GOLANG PROGRAMMING

By Dr. Vishwanath Rao

Day 1

Benefits of Modern Programming
Comparing existing OOP language with GOlang
Benefits of Functional Programming
Advantages and Disadvantages of most famous languages.

Introduction to Golang
Background, History
Static Typing in Golang
Building, Running a Go Program

Environment Setup
Testing Environment

Basic data types, variables declaration
Numerical and Boolean operations
Different ways of variable handling

For and if statements
Go Switch

Golang Arrays,
Declaring and Initializing an array
Looping through an array
Slicing an array
Copying to an array
Appending elements to an array
String and String arrays

String operations and formatting
String methods Index, Contains, Count, Replace
Splitting a string, Sorting an array of strings

Introduction to maps
Creating a map, adding members to the map
Length of a map, adding new key/value pair
Deleting a key in the map

Introduction to functions
Creating simple functions,
function signatures and syntax
Passing parameters/arguments to functions
Returning single
multiple values from functions
Variadic functions and samples

Functions as expressions in Golang
Inline functions in Golang
Writing recursive functions in Golang
Deferring statements in a function
Panic and Recover methods in Golang

Day 2

Introduction to Structs
Creating, declaring a struct and struct members
Initializing a structure with initial values
Assigning methods to structs

Introduction to interface types
Creating an interface
Implementing an interface and achieving polymorphism
Polymorphism demo

Introduction to Pointers
Pass by value and pass by pointers
Getting the address of a variable
Passing the address of the variable
Dereferencing the pointer
Using new function

Using go’s built-in packages (os, log, io/ioutil)
Creating/opening a file
Reading from a file, Writing to a file
Closing a file, logging errors using log package
Type conversions
Converting int to float and vice-versa
Strconv - string conversion functions ParseInt, ParseFloat

Introduction to Go concurrency
Converting sequential flow to concurrent flow
Using Goroutines
Introduction to channels
Creating a channel using make function
Passing/Receiving information thru channels
Channel synchronization through sync package
Using waitGroup from sync package
Using mutexes for synchronization
Concurrency patterns and their usage

Day 3

Introduction to http programming in Golang
Using net/http package
Creating a web server

Creating a route handler using http HandleFunc method
Installing third party packages using go get
3rd party frameworks (Gin Gonic)
Setting up multiple routes and handlers
Returning strings, json from the http methods
Defining data models using structs

Encoding/decoding structs to Json using Json Encoder/Decoder
Serving static files
Parsing request and url parameters
Parsing request body
CRUD operations
Validating requests params/body
Handling single/multiple file uploads
Using middleware architecture

Day 4

Introduction to database programming in go
Built in sql package
Installing mysql drivers for go
Opening and closing sql connections
Connection pools
Importing and exporting data
Sample tables creation
One to many relationship
Performing Inserts and Updates

Querying single/multiple rows
Populating results into structs
Handling nested structs
SQL Joins and struct handling
Handling pagination
Ordering and Filtering
Handling database errors
Exposing MySQL data via REST api
Go format, Go Build, Go run commands
Compiling Go programs for various platforms
Building go apps for deployment

Day 5

Microservice fundamentals
12 Factor Application
Host Components as Service
Docker container Overview WRT GOlang
Creating MicroServices Applications
Using Service Components

Deployment Models
Docker containers creation using Go Apis
Different models of Deployments

Serverless vs Kubernetes
working with Serverless Applications

Profiling and Mocking techniques
Inbuilt methods
Tuning using Design Patterns
Coding Best Practices