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 \( (y < 50) \)
- \( \text{thisIsAVariable} = \) “sequence of characters”
- \( \text{this_is_a_variable} = x + y \times z \)
- \( \text{_privateVariable} = 34 \)
- \( \text{__protectedVariable} = 78 \)
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 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?