Programming Concepts Review

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CS206: Structures of Computation

Major Programming Topics

- Expressions
- Variables
- Functions
- Data and other Structures
- Boolean Expressions
- Looping and Blocks
- Assignment

Expressions

- 42

- 1 + 2

- (3 + 5) * 7.675236623

- (56 + 34) * (76 -23)

- True or False

- True and True

- 5.1 > 8

- "this is a string" + ", and so is this!"

Variables

- x = 42
- y = 16 + x
- z = (x > 45) and (y < 50)
- thisIsAVariable = "sequence of characters"
- this_is_a_variable = x + y * z
- _privateVariable = 34
- __protectedVariable = 78

Functions

- def NAME():
  expression...

- def name():
  34 + 34

- def compute_tip(bill):
  return bill * 0.20

- def compute_total(bill):
  return compute_tip(bill) + bill

Data and other Structures

- Lists
  - [1, True, "some string", 3.2, len]
  - [ ].append(x), [ ].remove(x), EXP in [ ], sorted([ ])
- Modules/Libraries
  - import random; random.random()
- Objects and Methods
  - [21, 22].append(23)

Boolean Expressions

- An expression that results in True or False
- True == True
- True == False
- True and False and False and False
- False or False or False or True
- 1 == 2 and 4 != 4 or 6 < 7
- [True, False][0] and

Looping and Blocks

- if BOOLEAN-EXPRESSION:
    EXPRESSION...

- if BOOLEAN-EXPRESSION:
    EXPRESSION...
elif BOOLEAN-EXPRESSION:
    EXPRESSION...

- if BOOLEAN-EXPRESSION:
    EXPRESSION...
else:
    EXPRESSION...

Looping and Blocks

- if True:
    x = 1
    y = 2
  else:
    x = 2
    y = 1

- while True:
    print "Waiting..."

Looping and Blocks

- for x in range(10):
    print "Happy Birthday to you!"

- for x in [5, 2, 1, 7, 4, 3]:
    print x

- for x in range(100):
    if is_prime(x):
        print x, "is prime!"

- X = 0
  while x < 10:
    x = x + 1
    print "Happy Birthday to you!"

Assignment

- Write a function to determine if a number is prime or not

- Find the first 100 primes, and put in list

- BONUS: what is the largest prime that you can write a program to find?

- Find all of the unique words in a paragraph, and put in a list. What does the ratio of unique words to text length say about the writer?

- BONUS: What were the most common words in some recent public speeches?