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Designing a comprehensive course on Go

Stanislav Zeman

Why Go

- Popularity
- Use cases
  - CLIs
  - Web Development
  - Cloud
  - DevOps
- Career
  - Google, Microsoft, Meta, Cloudflare, Twitter, Uber, …

TIOBE Index

Jun 2024	Jun 2023	Change	Programming Language	Ratings	Change
1	1		Python	15.39%	+2.93%
2	3	↑	C++	10.03%	-1.33%
3	2	↓	C	9.23%	-3.14%
4	4		Java	8.40%	-2.88%
5	5		C#	6.65%	-0.06%
6	7	↑	JavaScript	3.32%	+0.51%
7	14	⇈	Go	1.93%	+0.93%
8	9	↑	SQL	1.75%	+0.28%
9	6	↓	Visual Basic	1.66%	-1.67%
10	15	⇈	Fortran	1.53%	+0.53%

https://www.tiobe.com/tiobe-index/

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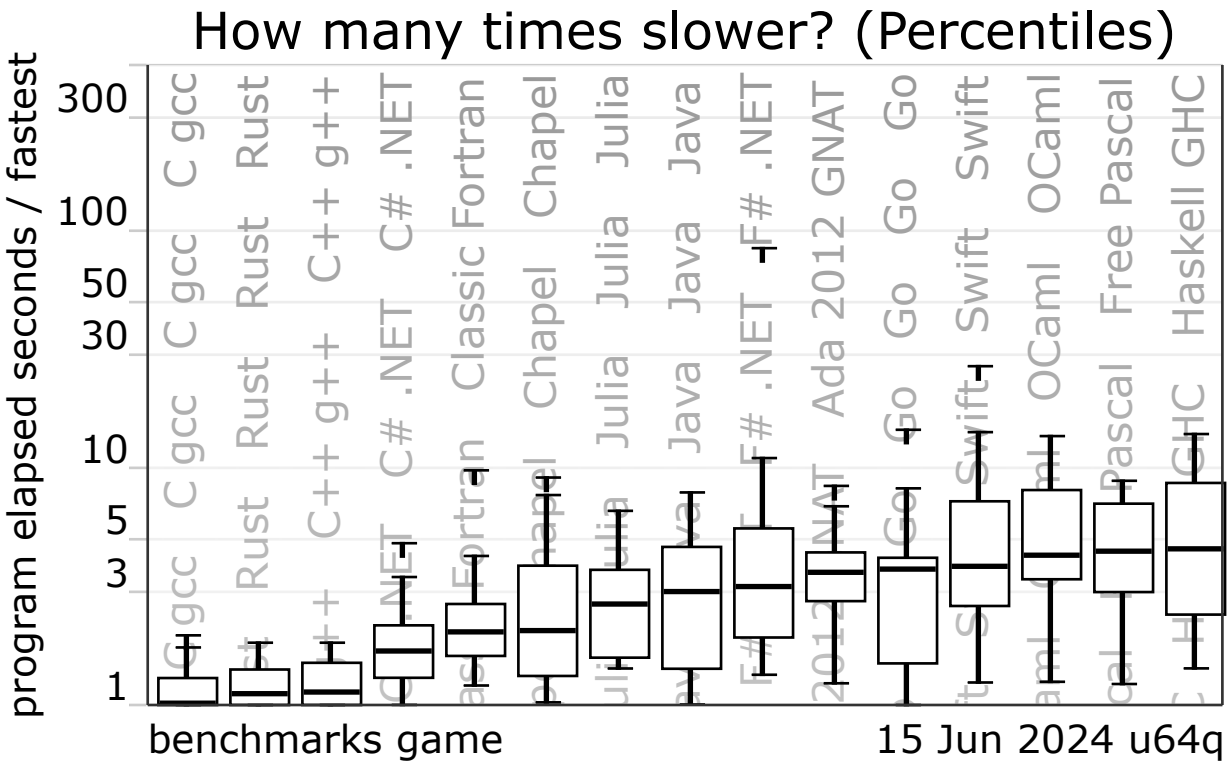
Go Characteristics

- Garbage collected
- Concurrency
  - Messaging
  - Goroutines
- Simplicity
  - 25 keywords
- Performance

benchmarks game

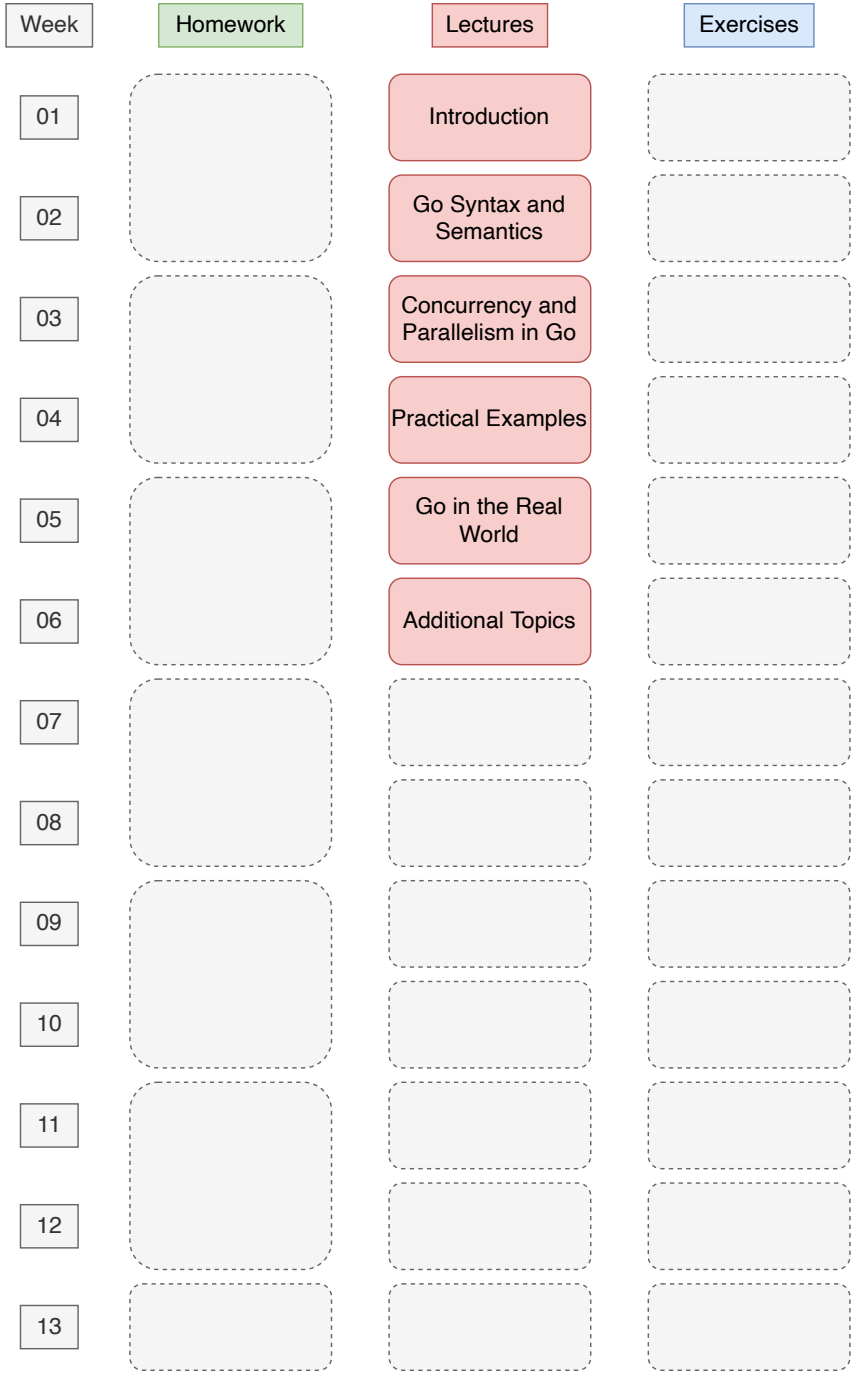


https://benchmarksgame-team.pages.debian.net/benchmarksgame/box-plot-summary-charts.html

Old Course

- PB173: Autumn 2023
  - Martin Ukrop, Pavel Tišnovský, Ivan Nečas, Stanislav Zeman
  - First run
  - Half-semester course
- Red Hat
  - https://github.com/RedHatOfficial/GoCourse

Old Design



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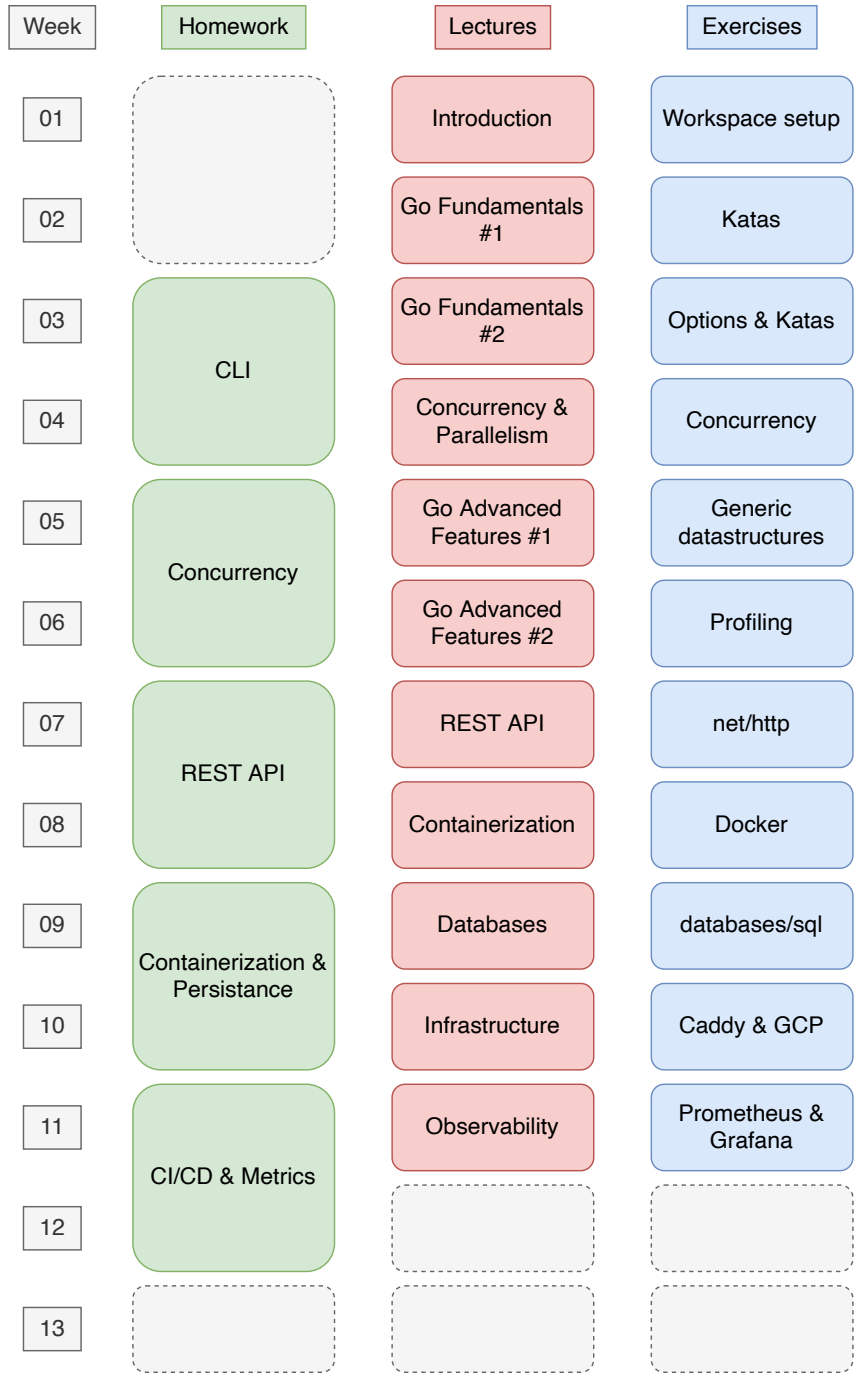
Motivation

- Feedback
  - Hands-on practice
- Update materials
  - Restructure
  - Update outdated slides
  - Add new concepts

Assignment

- Design a new course
  - Based on the Red Hat Go course
- Requirements
  - Lectures covering the whole semester (11/12)
  - Hands-on exercises
  - Homework assignments and/or larger projects
  - Basic didactical reasoning
  - Public materials under permissive license

New Design


Week
Homework
Lectures
Exercises
01
02
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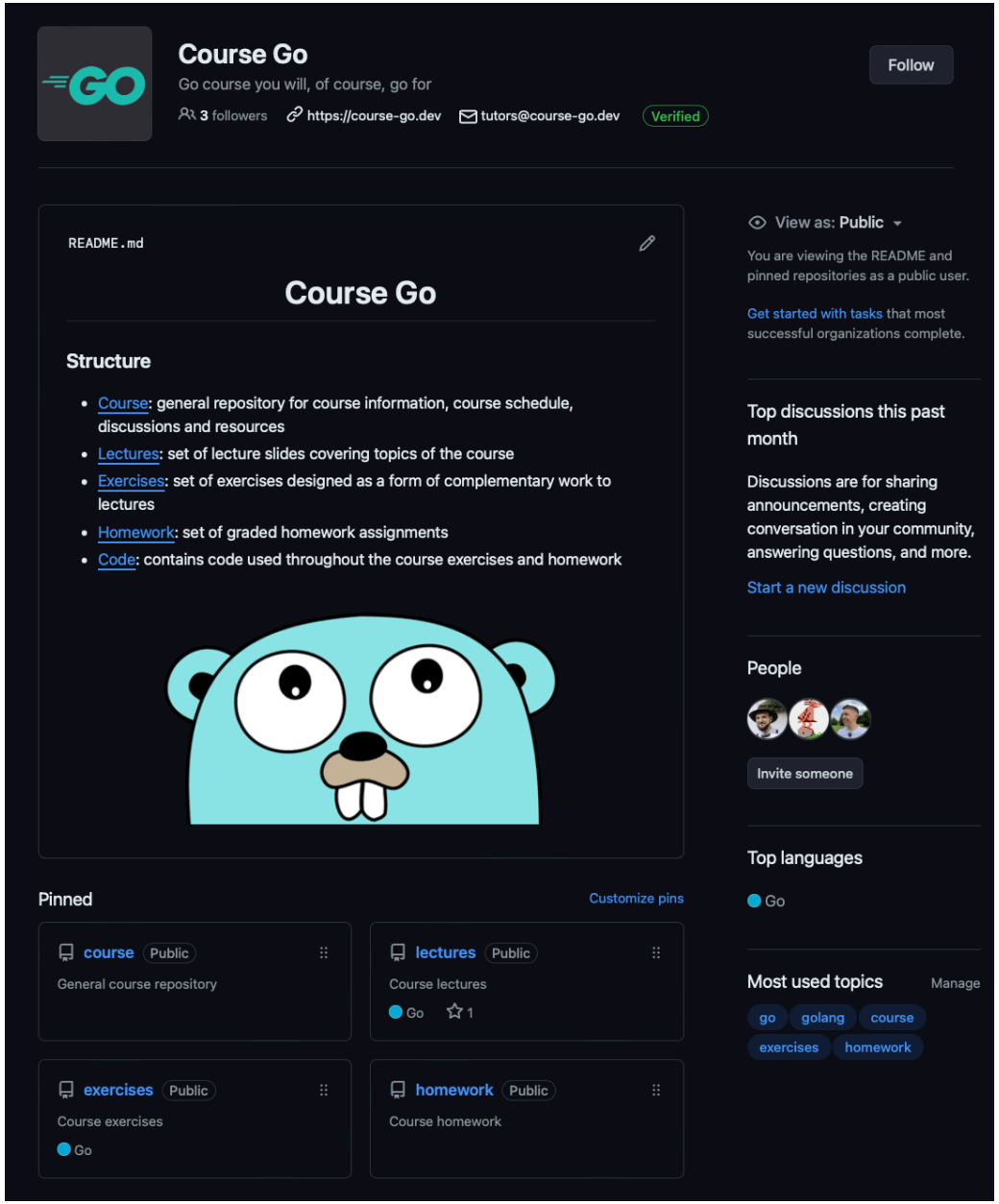
13
Introduction
Workspace setup
Go Fundamentals #1
Katas
CLI
Go Fundamentals #2
Options & Katas
Concurrency & Parallelism
Concurrency
Concurrency
Go Advanced Features #1
Generic datastructures
Go Advanced Features #2
Profiling
REST API
REST API
net/http
Containerization
Docker
Containerization & Persistance
Databases
databases/sql
Infrastructure
Caddy & GCP
CI/CD & Metrics
Observability
Prometheus & Grafana

Beyond just Go

- Containerisation
  - Docker
- Infrastructure
  - CI/CD
  - Proxying
  - Google Cloud Platform
- Observability
  - Metrics
  - Logs
  - Traces
  - OpenTelemetry

GitHub



https://github.com/course-go | https://course-go.dev

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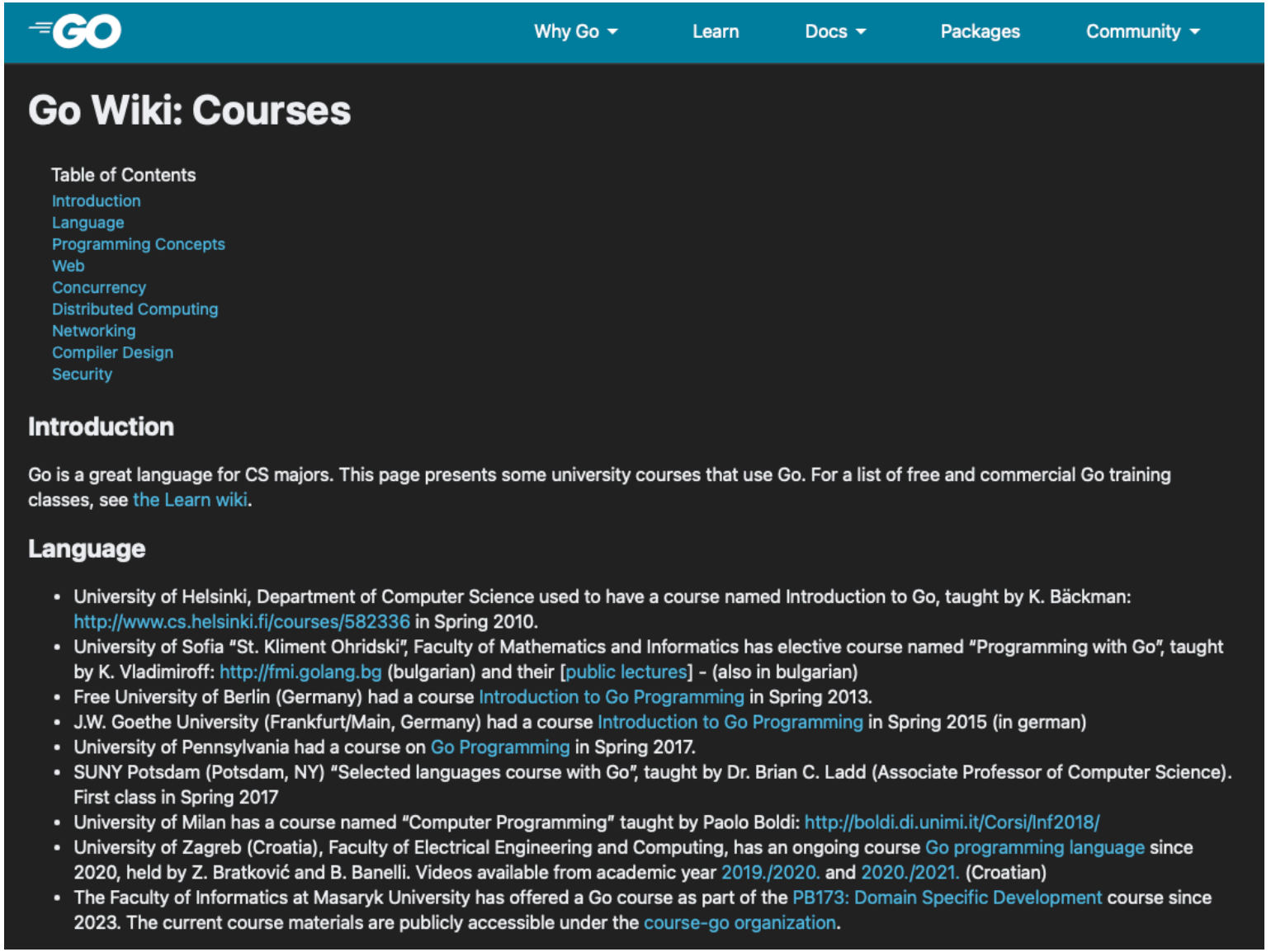
Go Wiki



GO Why Go Learn Docs Packages Community

Go Wiki: Courses

Table of Contents

Introduction

Go is a great language for CS majors. This page presents some university courses that use Go. For a list of free and commercial Go training classes, see the Learn wiki.

Language

- University of Helsinki, Department of Computer Science used to have a course named Introduction to Go, taught by K. Bäckman: http://www.cs.helsinki.fi/courses/582336 in Spring 2010.
- University of Sofia "St. Kliment Ohridski", Faculty of Mathematics and Informatics has elective course named "Programming with Go", taught by K. Vladimiroff: http://fmi.golang.bg (bulgarian) and their [public lectures] - (also in bulgarian)
- Free University of Berlin (Germany) had a course Introduction to Go Programming in Spring 2013.
- J.W. Goethe University (Frankfurt/Main, Germany) had a course Introduction to Go Programming in Spring 2015 (in german)
- University of Pennsylvania had a course on Go Programming in Spring 2017.
- SUNY Potsdam (Potsdam, NY) "Selected languages course with Go", taught by Dr. Brian C. Ladd (Associate Professor of Computer Science). First class in Spring 2017
- University of Milan has a course named "Computer Programming" taught by Paolo Boldi: http://boldi.di.unimi.it/Corsi/Inf2018/
- University of Zagreb (Croatia), Faculty of Electrical Engineering and Computing, has an ongoing course Go programming language since 2020, held by Z. Bratković and B. Banelli. Videos available from academic year 2019./2020. and 2020./2021. (Croatian)
- The Faculty of Informatics at Masaryk University has offered a Go course as part of the PB173: Domain Specific Development course since 2023. The current course materials are publicly accessible under the course-go organization.

https://go.dev/wiki/Courses

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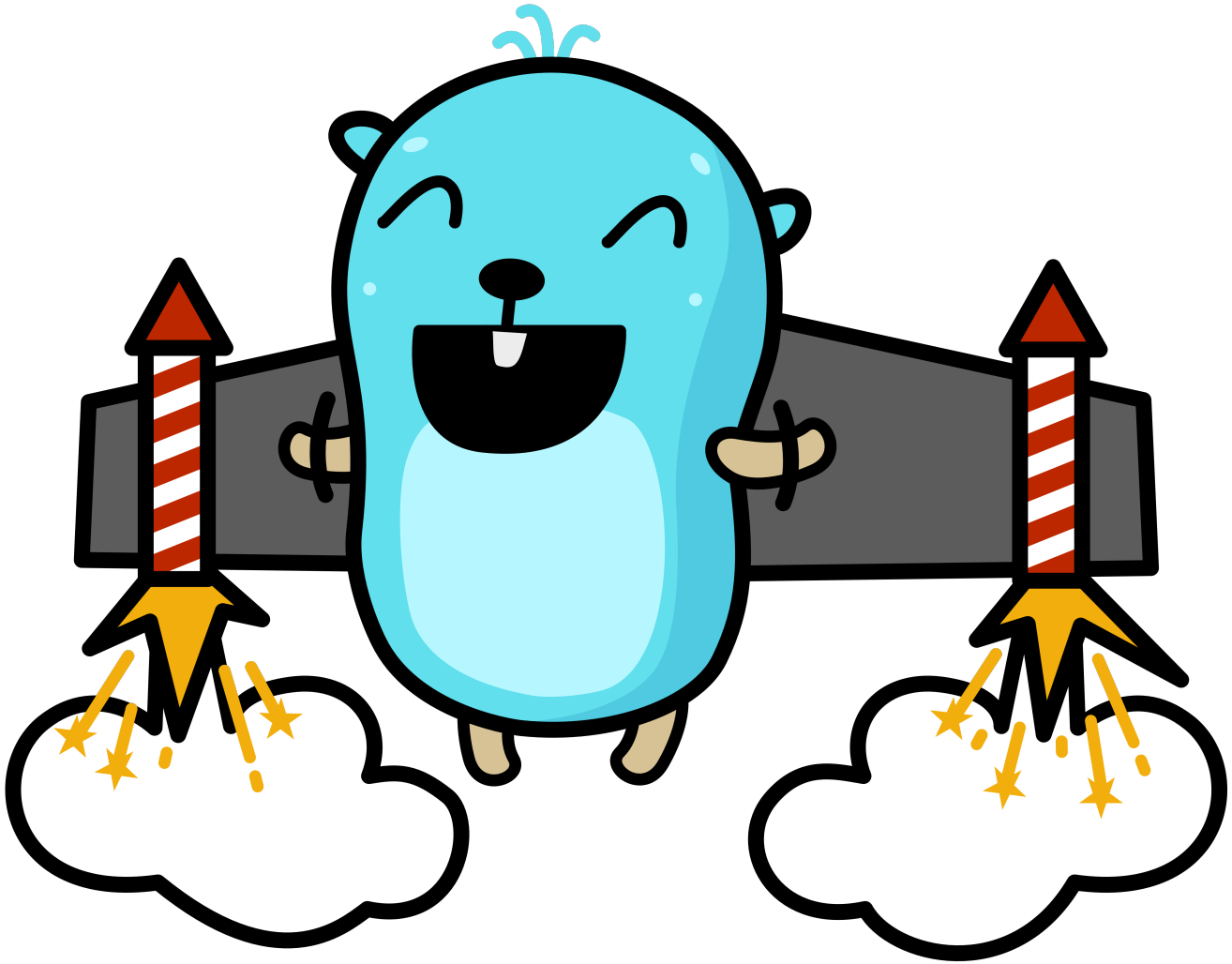
What next?

- Sample solutions and revision
- PB173: Autumn 2024
  - Feedback
  - Iterate
- Extend
  - Auth, Event-driven, gRPC, GraphQL, etc.
- Share
- Dedicated course?

Thank you



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