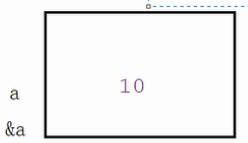
1.一个变量a一般有两种含义,一种代表内存里面的内容,一种代表地址

```
func main() {
    var a int = 10
    //每个变量有2层含义：变量的内存，变量的地址
    fmt.Printf("a = %d\n", a) //变量的内存
    fmt.Printf("&a = %v\n", &a)
}
```

a ===> 内存的内容
&a ===> 内存外面的标号，地址，也叫指针



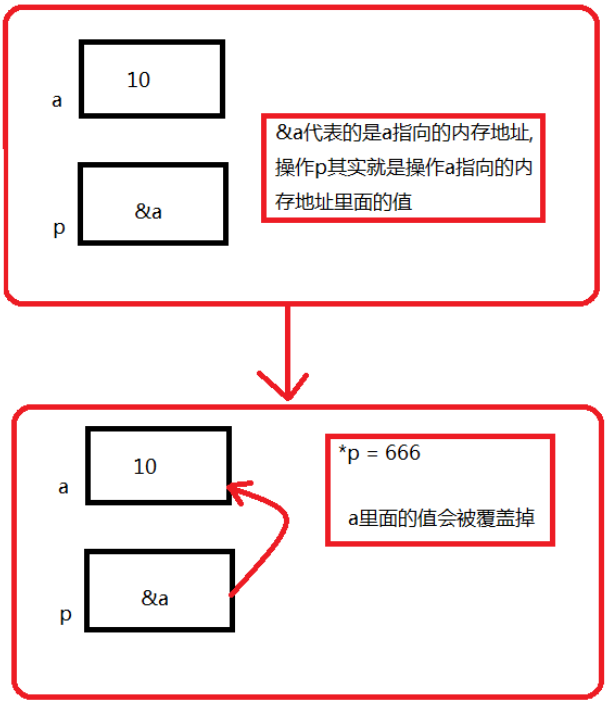
内存： =====》 教室
&a ： =====》 教室外面的门牌号

内存用来存放东西 a = 10
教室里面也是放桌子 教室 = 桌子

2.指针的基本操作

```
func main() {
    //定义一个指针变量
    var p *int
    var a = 10
    fmt.Println("a is ", a)
    p = &a
    *p = 999
    fmt.Println("after a is ", a)
}
```

```
// 16_指针的基本操作
package main

import (
    "fmt"
)

func main() {
    //定义一个指针变量
    var p *int
    var a = 10
    fmt.Println("a is ", a)
    p = &a
    *p = 999
    fmt.Println("after a is ", a)
}
```



3.坚决不能操作没有合法指向的指针

4.new函数

```go
// 17_new函数的使用
package main

import (
    "fmt"
)

func main() {
    //new函数可以返回一个指针的变量
    p := new(int)
    *p = 999
    fmt.Println("*p is ", *p)
}
```

```
管理员: C:\Windows\system32\cmd.exe
Microsoft Windows [版本 6.1.7601]
版权所有 (c) 2009 Microsoft Corporation。保留所有权利。

E:\code\go\src>go run 16_指针的基本操作.go
a is  10
after a is  999

E:\code\go\src>go run 17_new函数的使用.go
*p is  999

E:\code\go\src>
```

5.通过指针解决值传递存在的问题

18_指针解决值传递存在的问题.go

```go
// 18_指针解决值传递存在的问题
package main

import (
    "fmt"
)

func swap(p1, p2 *int) {
    *p1, *p2 = *p2, *p1
}

func main() {
    a := 10
    b := 22
    fmt.Println("a is ", a, " b is ", b)
    swap(&a, &b)
    fmt.Println("a is ", a, " b is ", b)
}
```

```
管理员: C:\Windows\system32\cmd.exe
Microsoft Windows [版本 6.1.7601]
版权所有 (c) 2009 Microsoft Corporation。保留所有权利。

E:\code\go\src>go run 16_指针的基本操作.go
a is  10
after a is  999

E:\code\go\src>go run 17_new函数的使用.go
*p is  999

E:\code\go\src>go run 18_指针解决值传递存在的问题.go
a is  10  b is  22
a is  22  b is  10

E:\code\go\src>
```

6.数组定义的时候必须使用常量,操作数组元素要从0开始到len()-1结束,不对称元素,这个数字叫做下标

7.二维数组的定义

system | src | 18_指针解决值传递存在的问题.go | 19_数组的初始化.go

```go
// 19_数组的初始化
package main

import (
    "fmt"
)

func main() {
    arr := [4]int{2: 12, 3: 22}
    fmt.Println("arr is ", arr)

    //二维数组的初始化
    secondArr := [2][3]int{1: {4, 5, 6}}
    fmt.Println("secondArr is ", secondArr)
}
```

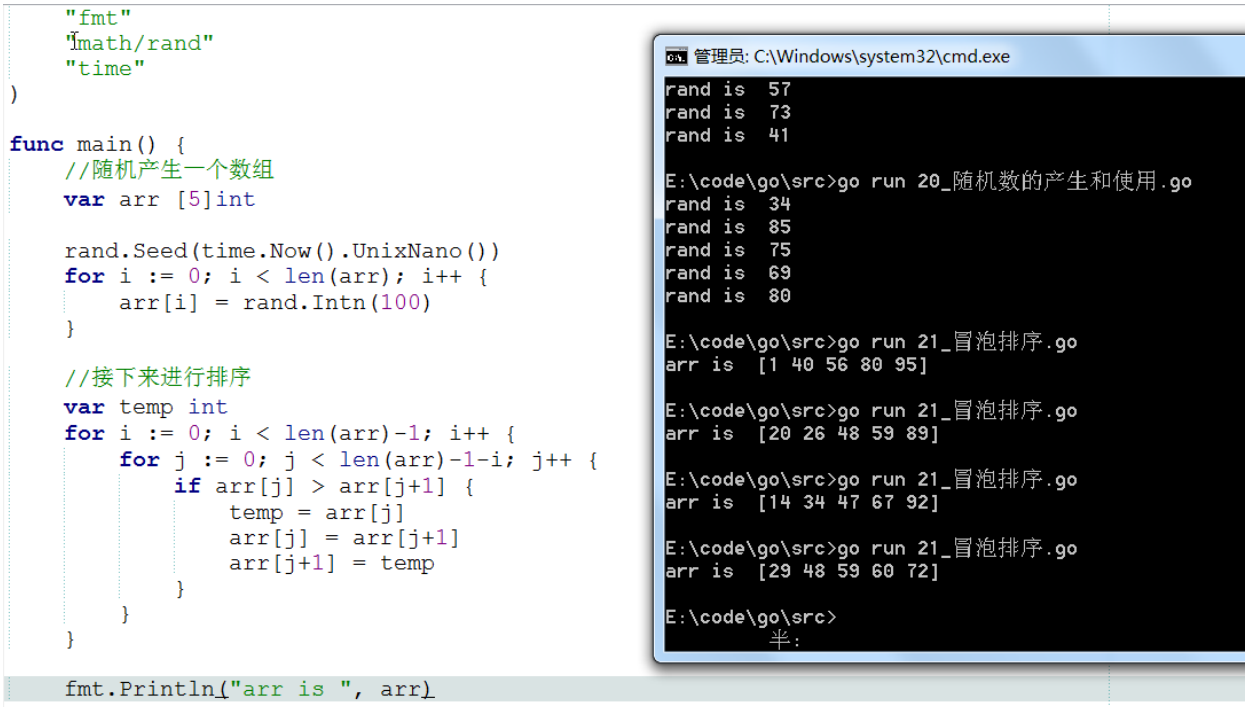
```
管理员: C:\Windows\system32\cmd.exe
E:\code\go\src>go run 17_new函数的使用.go
*p is  999

E:\code\go\src>go run 18_指针解决值传递存在的问
a is  10  b is  22
a is  22  b is  10

E:\code\go\src>go run 19_数组的初始化.go
arr is  [0 0 12 22]

E:\code\go\src>go run 19_数组的初始化.go
# command-line-arguments
.\19_数组的初始化.go:13:34: syntax error: unexp


E:\code\go\src>go run 19_数组的初始化.go
arr is  [0 0 12 22]
secondArr is  [[1 2 3] [4 5 6]]

E:\code\go\src>go run 19_数组的初始化.go
arr is  [0 0 12 22]
secondArr is  [[0 0 0] [4 5 6]]
```

8.数组的比较和赋值

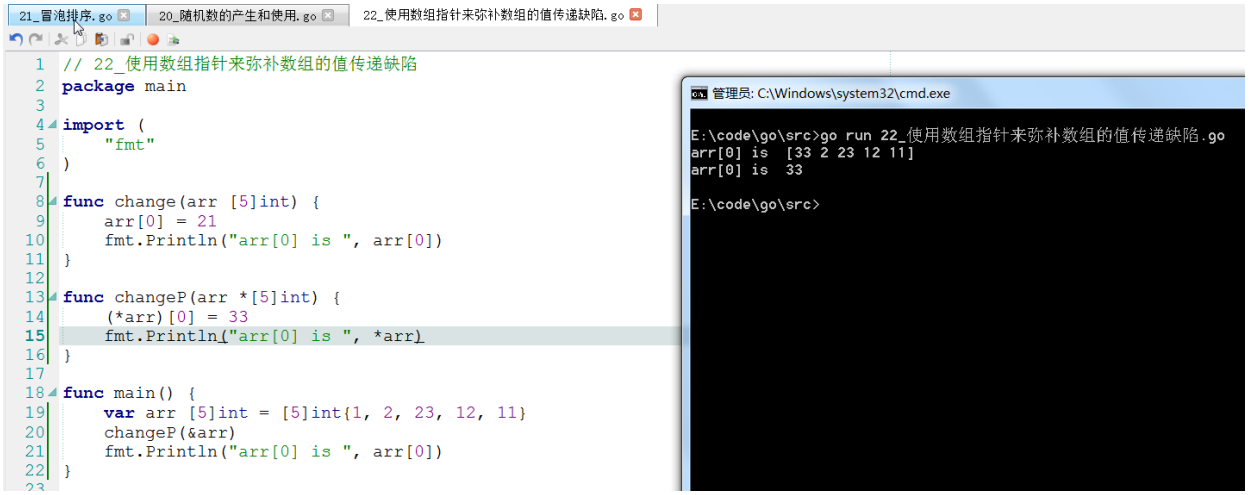
两个数组进行比较的前提是两个数组的类型要一样,只能使用==和!=来进行比较运算

9.生成随机数

10.生成随机数和冒泡排序结合



11.数组指针的传递



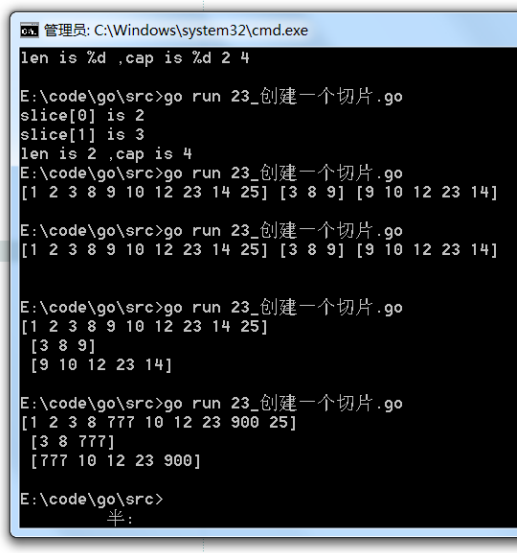
12.切片和数组最主要的区别在于切片定义的时候不需要指定长度

13.数组和切片的区别,使用make也可以新建一个切片 arr := make([]int,5)

```go
package main //必须有个main包

import "fmt"

func main() {
    array := []int{0, 1, 2, 3, 4, 5, 6, 7, 8, 9}
    //[low:high:max] 取下标从low开始的元素， len=high-low, cap=max-low
    s1 := array[:] //[0:len(array):len(array)] 不指定容量和长度一样
    fmt.Println("s1 = ", s1)
    fmt.Printf("len = %d, cap = %d\n", len(s1), cap(s1))

    //操作某个元素，和数组操作方式一样
    data := array[1]
    fmt.Println("data = ", data)

    s2 := array[3:6:7] //a[3], a[4], a[5]    len = 6-3=3    cap = 7-3=4
    fmt.Println("s2 = ", s2)
    fmt.Printf("len = %d, cap = %d\n", len(s2), cap(s2))

    s3 := array[:6] //从0开始，去6个元素，容量也是6， 常用
    fmt.Println("s3 = ", s3)
    fmt.Printf("len = %d, cap = %d\n", len(s3), cap(s3))

    s4 := array[3:] //从下标为3开始，到结尾
```

14.切片和底层数组的关系,实际的切片只有一个

```go
// 23_创建一个切片
package main

import (
    "fmt"
)

func testSlice() {
    arr := []int{1, 2, 3, 8, 9, 10, 12, 23, 14, 25}
    slice1 := arr[2:5]
    slice1[2] = 777
    slice2 := slice1[2:7]
    slice2[4] = 900
    fmt.Println(arr, "\n", slice1, "\n", slice2)
}

func testSlice_01() {
    arr := [5]int{1, 2, 3, 9, 10}
    slice := arr[1:3:5]
    for i, data := range slice {
        fmt.Printf("slice[%d] is %d\n", i, data)
    }
    fmt.Printf("len is %d ,cap is %d", len(slice), cap(slice))
}

func main() {
    testSlice()
}
```



15.copy的使用

copy(destSlice,srcSlice),将srcSlice赋值给destSlice

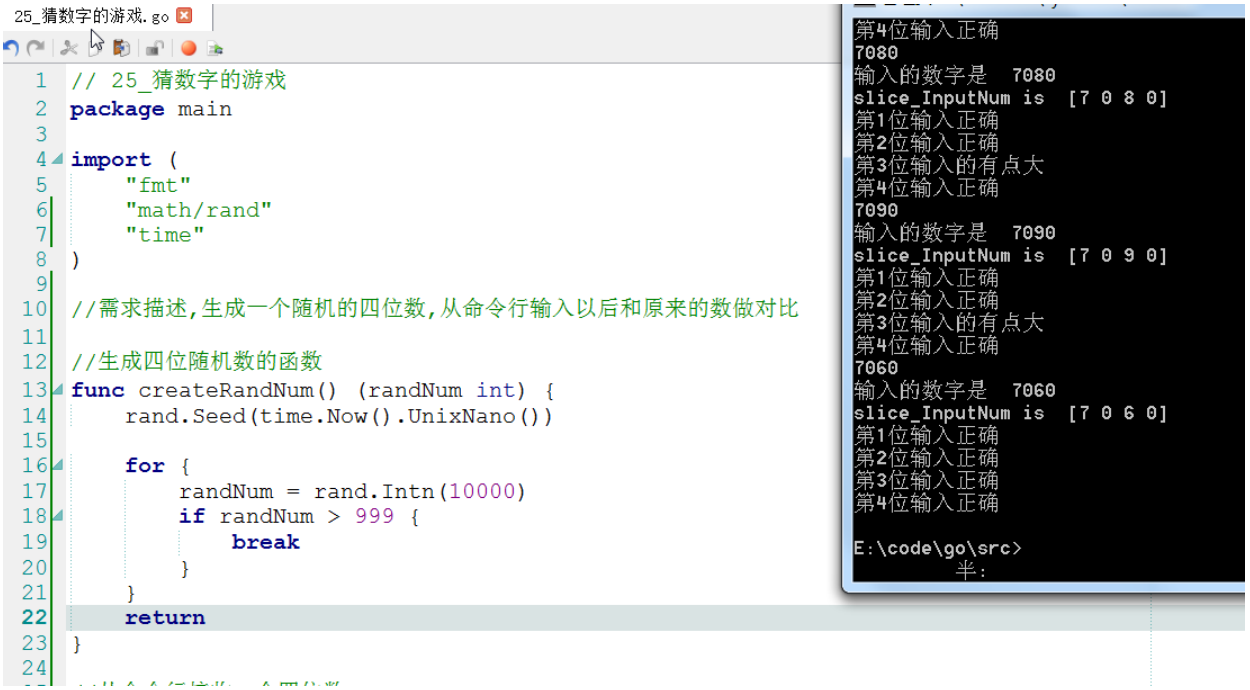
16.创建一个猜数字的游戏

```go
// 25_猜数字的游戏
package main

import (
    "fmt"
    "math/rand"
```

```
    "time"
)

//需求描述,生成一个随机的四位数,从命令行输入以后和原来的数做对比

//生成四位随机数的函数
func createRandNum() (randNum int) {
    rand.Seed(time.Now().UnixNano())

    for {
        randNum = rand.Intn(10000)
        if randNum > 999 {
            break
        }
    }
    return
}

//从命令行接收一个四位数
func getNumFromCmd() (inputNum int) {
    for {
        fmt.Scan(&inputNum)
        //对输入的数字进行检测,如果是合法的四位数,才返回
        if inputNum > 999 && inputNum < 10000 {
            return
        } else {
            fmt.Println("输入的数字不合法,请重新输入")
        }
    }
}

//定义一个函数,将一个数字拆分成一个切片
func getSliceFromNum(num int, slice []int) {
    slice[0] = num / 1000
    slice[1] = num / 100 % 10
```

```
    slice[2] = num / 10 % 10
    slice[3] = num % 10

}

func main() {
    //生成一个随机的四位数
    randNum := createRandNum()
    fmt.Println("randNum is ", randNum)

    //拿输入的数和随机生成的数按位比较
    //创建一个切片
    slice_RandNum := make([]int, 4)
    getSliceFromNum(randNum, slice_RandNum)
    fmt.Println("slice_RandNum is ", slice_RandNum)

    for {
        //从命令行接收一个四位数
        inputNum := getNumFromCmd()
        fmt.Println("输入的数字是 ", inputNum)

        //将从命令行输入的数字切分成切片
        slice_InputNum := make([]int, 4)
        getSliceFromNum(inputNum, slice_InputNum)
        fmt.Println("slice_InputNum is ", slice_InputNum)
        var n int
        //两个切片按位进行比较
        for i, data := range slice_RandNum {
            if data > slice_InputNum[i] {
                fmt.Printf("第%d位输入的有点小\n", i+1)
            } else if data < slice_InputNum[i] {
                fmt.Printf("第%d位输入的有点大\n", i+1)
            } else {
                fmt.Printf("第%d位输入正确\n", i+1)
                n++
```

```
        }
    }
    if n == 4 {
        break
    }
  }

}
```



17.map 字典,映射

```
func main() {
    //定义一个map
    var students map[int]string = map[int]string{1: "mike", 2: "jack", 3: "john"}
    for key, value := range students {
        fmt.Printf("key is %d,value is %s\n", key, value)
    }

    //删除某一元素
    delete(students, 2)
    fmt.Println("students is ", students)
}
```

18.结构体的初始化

```go
//27_结构体变量的初始化
package main

import (
    "fmt"
)

type Student struct {
    age   int
    name  string
    addr  string
    score int
}

func main() {
    //结构体变量的初始化一定要全部赋值
    s1 := Student{12, "mike", "上海", 87}
    fmt.Println("student is ", s1)

    //还可以指定某一个变量进行赋值
    s2 := Student{age: 23, score: 89}
    fmt.Println("student2 is ", s2)
}
```

```
管理员: C:\Windows\system32\cmd.exe
E:\code\go\src>go run 26_map的遍历.go
key is 1,value is mike
key is 2,value is jack
key is 3,value is john
students is  map[1:mike 3:john]

E:\code\go\src>go run 27_结构体变量的初始化.go
# command-line-arguments
.\27_结构体变量的初始化.go:17:8: undefined: Studnet

E:\code\go\src>go run 27_结构体变量的初始化.go
student is  {12 mike 上海 87}

E:\code\go\src>go run 27_结构体变量的初始化.go
# command-line-arguments
.\27_结构体变量的初始化.go:17:30: cannot use 87 (type int) as
ld value
.\27_结构体变量的初始化.go:17:30: too few values in struct ini

E:\code\go\src>go run 27_结构体变量的初始化.go
student is  {12 mike 上海 87}
student2 is  {23   89}

E:\code\go\src>
```

19.结构体指针变量的初始化

```go
// 28_操作结构体的指针
package main

import (
    "fmt"
)

type Student struct {
    age   int
    name  string
    score int
}

func main() {
    //定义一个结构体指针
    var s1 *Student = &Student{23, "John", 89}
    fmt.Println("s1 is ", s1)

    s2 := &Student{29, "Hellen", 90}
    fmt.Println("*s2 is ", *s2)
}
```

```
管理员: C:\Windows\system32\cmd.exe
student is  {12 mike 上海 87}

E:\code\go\src>go run 27_结构体变量的初始化.go
# command-line-arguments
.\27_结构体变量的初始化.go:17:30: cannot use 87 (type int) as type
ld value
.\27_结构体变量的初始化.go:17:30: too few values in struct initiali

E:\code\go\src>go run 27_结构体变量的初始化.go
student is  {12 mike 上海 87}
student2 is  {23   89}

E:\code\go\src>go run 28_操作结构体的指针.go
s1 is  &{23 John 89}

E:\code\go\src>go run 28_操作结构体的指针.go
# command-line-arguments
.\28_操作结构体的指针.go:19:9: undefined: Studnet

E:\code\go\src>go run 28_操作结构体的指针.go
s1 is  &{23 John 89}
*s2 is  {29 Hellen 90}

E:\code\go\src>
```

20.go语言工程的可见性

如果想使用别的包的函数,结构体类型或者结构体成员,这些变量名称的首字母必须是大写的,不然不可见,如果首字母是小写的话,只能在同一个包下面使用