GO Language

Programming language survey

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Outline

Introduction

- Go is a procedural programming language. It was developed in 2007 by Robert Griesemer, Rob Pike, and Ken Thompson at Google but launched in 2009 as an open-source programming language. Programs are assembled by using packages, for efficient management of dependencies. This language also supports environment adopting patterns alike to dynamic languages. For eg., type inference (y := 0 is a valid declaration of a variable y of type float).
- Go is a statically typed, concurrent, and garbage-collected programming language created at Google in 2009. It is designed to be simple, efficient, and easy to learn, making it a popular choice for building scalable network services, web applications, and command-line tools.
- Go is known for its support for concurrency, which is the ability to run multiple tasks simultaneously. Concurrency is achieved in Go through the use of Goroutines and Channels, which allow you to write code that can run multiple operations at the same time. This makes Go an ideal choice for building high-performance and scalable network services, as well as for solving complex computational problems.

APPLICATIONS

- Caddy, an open source HTTP/2 web server with automatic HTTPS capability
- CockroachDB, an open source, survivable, strongly consistent, scale-out SQL database.
- Consul, a software for DNS-based service discovery and providing distributed Key-value storage, segmentation and configuration.
- Docker, a set of tools for deploying Linux containers
- EdgeX, a vendor-neutral open-source platform hosted by the Linux Foundation, providing a common framework for industrial IoT edge computing
- Grafana, a multi-platform open source analytics and interactive visualization web application, whose back end is written in Go.
- Hugo, a static site generator
- InfluxDB, an open source database specifically to handle time series data with high availability and high performance requirements
- InterPlanetary File System, a content-addressable, peer-to-peer hypermedia protocol
- Juju, a service orchestration tool by Canonical, packagers of Ubuntu Linux

FEATURES

- **Language Design:** The designers of the language made a conscious purposeful to keep the language simple and easy to understand. The entire detailing is in a few pages and some interesting design decisions were made through Object-Oriented support in the language.Towards this, the language is opinionated and recommends an idiomatic way of achieving things. It prefers Composition over Inheritance. In Go Language, "Do More with Less" is the mantra.
- **Package Management:** Go merges modern day developer workflow of working with Open Source projects and includes that in the way it manages external packages. Support is provided directly in the tooling to get external packages and publish your own packages in a set of easy commands.
- **Powerful standard library:** Go has powerful standard library, which is distributed as packages.
- **Static Typing:** Go is static typed language. So, in this compiler not just work on compiling the code successfully but also ensures on type conversions and compatibility. Because of this feature Go avoid all those problems which we face in dynamically typed languages.
- **Testing Support:** Go provides us the unit testing features by itself i.e., a simple mechanism to write your unit test parallel with your code because of this you ca understand you code coverage by your own tests. And that can be easily used in generating your code documentation as an example.

ADVANTAGES

- **Concurrency:** It allows multiple process running simultaneously and effectively.
- **Quick Outcome:** Its compilation time is very fast.
- **Library:** It provides a rich standard library.
- **Garbage collection:** It is a key feature of go. Go excels in giving a lot of control over memory allocation and has dramatically reduced latency in the most recent versions of the garbage collector. It validates for the interface and type embedding.
- **Concurrency:** Go provides excellent support for concurrency, making it easy to write code that can run multiple tasks simultaneously. This is achieved through Goroutines and Channels, which allow you to write code that can run multiple operations at the same time.
- **Performance:** Go is designed to be fast and efficient, with a focus on performance and low memory usage. This makes it well-suited for building high-performance network services, as well as for solving complex computational problems.
- **Simplicity:** Go has a straightforward syntax and a simple type system, making it easy to learn and use, even for people with no prior programming experience.
- **Garbage Collection:** Go has built-in garbage collection, which automatically manages memory for you. This eliminates the need for manual memory management, reducing the likelihood of memory leaks and other bugs that can a from manual memory management.

DISADVANTAGES

- It has no support for generics, even if there are many discussions about it. packages distributed with this programming language is quite useful but Go is not so object-oriented in the conventional sense.
- There is absence of some libraries especially a UI tool kit.
- Limited Object-Oriented Features: Go does not have full-fledged object-oriented features like inheritance and polymorphism. This can make it more difficult to write complex programs, especially for developers who are used to traditional object-oriented languages.
- No Generics: Go does not have built-in support for generics, which makes it difficult to write reusable code.
- Immature Standard Library: Go's standard library is relatively new and still maturing, which can make it difficult to find the tools you need for a particular task.

EXAMPLE

```go
package main

import "fmt"

// Main function
func main() {

    fmt.Println("!... Hello World ...!")
}
```

Figure: Example for an GO

Thank you

Thank You

References

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