



# Web dev

## Foundations

| Easy  | Medium                                     | Hard  |
|---|--|---|
| HTML  |  |   |
| CSS   |  |   |
| Bash basics (cd, ls, pwd, mkdir, touch, vi)       |  |   |
|   | Bash medium (grep, piping, reverse search) |   |
| Git/Github  |  |   |
| JS Intro, Single threaded nature of JS            |  |   |
|   | Async JS, callback queue, event loop       |   |
|   |  | Creating promises, Common Promise API methods |
| Common JS APIs (map, filter, reduce, Object.keys) |  |   |

## Simple frontend, DOM

| Easy   | Medium                              | Hard   |
|--|-------------------------------------|--|
| Intro to DOM, DOM Tree Structure   |                                     |  |
| Common DOM APIs (getElementById, getElementsByClassName, querySelector, innerHTML, innerText, getAttribute, setAttribute). |                                     |  |
| Event handlers, onClick, stopPropagation,  |                                     |  |
| localStorage   |                                     |  |
|  | DOM Manipulation, Dynamic frontends |  |
|  |                                     | Creating a simple reconciler, Foundation for react |

Project

- 1. Pure frontend TODO app using DOM Manipulation

Node.js/Bun/Cloudflare Runtime - Various JS runtimes

| easy                              | medium         | hard                                    |
|-----------------------------------|----------------|---|
| What is a JS runtime              |                |   |
| Node.js installation, common APIs |                |   |
| file system api, fetch.           |                |   |
| External packages, axios vs fetch |                |   |
|                                   | v8, cf runtime |   |
|                                   |                | stream, worker threads, cluster module, |

HTTP Servers

| Simple                                 | Medium                                  | Advance |  |
|--|---|---------|--|
| What are HTTP Servers                  |   |         |  |
| Methods, routes, URLs, IPs and domains |   |         |  |
|  | headers, body, query parameters         |         |  |
|  | Intro to express, creating routes       |         |  |
|  | Middlewares in express                  |         |  |
|  | File system like DBs                    |         |  |
|  | Authentication using jwt, basics of jwt |         |  |
|  | Secret management using Doppler         |         |  |

## NoSQL Databases

| Easy                                 | Medium                 | Hard |
|--------------------------------------|------------------------|------|
| Intro to Databases                   |                        |      |
|                                      | SQL vs NoSQL           |      |
| MongoDB Intro, getting your first DB |                        |      |
| mongoose, Schemas etc. Simple CRUD   |                        |      |
|                                      | Relationships intro    |      |
|                                      | Relationships in Mongo |      |
|                                      | Aggregations in mongo  |      |

## SQL Databases

| Easy                              | Medium  | Hard                                 |
|-----------------------------------|---|--------------------------------------|
| Recap SQL vs NoSQL                |   |                                      |
| Postgres intro, getting your free | Creating schemas while dealing with SQL databases, CREATE TABLE |                                      |
|                                   | Creating schemas while dealing with SQL databases, CREATE TABLE |                                      |
|                                   | SQL queries (CRUD)  |                                      |
|                                   | Indexes   |                                      |
|                                   |   | Transactions and Concurrency Control |
|                                   |   | Normalization                        |
|                                   | Sub queries, batch queries                                      |                                      |

ORMs

| Simple        | Medium   | Hard |
|---------------|--|------|
| Intro to ORMs |  |      |
|               | Prisma basics, setup, schema generation and CRUD queries |      |
|               | Transactions and relationships in prisma                 |      |
|               | Drizzle basics, setup, schema                            |      |
|               | Txns and relationships in drizzle                        |      |

React

|  |                                      |                              |
|--|--------------------------------------|------------------------------|
| Revise DOM, foundation of React, why frontend frameworks |                                      |                              |
| Components in react                                      | useState, useEffect                  |                              |
| Routing in react   |                                      | Connecting FE to BE          |
|  |                                      | useRef, useMemo, useCallback |
|  | Custom hooks                         |                              |
|  | Context API                          |                              |
|  | Intro to state management            |                              |
|  | intro to recoil, atoms and selectors |                              |
|  |                                      | atomFamily, selectorFamily   |

Styling React apps

|             |          |      |
|-------------|----------|------|
| Easy        | Medium   | Hard |
| Material UI |          |      |
|             | Tailwind |      |
|             | Shadcn   |      |
|             |          |      |

Typescript

|                   |                  |  |
|-------------------|------------------|--|
| Easy              | Medium           | Hard                                   |
| TS vs JS, why TS? |                  |  |
|                   | types in ts      |  |
|                   | interfaces in ts |  |
|                   |                  | Advance TS APIs (Partial, Exclude ...) |

## Project

Pure frontend -

1. Gmail clone

Full stack

1. Excelidraw

## NextJS

| Easy          | Medium                       | Hard |
|---------------|------------------------------|------|
|               | Why NextJS, SSR vs CSR       |      |
|               | File based routing           |      |
|               | Middlewares                  |      |
|               | SSG, ISR                     |      |
|               | Tailwind, shadcn integration |      |
|               | API routes                   |      |
| Data fetching |                              |      |
|               | NextAuth, Cookie based auth  |      |
|               | Internationalization         |      |

## Monorepos, Turborepo, lints

| Easy               | Medium                         | Hard                   |
|--------------------|--------------------------------|------------------------|
| What is linting    |                                |                        |
|                    | Prettier, eslint               |                        |
|                    |                                | pre commit hooks/husky |
|                    |                                | lints in CI            |
| What is a monorepo |                                |                        |
|                    | Basic yarn workspaces monorepo |                        |
| What is turborepo  |                                |                        |
|                    | Turborepo                      |                        |

## Websockets, rtc

| Easy                                     | med   | hard               |
|--|---|--------------------|
| one way vs two way comm                  |   |                    |
| what are ws, how are they diff from http |   |                    |
|  | Creating a websocket server                 |                    |
|  | Client side logic to connect to a ws server |                    |
|  | UDP vs TCP communication, webrtc            |                    |
|  |   | SFUs and Mediasoup |

## Project

1. Build a chat app (simple)
2. Build a chess app/other real time game

## Testing

| Easy         | Medium           | Hard              |
|--------------|------------------|-------------------|
| Why testing? |                  |                   |
|              | Unit tests       |                   |
|              |                  | Integration tests |
|              | End to end tests |                   |

## Advance backend

| Easy | Medium                                     | Hard |
|------|--|------|
|      | Advance BE communication                   |      |
|      | queues (redis)                             |      |
|      | pub subs (redis/kafka/RabbitMQ)            |      |
|      | Scaling ws, http servers                   |      |
|      | Node.js vs go lang vs rust for performance |      |

## More topics

- ZOD
- \* Serverless BE
- openAPI spec
- Autogenerated clients