Guide2Code - Go Programming Roadmap

Phase 1: Beginner Level

Topics to Learn:

1. Introduction to Go (Installation, Go Modules, Basic Syntax)
2. Variables & Data Types (int, float, string, bool, struct)
3. Operators & Expressions
4. Control Flow (if-else, switch-case)
5. Loops (for loop, range-based iteration)
6. Functions & Scope (First-class Functions, Closures)
7. Arrays, Slices, Maps & Structs
8. Pointers in Go (Memory Addressing, Dereferencing)
9. File Handling (Reading/Writing Files, JSON Parsing)
10. Error Handling & Debugging (defer, panic, recover)

Beginner Project Ideas:

- Simple Calculator – Perform basic arithmetic operations
- To-Do List CLI – Create a basic command-line to-do list
- Age Calculator – Calculate age based on the birth year
- Temperature Converter – Convert between Celsius & Fahrenheit
- Contact Manager – Store and retrieve contacts in JSON format

Phase 2: Intermediate Level

Topics to Learn:

1. Concurrency in Go (Goroutines, Channels)
2. Interfaces & Structs (Method Sets, Embedding)
3. Working with Databases (SQL, GORM)
4. REST API Development (net/http, Gin, Fiber)
5. Web Scraping with Go (colly)
6. Working with JSON & XML (encoding/json, encoding/xml)
7. File & Directory Operations (os, io/ioutil)

8. Unit Testing & Benchmarking (testing, testify)
9. Working with Time & Date (time package)
10. Data Serialization (Protobuf, gRPC)

Intermediate Project Ideas:

- URL Shortener – Build a simple URL shortening service
- RESTful API for Task Management – CRUD operations with Gin/Fiber
- Weather Data Fetcher – Fetch & analyze weather data using APIs
- Blog CMS – Create a simple content management system
- Cryptocurrency Price Tracker – Track crypto prices using API integration

Phase 3: Advanced Level

Topics to Learn:

1. Advanced Concurrency (Worker Pools, Mutexes, WaitGroups)
2. Microservices Architecture with Go
3. Distributed Systems & Networking (RPC, ZeroMQ)
4. Advanced Database Operations (NoSQL, PostgreSQL)
5. Kubernetes & Docker for Go Applications
6. Secure Coding Practices in Go (JWT, OAuth, Cryptography)
7. Machine Learning in Go (Gorgonia, Gonum)
8. Blockchain Development with Go (Ethereum, Hyperledger)
9. Performance Optimization & Profiling (pprof, tracing)
10. Cloud Deployment (AWS Lambda, Google Cloud Run)

Advanced Project Ideas:

- Real-time Chat Application – WebSocket-based chat service
- AI-powered Sentiment Analysis – NLP with Go
- IoT Dashboard – Collect & visualize IoT sensor data
- Load Balancer – Implement a basic reverse proxy
- Blockchain Explorer – Analyze transactions on a blockchain