Overview/Questions

- Review: variables and arithmetic operations
- Input and output to a Python program
- ASCII encoding and decoding
- The definite loop
Variables

A variable is a spot in memory which can hold a value.
– The value is stored using a name we chose.
– We can recall it when needed to use the value, or change it to hold something else.

\[ x = 42 \]

Elements of Programs

Identifiers
Programmers use names to identify modules (e.g. hello.py), functions (e.g. main), and variables (e.g. pesos) within programs.

Variables
Give names to values within programs
Identifier Naming Rules

Identifiers in Python follow these rules:
- Must begin with a letter or underscore _
- May contain letters, numbers, underscores
- May not contain spaces, punctuation, etc.
- May not be Python keywords
- Are case sensitive

<table>
<thead>
<tr>
<th>x</th>
<th>9thValue</th>
</tr>
</thead>
<tbody>
<tr>
<td>xl</td>
<td>print</td>
</tr>
<tr>
<td>dollars</td>
<td>hello there</td>
</tr>
<tr>
<td>dollarsAndCents</td>
<td>my.favorite.letter</td>
</tr>
<tr>
<td>dollars_and_cents</td>
<td></td>
</tr>
<tr>
<td>main</td>
<td></td>
</tr>
</tbody>
</table>

Text Input and Output

requestString(message) -- show a input-box with the message, and returns a text variable
displayInformation(message) -- show a output with the message

```python
def greeting():
    name = requestString("What is your name? ")
    message = "Hello, " + name
    showInformation(message)
```

Numeric Input and Output

`requestNumber(message)` -- show a input-box with the message, and returns a text variable

`floor(number)` -- returns the next lower whole number

`str(number)` -- returns a string representation of this number

```python
def printHeight():
    dec = requestNumber("How many feet tall are you?")
    feet = floor(dec)
    inch = (dec - feet)*12
    print "You are " + str(feet) + " feet and " + str(inch) + " inches tall."
```
The Definite Loop

The definite loop is a structure for iterating over a sequence of values.

Pseudocode example:
for each ... in ... :
    do this
    do that

The Definite Loop

The definite loop has the general form:
for <var> in <sequence>:
    <body>

The <body> of the loop can be any Python statement(s). The scope of the loop body is determined by indentation.
The Definite Loop

The definite loop has the general form:
for <var> in <sequence>:
    <body>

Example: iterating characters in a string
word = “whatever”
for ch in word:
    print ch

Iterating over strings

We can use the for loop to iterate through strings. One way to do that is for the loop index variable to take on each character in the string, one at a time:

```python
def showLetters():
    word = requestString("Enter a word: ")
    for ch in word:
        print ch
```
Iterating over strings

We can use the for loop to iterate through strings.

The other way to do that is to split a phrase into a list of words. Now the loop index variable takes on each word in a phrase, one at a time:

```python
def splitPhrase():
    phrase = requestString("Enter a line of your favorite poem: ")
    for word in phrase.split():
        print(word)
```

Example:
convert to ASCII codes

Recall that we can find the ASCII number for a letter by using the built-in function `chr(letter)`.

Combining with the for loop:

```python
def showLetters():
    word = requestString("Enter a word: ")
    for ch in word:
        print(ch, "-->", ord(ch))
```
What You Learned Today

– Review: variables and arithmetic operations
– Input and output (as text, numbers)
– ASCII encoding and decoding
– The definite loop

Announcements and To Do List

– Download & install JES on your computer!
  • http://code.google.com/p/mediacomp-jes/downloads/list
    (pick 4.3 -- Mac or Windows)
– Readings:
  • The CS101 Guide to Python/JES
    – http://www.cs.bu.edu/courses/cs101b1/jes/
  • Optional (free) book about Python:
    How to Think Like A Computer Scientist: Learning with Python
    Available online at: http://openbookproject.net//thinkCSpy/
– HW9 is due Wednesday 3/30
– Quiz 4 is on Friday 4/1
  • Covers lectures 18-24 (video, flash, intro python)