Deep Dive into Interfaces

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Overview

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- Things to avoid with interfaces
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Introduction

- An interface type is defined as a set of method signatures
- Provides a way to achieve Polymorphism
- Lets you use duck typing like Python but provides compile time validation

Some tips that will help

- Start with concrete data structures
- Do not export interfaces unless you need to
- When you need users of the package to provide an implementation detail
- Multiple implementations that need to be maintained internally
- Try (Do) not to use empty interfaces

Things to avoid with interfaces

```
package api
type Service interface {
    Start()
    HandlePutAPI(key string, value string)
    HandleGetAPI(key string) string
```

```
type service struct {
    store map[string]string
func (s *service) Start() {
    s.store = make(map[string]string)
func (s *service) HandlePutAPI(key string, value string) {
    s.store[key] = value
func (s *service) HandleGetAPI(key string) string {
    if val, ok := s.store[key]; ok {
        return val
    return ""
func MakeAPIService() Service {
    newService := service{}
    newService.store = make(map[string]string)
    return &newService
```

Things to avoid with interfaces (interface pollution)

go test -bench=.

goos: darwin

goarch: amd64

pkg: github.com/msk610/talk/api

BenchmarkInterfacePutAPI-4 20000000 60.9 ns/op

BenchmarkStructPutAPI-4 20000000 57.8 ns/op

BenchmarkInterfaceGetAPI-4 30000000 39.1 ns/op

BenchmarkStructGetAPI-4 50000000 24.6 ns/op

```
package main
type Foo struct{}
func (*Foo) Talk() {}
func (Foo) Answer() {}
type Speaker interface {
    Talk()
   Answer()
```

```
func GiveMeetupTalk(speaker Speaker) {
    if speaker != nil {
        speaker.Talk()
        println("Speaker gave talk")
                                                   Breaks here
        speaker.Answer()
        println("Speaker answered questions")
func main() {
    var badFoo *Foo = nil
    var badSpeaker Speaker = badFoo
    GiveMeetupTalk(badSpeaker)
```

(method dispatch table for Foo, nil)

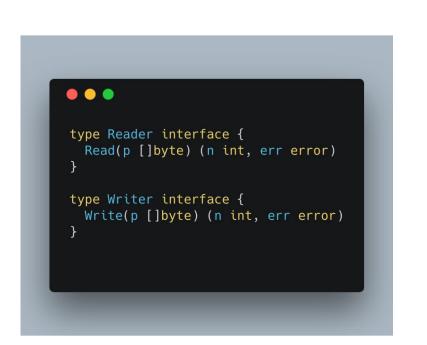
Things to avoid with interfaces (nil values)

\$ go run main.go

Speaker gave talk panic: value method main.Foo.Answer called using nil *Foo pointer

Some good example use cases of interfaces

```
package main
import (
    "fmt"
    "sort"
type Foo struct {
   Bar int
   Baz int
}
type ByBarBaz []Foo
func (b ByBarBaz) Len() int { return len(b) }
func (b ByBarBaz) Swap(i, j int) { b[i], b[j] = b[j], b[i] }
func (b ByBarBaz) Less(i, j int) bool { return b[i].Bar+b[i].Baz < b[j].Bar+b[j].Baz }</pre>
func main() {
    foos := []Foo{
       {0, 1},
       {4, 2},
       {2, 10},
       {0, 0},
    sort.Sort(ByBarBaz(foos))
    fmt.Println(foos)
```



Some sample scenarios

- Mocking: Especially with databases
- API: Interacting with various packages (maintaining various versions)
- Abstract data type: Building SQL CRUD library

Conclusion

- Do not limit yourself
- Start with concrete structures
- Postel's Law
 - "Be conservative with what you do, be liberal with what you accept from others"

Useful Links

- https://medium.com/@rakyll/interface-pollution-in-go-7d58bccec275
- https://blog.chewxy.com/2018/03/18/golang-interfaces/
- https://www.ardanlabs.com/blog/2016/10/avoid-interface-pollution.html
- https://medium.com/@matryer/golang-advent-calendar-day-seventeen-io-rea der-in-depth-6f744bb4320b