Programming in Go

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Strings

Strings

Types related to strings:

- `byte`: a synonym for `uint8`
- `rune`: a synonym for `int32` for characters
- `string`: an **immutable** sequence of "characters"
  - physically a sequence of `bytes` (UTF-8 encoding)
  - logically a sequence of (unicode) `runes`

Runes (characters) are enclosed in single quotes: `'a'`

"Raw" strings use backtick quotes: `` `string with "quotes"` ``

They also don't evaluate escape characters such as `\n`

String-related types

Let's see `rune` vs `byte` in a string:

```
package main
import "fmt"

func main() {
    s := "élite"
    fmt.Printf("%8T %[1]v\n", s)
    fmt.Printf("%8T %[1]v\n", []rune(s))
    fmt.Printf("%8T %[1]v\n", []byte(s))
}
```

é is one rune (character) but two bytes in UTF-8 encoding:

```
  string élite
 []int32 [233 108 105 116 101]
 []uint8 [195 169 108 105 116 101]
```

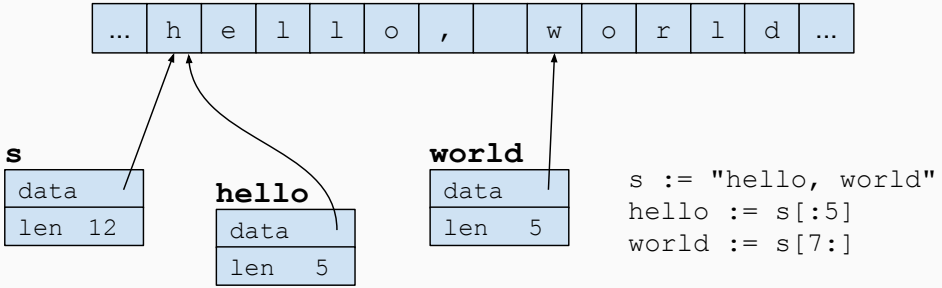
String-related types, in Chinese

I can’t do this in the slides:

String structure

The internal string representation is a pointer and a length

Strings are **immutable** and can share the underlying storage



Strings

Strings are a sequence of characters and are **immutable**

The built-in `len` function calculates the length

Strings overload the addition operator (+ and +=)

```
s := "the quick brown fox"

a := len(s)                    // 19
b := s[:3]                     // "the"
c := s[4:9]                    // "quick"
d := s[:4] + "slow" + s[9:]    // replaces "quick"

s[5] = 'a'                     // SYNTAX ERROR
s += "es"                      // now plural (copied)
```

Strings are passed *by reference*, thus they aren't copied

String functions

Package `strings` has many functions on strings

```
s := "a string"

x := len(s)                    // built-in, = 8

strings.Contains(s, "g")       // returns true
strings.Contains(s, "x")       // returns false

strings.HasPrefix(s, "a")      // returns true
strings.Index(s, "string")     // returns 2

s = strings.ToUpper(s)         // returns "A STRING"
```

Note that we assign the result of `ToUpper` back to s

```go
package main
import (
    "bufio", "fmt", "os", "strings"
)

func main() {
    if len(os.Args) < 3 {
        fmt.Fprintln(os.Stderr, "not enough args"); os.Exit(-1)
    }

    old, new := os.Args[1], os.Args[2]
    scan := bufio.NewScanner(os.Stdin)

    for scan.Scan() {
        s := strings.Split(scan.Text(), old) // assumes it's a word!
        t := strings.Join(s, new)
        fmt.Println(t)
    }
}
```