middleware:** Functions that run before a request is completed.

Advanced JS/TS

- **Promises:** Handle asynchronous operations.
- `async/await`: Syntactic sugar for Promises.
- **Closures:** Functions that remember their parent scope.
- **Event loop:** The mechanism for non-blocking I/O.

Styling with Tailwind

- **Responsive design:** Using utility classes like `md:` and `lg:`.
- **Conditional classes:** Applying classes with JavaScript logic.

2. Backend (Node.js, Express, REST APIs, Microservices)

Core Concepts

- **REST APIs:** Creating endpoints (`GET`, `POST`, etc.) in Express.
- **Middleware:** A series of functions that execute in order.
- **Authentication & authorization:**
  - **JWT:** A compact, stateless authentication token.
  - **Sessions & cookies:** Storing user data on the server.

Microservices

- **Communication:** Via REST or message queues.
- **Scaling:** Services can be scaled independently.

3. Databases (MongoDB, MySQL, PostgreSQL, Redis)

MongoDB (NoSQL)

- **Schema design:** Structuring data.
- **Indexing:** Speeding up queries.
- **Aggregation pipeline:** For complex data processing.

SQL (MySQL/PostgreSQL)

- **Joins:** Combining data from multiple tables.
- **Subqueries:** A query inside another query.
- **Normalization:** Reducing data redundancy.

Redis (In-memory)

- **Caching:** Storing frequently accessed data.
- **Session storage:** Fast retrieval of user sessions.
- **Pub/Sub:** Messaging pattern for communication.

4. Cloud & DevOps (AWS, GCP, Docker, Kubernetes, Jenkins)

AWS Services

- **EC2:** Virtual servers.
- **S3:** Object storage.
- **Lambda:** Serverless computing.
- **RDS:** Managed relational databases.

Docker

- **Containerization:** Packaging apps with dependencies.
- **Dockerfile:** Script to build an image.
- **Volumes:** Persisting data.

Kubernetes

- **Pods:** Smallest deployable units.
- **Deployments:** Manage sets of replica pods.
- **Services:** Expose pods as a network service.

CI/CD Pipeline

- **Jenkins:** Automates building, testing, and deploying.

5. Key Projects (Food Delivery App, Scholarship Portal)

Food Delivery App

- **JWT auth:** Stateless authentication flow.
- **Payment gateway:** Integrating a third-party service.
- **Real-time tracking:** Using WebSockets.

Scholarship Portal

- **Form validation:** Ensuring correct user input.
- **Email notifications:** Automated emails via Nodemailer.
- **Admin dashboard:** Interface for management.

6. Other Tools

PySpark

- **ETL pipeline:** Extracts, transforms, and loads data.
- **Dataframes:** Distributed collections of data.

Power BI

- **Dashboards:** Creating interactive visualizations.

Struts

- **Java framework:** Legacy web application development.

Agile/Scrum

- **Ceremonies:** Standups, reviews, retrospectives.

🎯 Must-Revise Interview Topics

- **DSA & Problem Solving:** Arrays, strings, hashing, recursion, stacks/queues, DP.
- **System Design (basic):** Designing scalable systems (e.g., URL shortener, chat app).
- **Behavioral:** Discussing teamwork, challenges, and solutions.
- **SQL Queries:** Writing queries with joins, grouping, and window functions.