

COS 316 Precept #4

Testing & Benchmarking

Please download repository from <https://github.com/cos316/precepts>, checkout the fall22 branch and navigate to *precept4* directory.

Overview

- What is *testing*?
 - evaluation of software against user requirements & systems specs
 - identify defects in software - show the presence of bugs, but not their absence
- What is *benchmarking*?
 - evaluation of system performance - time (CPU vs wall clock), memory, etc.

Testing - Basic Approach in Go

- Source files and associated test files are placed in the same package/folder
- The name of the test file for any given source file is `_test.go`
 - E.g., `router.go` and `router_test.go`
- Import `"testing"`
- Test functions need to have the `"Test"` prefix, and the next character in the function name should be capitalized

Testing - Exercises

```
> cd precept4/mysort
```

```
# run test framework
```

```
> go test -v
```

```
# fix the bug and demonstrate tests pass
```

Benchmarking - Basic Approach in Go

- Benchmarks also reside in the `_test.go` files
- Import `"testing"`
- Benchmark functions need to have the `"Benchmark"` prefix, and the next character in the function name should be capitalized

Benchmark - Exercises

- How to eliminate certain code in benchmarks?
 - `b.ResetTimer()`, `b.StartTimer()`, `b.StopTimer()`
- How to benchmark specific functions:
 - `go test --bench=Fib20`
- How to show memory allocations?
 - `go test --bench=. --benchmem`
or
 - `b.ReportAllocs()`

Benchmark - Exercises

```
> cd precepts/precept4/fib
```

```
# run benchmark framework
```

```
> go test --bench=.
```

```
# will run for 10 seconds
```

```
> go test --bench=. --benchtime=10s
```

```
# will run experiment 10 times
```

```
> go test --bench=. --count=10
```

Testing and Benchmark - Exercises

```
> cd precepts/precept4/stack
```

```
# develop and run tests
```

```
# develop and run benchmarks
```

Questions:

1. Does your testing framework pass all tests?
2. Do your benchmark(s) demonstrate improved performance?