



A popular procedural language with support for objects and concurrency.

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2009

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CMPT 383
Summer 2022
SFU Surrey

What was in 2009?

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2009: First Appearance



Bitcoin

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2009: Most Popular Console Video Game

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2009: Highest-Grossing Movie

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2009: Most Popular Song

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Boom Boom Pow,
The Black Eyed Peas

2009 Facts

- 13th of February, 2009 at 11:31:30pm: Unix time passed 1,234,567,890 seconds
- H1N1 flu declared
- Usain Bolt set 100m world record in 9.58s
- Popstar Michael Jackson died.
- On June 28, 2009 physicist Stephen Hawking threw a party for time-travelers. He announced the party the day after it happened, and according to Hawking, no one came.

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Go

Created at Google in 2007

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First public release 2009 <https://eduassistpro.github.io/>


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Go's Original Designers

Robert Griesemer

Rob Pike

Ken Thompson



One of the original designers of Unix. Also won a Turing Award!

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Go Can Get You a Job!

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Powerful Command-Line Applications in Go

Build Fast and Maintainable Tools



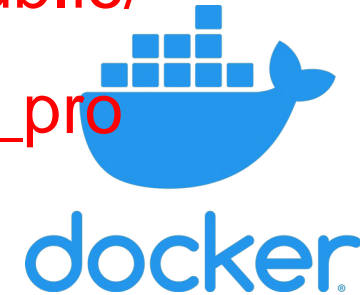
Command-line utilities.

What's Go **Good** For?

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Websites and services
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e.g. Hugo is a popular static website generator



DevOps tools
Like Docker and
Kubernetes

What's Go **Not** so Good For?

- Go is **garbage collected**, so you don't get same flexibility as C/C++ when it comes to memory management
- Go is generally **not** as <https://eduassistpro.github.io/>, so it is **not** the best choice when per is the primary concern
- Go discourages “clever” code in favour of straightforward, simple code that some programmers think is not as “fun”

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Measuring the performance of different programming languages is surprisingly difficult to do fairly. Check out

[the Computer Language Benchmarks Game](#)

Go was designed by software engineers needing to solve real-world problems. They weren't programming language theoreticians.

Major Features of Go

Syntactically similar to C, but with some important differences

Multiple ways to define new variables

Optional semi-colons; some syntax simplifications

Compiled

Fast compile times are one of the distinctions of Go

Memory-safe and garbage-collected

No dangling pointers, no manual memory deletion

Uses interfaces and embedding instead of inheritance

Lack of inheritance is not usually a problem, but it can take some getting used to at first

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Apparently the decision to start the Go project was made while waiting for a C++ program to compile.

Major Features of Go

Types

Statically typed: type of values is known at run-time and checked by the compiler

Basic numeric types

Pointers

Arrays

Slices: “point” to a sequence of elem <https://eduassistpro.github.io/>

Built-in hash maps

Structures and interfaces

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Functions

Can return multiple values


Methods are functions with a special “self” parameter that can be used with interfaces

Closures: functions can be passed to functions and returned by functions

Packages and Modules

Organized collections of code

Support for downloading from online



Closures are a major feature we'll see again in other languages.

Major Features of Go

Many programmers say Go's good built-in support for concurrency is its killer feature.



Concurrency

Based the **CSP** model of concurrency

Goroutines allow you to run multiple functions concurrently

Channels communicate informa

uctured way

Extensive Standard Library

Go is ready to write web servers and apps out of th

Software tool support

Syntax of Go was deliberately made as simple as possible to make it easier for software tools to process it

Go source code has a standard format; use the **gofmt** tool

Other standard tools, such as support for unit tests, fuzzing

Generics

Added in Go 1.18 in 2022; we probably won't cover them in this course

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Major Features **Not** in Go

Features **not** part of Go

No inheritance

No pointer arithmetic

No assertions

No implicit type conversions

No C++-style exceptions; instead, defer/

No interpreter, compiled only

Go aims to be simple yet practical. The core rules of Go programming are pretty small compared to other modern languages.

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functions return error values

Hello, World!

```
$ go run hello_world.go  
$ ./hello_world
```

```
// hello_world.go
```

```
package main
```

```
import https://eduassistpro.github.io/  
        Add WeChat edu_assist_pro  
func main() {  
    fmt.Println("Hello, world!")  
}
```