

# Software Design & Architecture

Visit Backend Developer Roadmap

- Minimap of Topics
- Clean Code
  - Programming Paradigms
  - Object Oriented Programming
  - Design Principles
  - Design Patterns
  - Architectural Principles
  - Architectural Styles
  - Architectural Patterns
  - Enterprise Patterns

- Be Consistent
- Meaningful names over Comments
- Indentation and Code Style
- Keep methods, classes, files small
- Pure functions
- Minimize cyclomatic complexity
- Avoid passing nulls, booleans
- Keep framework code distant
- Use correct constructs
- Tests should be fast and independent
- Use meaningful names
- Organize code by the actor it belongs to
- Command Query Separation
- Keep it simple and refactor often

Clean Code Principles

Programming Paradigms

Object Oriented Programming

Design Principles

- Structured Programming
- Functional Programming
- Object Oriented Programming

- Composition over Inheritance
- Encapsulate what varies
- Program against abstarctions
- Hollywood principle
- SOLID
- DRY
- YAGNI

- Model-Driven Design
  - Domain Models
  - Anemic Models
  - Layered Architectures
  - Domain Language
  - Class Invariants
- Paradigm Features
  - Abstract Classes
  - Concrete Classes
  - Scope / Visibility
  - Interfaces
- Primary Principles
  - Inheritance
  - Polymorphism
  - Abstraction
  - Encapsulation

Design Patterns

- GoF Design Patterns
- PoSA Patterns

- Architectural Principles
  - Component Principles
  - Policy vs Detail
  - Coupling and Cohesion
  - Boundaries
- Architectural Patterns
  - Domain-Driven Design
  - Model-View Controller
  - Microservices
  - Blackboard Pattern
  - Microkernel
  - Serverless Architecture
  - Message Queues / Streams
  - Event Sourcing
- SOA
- CQRS

Architectural Styles

- Event-Driven
- Publish-Subscribe
- Messaging
- Distributed
  - Client-Server
  - Peer-to-Peer

Structural

- Component-Based
- Monolithic
- Layered

Enterprise Patterns

- DTOs
- Identity Maps
- Use Cases
- Repositories
- Mappers
- Transaction Script
- Commands / Queries
- Value Objects
- Domain Models
- Entities
- ORMs