Python Basics!

functions, scope

CS101 Lecture #4

2016-10-10

Administrivia

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- Homework #2 is due Wed Oct. 19.

Data Types—A Few Points

Complex numbers, $\mathbb{C}$

- Represent numbers with an imaginary component.
- Use `j` for *i*:
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  `z = 1.0 + 1j`
- `z.real + z.imag * 1j`

Strings

- As a literal: text surrounded by quotes.
  - `"DEEP"`
- Each symbol is a character.
- Unlike numeric types, strings vary in length.

String operations

- **Concatenation**: combine two strings
  - Uses the + symbol
  - `'RACE' + 'CAR'`
- **Repetition**: repeat a string
  - Uses the *
  - `'HELLO '*10`
- **Formatting**: used to encode other data as string
  - Uses % symbol

Formatting operator

- Creates string with value inserted
  - Formats nicely
  - Requires indicator of type inside of string

```
"%i"  int
"%f"  float
"%e"  float (scientific notation)
"%s"  str
```

Example

```
print( "An integer:  %i" % 7 )
print( "A float:     %f" % 7.0 )
print( "A float:     %e" % 7.0 )
print( "A string:    %s" % 'seven' )
```

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  a[0]
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- The integer is the index.
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- If negative, counts down from end.
- Does this work on other data types like `int`?

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- Range specified inside of indexing operator
  ```
  a = "FIREHOUSE"
  a[0:4]
  ```
- Can be a bit tricky at first:
  - Includes character at first index
  - Excludes character at last index

Example

```
alpha = "ABCDE"
x = alpha[1:3]
```

What is the value of `x`?

A `'AB'`
B `'ABC'`
C `'BC'`
D `'BCD'`
E `'CD'`

Functions

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- Many functions come built-in to Python or in the standard library.
- Others we will compose at need.

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- A function can accept zero to many arguments.
- Multiple arguments are separated by commas:
  - `min( 1,4,5 )`
  - `max( 1,4,5 )`

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- A set of built-in functions to convert data from one type to another.
  - `float( "0.3" )`
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- Be careful of nonsense:
  - `int( "Rex" )`
  - `int( 3 + 5j )`
- Also called subroutine or procedure.

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- Return value: input from user (as `str`)

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- Next time we will write our first nontrivial program.

Reminders

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