**Why do we need go?**

We can typically classify the programming languages into 3 categories based on their uses

1. Efficient compilation
2. Efficient execution
3. Ease of programming

Finding all three in a single programming language is generally difficult. So Golang is an attempt to combine all the above features.

So, it is an attempt to combine ease of programming of an interpreted, dynamic language with the efficiency of statically typed compiled language.

Go is built to be fast, and it takes just a few seconds to build a large executable on a single computer.

[**GO**](https://www.geeksforgeeks.org/golang/)**:**  
Go or Golang is a statically typed (i.e. the datatype of variables are needed to be defined before compilation) open-source procedural-oriented programming language. It was designed at Google by Robert Griesemer, Rob Pike, and Ken Thompson and was released on the 10th of November 2009. The language was designed using [C language](https://www.geeksforgeeks.org/c-programming-language/) so the syntax of the language is quite similar to C language. Go is also easier to learn than other C-type languages. Tech-giants like Uber, DailyMotion, Medium, Soundcloud, Docker, Intel, Baidu, Twitch, Google itself, and many more are using Go language. It is mostly used for creating static websites, web scraping, server development, and designing backend. However, GO is still not very popular due to the language being slower and verbose. It is quite preferred in the open-source community.

**Advantages:**

* Go is very simple and the fact that it was developed from C makes it easier to learn, especially to those coming from C\C++ background.
* GO is compiled into machine code hence it is very fast and also the generated binaries are very small.
* GO supports concurrency using goroutines. This means rather than linearly processing all programs in order, go parallelly does tasks and executes the program accordingly.
* GO has memory safety, this means that Go doesn’t have the risk of dangling pointers or data leaks. Go is very secure.
* Go’s standard library has most of the required functions which saves the user from the hassle of importing libraries.
* GOs backed by Google which is a tech-giant and also GO is used by Google which is enough to assume that it is not going anywhere soon.
* programs can be edited and run on the web directly.

**Disadvantages:**

* GO doesn’t have generics. This reduces the reusability of the code.
* The library support for GO is very weak. It is because the language is very young.
* GO doesn’t have a GUI library.
* The dependency manager in GO is very buggy.zsss

[**Rust**](https://www.geeksforgeeks.org/rust-vs-dart-which-is-more-likely-to-replace-cpp/)is a multi-paradigm open-source systems programming language that is especially safe concurrency. Rust programming language has been developed by Graydon Hoare at Mozilla research and it came into existence back in 2010. It lacks concurrency so it is less popular in the case of developing parallel systems. Some of the companies that use Rust language are Mozilla, Dropbox, Sentry, Postmates, Brilliant, etc.

**Advantage of Rust language:**

* It provides quick debugging and testing
* It is ideally memory safe
* It has predictable runtime behavior
* It saves crashing
* It saves debugging time

**Disadvantage of Rust language:**

* Learning Rust is a little difficult than Go
* It is slow to compile
* It is less efficient
* It is harder to maintain
* Lack of efficient garbage collection

**ERLANG:**  
ERLANG is a functional open-source programming language developed by Joe Armstrong, Robert Virding, and Mike Williams in 1986 at Ericsson Computer Science Laboratory.  It is released under Apache License 2.0. Erlang is used for the development of massively scalable real-time and highly reliable systems. Erlang is being successfully used by WhatsApp, National Health Service (NHS), AdRoll, Vocalink a Mastercard company, Goldman Sachs, Nintendo, bet365, IBM Cloudant, etc.

**Advantages:**

* Erlang is very simple language, and the functions are easily understood.
* Erlang has concurrency.
* Erlang has garbage collection feature.
* Erlang has the most loved hot-reload feature.
* Erlang’s standard library has easy-to-use functions which makes it easy to implement while also being elegant.
* Erlang is a dynamic language, so we don’t have to define the datatypes before compilation.
* Erlang’s community base is very strong, small, and simplicity driven.

**Disadvantages:**

* Setting up Erlang can be hard to understand.
* The hot-reload feature of Erlang is not used anymore after the introduction of containers.
* The dynamic typesetting of Erlang makes it vulnerable to error in code.

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**Conclusion:**

**When we compare GO with ERLANG**

Programmers prefer GO since it is simple where as ERLANG is preffered because it is realtime and supports memory distribution. For its syntax, speed,concurrency and portability go is preffered so it is used for server development. Where as ERLANG does have it advantage when it comes to fault tolerance. So it is preferred for developing scalable systems.

**Now if we compare GO with RUST**

Again GO is faster,simpler,popular and supports concurrency. As a result is used to develop applications to be faster. The only feature that GO majorly lacks compared to RUST is its functionalities and features.

References

<https://www.geeksforgeeks.org/difference-between-go-and-erlang/>

<https://www.geeksforgeeks.org/difference-between-golang-and-rust/>

This work was referenced from the above site just for learning purpose.