Genome 559

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Web page:
A few small issues

• What does this do?

• answer = 4/3
A few small issues

- What does this do?

- answer = 4/3

- print answer

- 1

- This is integer arithmetic! If you want a real number:

- answer = 4.0/3.0

- print answer

- 1.33333
A correction

- I said that the following:

  - `linelist = filehandle.readlines()`
  
  - `line = linelist.find("<")`

- would find lines consisting solely of a single `<`

- I was wrong: this code is an error

- `find()` can only be used on strings

- The result of `readlines()` is a list of strings, not a string
import sys
filename = sys.argv[1]
filehandle = open(filename, "r")
for index in range(0,5) :
    nextline = filehandle.readline()
    numchars = len(nextline)
    if numchars < 7:
        continue
    if numchars < 13:
        print nextline[7:numchars+1]
    else :
        print nextline[7:13]
filehandle.close()
Dictionaries

- A dictionary organizes linked information

- Examples:
  - word and definition
  - name and phone number
  - name and DNA sequence
  - username and password

- If you know the first entry, you can immediately get the second one
Rules for dictionaries

- The first item is a “key”
- Each key can only appear once
- A key must be an immutable object: number, string or tuple
- Lists cannot be keys (they are mutable)
- The key should be the item you’ll use to do look-ups
Key example: name and telephone number

- Phone book: we have a name, we want a number
- Name is the key
- Crank call prevention: we have a number, we want a name
- Number is the key
# Creating a dictionary

# create an empty dictionary
myDict = {}

# create a dictionary with three entries
myDict = {"Mary": 4123, "Jon": 2057, "Fred": 1122}

# add another entry
myDict["Joe"] = 2232

# change Mary’s phone number
myDict["Mary"] = 4040

# delete Mary from dictionary
del myDict["Mary"]
Using a dictionary

```python
>>> myDict["Mary"]
4040
>>> myDict.keys()
['Mary', 'Joe', 'Fred', 'Jon']  # in no particular order
>>> myDict.haskey('Bill')
False
>>> 'Jon' in myDict
True
```
Using a dictionary

birthdays = {"Mary":"July 6", "Jon":"May 21", "Gwynne":"Sept 1"}
for person in birthdays.keys() :
    print "Send ", person, " a card on ", birthdays[person]
Sorting a dictionary

```python
sortkeys = birthday.keys()
sortkeys.sort()
for person in sortkeys:
    print "Send ", person, " a card on ", birthdays[person]
```

Question: why not for person in birthday.keys().sort()?
Practice problem 1

- Make a file with several lines like this:
  - Mary 2121
  - Joe 1432
  - Paul 8476

- Write a Python program to read this file in and create a dictionary where name is the key

- Print the dictionary to make sure it works
import sys
filename = sys.argv[1]
filehandle = open(filename,"r")
linelist = filehandle.readlines()
phonedict = {}
for line in linelist :
    wordlist = line.split()
    phonedict[wordlist[0]] = wordlist[1]
print phonedict
Comment on 1

- The phone "number" is a string

- This is probably a good thing:

- Phone number "0121" should not turn into 121
Practice problem 2

- Building on the previous program:

- Read in a second command line argument which is a name

- Print the phone number corresponding to that name
import sys
filename = sys.argv[1]
filehandle = open(filename,"r")
linelist = filehandle.readlines()
phonedict = {}
for line in linelist :
    wordlist = line.split()
    phonedict[wordlist[0]] = wordlist[1]
targetname = sys.argv[2]
print phonedict[targetname]
Practice problem 3

- Building on the previous program:
- Print out a telephone directory sorted by name
- Format like this:
- Mary extension 0121
- William extension 3243
import sys
filename = sys.argv[1]
filehandle = open(filename,"r")
linelist = filehandle.readlines()
phonedict = {}
for line in linelist:
    wordlist = line.split()
    phonedict[wordlist[0]] = wordlist[1]
keylist = phonedict.keys()
keylist.sort()
for person in keylist:
    print person, "extension", phonedict[person]