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# Introduction

A bunch of programming documents.

## Node相关的一些笔记

# Go

A bunch of Go learning stuffs.

## Go Doc

Go Standard library Translation

## errors

本文是 Go 标准库中 errors 包文档的翻译，原文地址为：  
<https://golang.org/pkg/errors/>

## 概述

errors 包实现了用于处理错误的函数。

示例：

```
package main

import (
    "fmt"
    "time"
)

// MyError 是一个包含了时间和消息的错误实现
type MyError struct {
    When time.Time
    What string
}

func (e MyError) Error() string {
    return fmt.Sprintf("%v: %v", e.When, e.What)
}

func oops() error {
    return MyError{
        time.Date(1989, 3, 15, 22, 30, 0, 0, time.UTC),
        "the file system has gone away",
    }
}

func main() {
    if err := oops(); err != nil {
        fmt.Println(err)
    }
}
```

示例执行结果：

```
1989-03-15 22:30:00 +0000 UTC: the file system has gone away
```

## New 函数

```
func New(text string) error
```

根据给定的文本返回一个错误。

示例：

```
package main

import (
    "errors"
    "fmt"
)

func main() {
    err := errors.New("emit macho dwarf: elf header corrupted")
    if err != nil {
        fmt.Print(err)
    }
}
```

示例执行结果：

```
emit macho dwarf: elf header corrupted
```

fmt 包的 Errorf 函数可以让用户使用该包的格式化功能来创建描述错误的消息。

示例：

```
package main

import (
    "fmt"
)

func main() {
    const name, id = "bimmler", 17
    err := fmt.Errorf("user %q (id %d) not found", name, id)
    if err != nil {
        fmt.Print(err)
    }
}
```

示例执行结果：

```
user "bimmler" (id 17) not found
```

## Go Gotchas

This collection of Go gotchas and pitfalls will help you find and fix similar problems in your own code.



## Assignment to entry in nil map

Why does this program panic?

```
var m map[string]float64
m["pi"] = 3.1416
```

```
# Output
panic: assignment to entry in nil map
```

## Answer

You have to initialize the map using the make function (or a map literal) before you can add any elements:

```
m := make(map[string]float64)
m["pi"] = 3.1416
```

# Invalid memory address or nil pointer dereference

Why does this program panic?

```
package main

import (
    "math"
    "fmt"
)

type Point struct {
    X, Y float64
}

func (p *Point) Abs() float64 {
    return math.Sqrt(p.X*p.X + p.Y*p.Y)
}

func main() {
    var p *Point
    fmt.Println(p.Abs())
}
```

```
panic: runtime error: invalid memory address or nil pointer dereference
[signal SIGSEGV: segmentation violation code=0x1 addr=0x0 pc=0x499043]

goroutine 1 [running]:
main.(*Point).Abs(...)
    /tmp/sandbox466157223/prog.go:13
main.main()
    /tmp/sandbox466157223/prog.go:18 +0x23
```

## Answer

**The uninitialized pointer `p` in the main function is nil, and you can't follow the nil pointer.**

If `x` is nil, an attempt to evaluate `*x` will cause a run-time panic.

— [The Go Programming Language Specification: Address operators](#)

You need to create a Point

```
func main() {
    var p *Point = new(Point)
    fmt.Println(p.Abs())
}
```

Since methods with pointer receivers take either a value or a pointer, you could also skip the pointer altogether:

```
func main() {  
    var p Point // has zero value Point{X:0, Y:0}  
    fmt.Println(p.Abs())  
}
```

## Array won't change

Why does the array value stick?

```
package main

import "fmt"

func Foo(a [2]int) {
    a[0] = 6
}

func main() {
    a := [2]int{1, 2}
    Foo(a) // Try to change a[0].
    fmt.Println(a) // Output: [1 2]
}
```

## Answer

- Arrays in Go are **values**
- When you pass an array to a function, **the array is copied**.

If you want to Foo to update the elements of a function, use a **Slice** instead.

```
package main

import "fmt"

func Foo(a []int) {
    if len(a) > 0 {
        a[0] = 6
    }
}

func main() {
    a := []int{1, 2}
    Foo(a) // Change a[0].
    fmt.Println(a) // Output: [6 2]
}
```

A slice does not store any data, it just describes a section of an underlying array.

When you change an element of a slice, you modify the corresponding element of its underlying array, and other slices that share the same underlying array will see the change.

## How does characters add up?

Why doesn't these print statements give the same result?

```
fmt.Println("H" + "i")
fmt.Println('H' + 'i')

// Output:
// Hi
// 177
```

### Answer

The rune literals 'H' and 'i' are integer values identifying Unicode code points: 'H' is 72 and 'i' is 105.

You can turn a code point into a string with a conversion.

```
fmt.Println(string(72) + string('i')) // "Hi"
```

You can also use the **fmt.Sprintf** function.

```
s := fmt.Sprintf("%c%c, world!", 72, 'i')
fmt.Println(s) // "Hi, world!"
```

## What happened to ABBA?

### What's up with `strings.TrimRight`?

```
fmt.Println(strings.TrimRight("ABBA", "BA")) // Output: ""
```

### Answer

The `Trim`, `TrimLeft` and `TrimRight` functions strip all Unicode code points contained in a **cutset**. In this case, all trailing A:s and B:s are stripped from the string, leaving the empty string.

To strip a trailing string, use **`strings.TrimSuffix`**.

```
fmt.Println(strings.TrimSuffix("ABBA", "BA")) // Output: "AB"
```

# Where is my copy?

## Why does the copy disappear?

```
var src, dst []int
src = []int{1, 2, 3}
copy(dst, src) // Copy elements to dst from src.
fmt.Println("dst:", dst)

// Output:
// dst: []
```

## Answer

The number of elements copied by the copy function is the **minimum of len(dst) and len(src)**. To make a full copy, you must allocate a big enough destination slice.

```
var src, dst []int
src = []int{1, 2, 3}

dst = make([]int, len(src)) // Update Here

copy(dst, src) // Copy elements to dst from src.
fmt.Println("dst:", dst)

// Output:
// dst: [1 2 3]
```

The return value of the copy function is the number of elements copied. See Copy function for more about the built-in copy function in Go.

## Using append

You could also use the append function to make a copy by appending to a nil slice.

```
var src, dst []int
src = []int{1, 2, 3}
dst = append(dst, src...)
fmt.Println("dst:", dst)

// Output:
// dst: [1 2 3]
```

Note that the capacity of the slice allocated by append may be a bit larger than len(src).

# Why doesn't append work every time?

What's up with the append function?

```
a := []byte("ba")

a1 := append(a, 'd')
a2 := append(a, 'g')

fmt.Println(string(a1)) // bag
fmt.Println(string(a2)) // bag
```

## Answer

If there is room for more elements, append reuses the underlying array. Let's take a look:

```
a := []byte("ba")
fmt.Println(len(a), cap(a)) // 2 32
```

This means that the slices **a**, **a1** and **a2** will refer to the **same underlying array** in our example.

To avoid this, we need to use two separate byte arrays.

```
const prefix = "ba"

a1 := append([]byte(prefix), 'd')
a2 := append([]byte(prefix), 'g')

fmt.Println(string(a1)) // bad
fmt.Println(string(a2)) // bag
```



## Go Blog

Some Go Learning notes.

- [A Quick Introduction to Elasticsearch for Node Developers](#)

## 每周阅读

记录每一周的阅读记录及链接

## **Week 01(20201024-20201030)**

### **Book**

- 《三体III-死神永生》
- 《Javascript 设计模式与开发实践》

### **Blog**

- [A Quick Introduction to Elasticsearch for Node Developers](#)

### **Blockchain**

- [An Introduction to Binance Smart Chain \(BSC\)](#)
- [Adding Binance Smart Chain and JNTR to your MetaMask](#)

## Week 01(20201031-20201106)

### Book

- 《三体III-死神永生》
- 《Javascript 设计模式与开发实践》

### Blog

- [How to be a Better Software Engineer: Book Recommendations](#)
- [Best Practices Every Node Developer Should Follow](#)
- [Redis + NodeJS 实现一个能处理海量数据的异步任务队列系统](#)
- [GitHub Actions 入门教程](#)
- [Creating Fast APIs In Go Using Fiber](#)

### Tutorial

- [basic bash guide](#)

### Library

- [oclif 命令行工具框架](#)
- [Fiber - Go web framework](#)
- [Go cobra](#)

### Blockchain

- [The Best Way To Learn Blockchain Programming](#)
- [How to Build Blockchain App - Ethereum Todo List 2019](#)
- [Getting Up to Speed on Ethereum](#)