CS 110: Exam #1, 03/21/2016

*** PLEASE TURN OFF ALL CELLPHONES ***
*** NO ELECTRONIC DEVICES ***

You may use your crib sheet only (one HANDWRITTEN 8-1/2 x 11 page both sides). You will have the whole class period, unless you get time-and-a-half. Spend only about one minute per point on each question to complete the exam on time.

1. **General Computer Knowledge (10 Points: a and b for 2 points each; c and d for 3 points each)**
   a. Indicate the *type* for each of these values:

   - 17  
   - 19.8  
   - “Hello world”  

   b. Give an example of a valid method call that converts a value of one type to a value of another type

   c. Why is it necessary to maintain code indentation in Python?

   d. How is a command line interface (CLI) different from a graphical user interface (GUI)?

2. **Python Identifiers and Their Meaning (10 Points)**

For each of the following, indicate if it is a valid Java identifier or not. If it is valid, explain what it would identify using the normal naming conventions. If it is not valid, explain why it is not valid.

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Valid(Yes/No)</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>foobar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>123abc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ca$h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>False</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STATES</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Expression Evaluation (20 Points)

import random

b1 = True
b2 = False
b3 = (random.random() < 0.5)
int1 = 4
int2 = 7
s1 = "hey"
s2 = "there"

# Show what is printed for at least 10 of the
# 12 following statements

print (int1 + int2)                       # a. ____________
print (int1 // int2)                      # b. ______________
print (int2 / float (int1))               # c. ______________
print (not b1 or b2)                      # d. ______________
print (not b1 or not b2)                  # e. ______________
print (str (int2 * 3 + int1) + s1 + s2)   # f. ______________
print (str (0 - int1) + "9" + str (b1))   # g. ______________
print (int2 % int1 > 2 and (b3 or b1))    # h. ______________
print (s2 + str (int2 * 3))               # i. ______________
print (s1 + str (int2 < int1 * 2 or b2))  # j. ______________
print (s2 + str (b1 or b2))               # k. ______________
print (s1 + str (int2/int1 <= 1 or b2))   # l. ______________
4. Booleans and Branching  (20 Points)

What is or is not printed by the following code segment?

```python
ok = "Okay"
no = "Nope"
alpha = 23
beta = 14
zeta = 0.0

if alpha >= beta:
    print ("It’s all Greek to me") # a.
    if alpha == 2 * beta:
        print ("Gamma") # b.
if ok == no:
    print ("Delta") # c.
else:
    print ("Epsilon") # d.
print ("Phi") # e.

new_var = alpha - beta + int(zeta)

if new_var == 0:
    print ("Pi") # f.
elif new_var == ord('A'):
    print ("Rho ") # g.
else:
    print ("Tau") # h.
    if abs(zeta) <= 0.000001:
        print ("Sigma") # i.
if no > ok:
    print ("Omega") # j.
```

PRACTICE
5. Repetition Statements and Lists (20 points)

a. Study the following code:

```python
for i in range(5):
    for j in range(i):
        print("*", end="")
    print("")
```

Draw the output of the program:

b. Write a line of Python code that creates a list or tuple named “nums” containing 5 integer elements.

c. Write a loop to print the values of all the elements in “nums”
6. Program Writing (20 Points)

Finish the code that will create two lists or tuples to hold the authors and titles of the books, execute a loop that will prompt the user for the book author (and store it in the authors list/tuple) and title (and store it in the titles list/tuple), and run a second loop to print each book’s information.

Sample output (will be different each time depending on user input):

How many books? 3

Book #1
Author? Stephen King
Title? The Stand

Book #2
Author? R. L. Stine
Title? Goosebumps

Book #3
Author? JRR Tolkien
Title? The Hobbit

Your books (3 total):
The Stand, by Stephen King
Goosebumps, by R. L. Stine
The Hobbit, by JRR Tolkien

Fill in the rest of the necessary code:

num_books = int (input ("How many books?")))
Answers:

1. Short Answer

a. 17 __int________
   19.8 __float________
   “Hello world” __str________

b. EXAMPLES: str(47) __int(19.5) __float(“98.45”)

c. Because – in certain structures like conditional statements and loops – the indentation is necessary in order to indicate which statements belong to a particular block of code.

d. In a CLI, the user interacts with the computer by typing commands at a prompt, whereas in a GUI, the user has access to a visual interface of textual and graphical elements that the user can manipulate via the keyboard and mouse.

2. Python Identifiers

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Val.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>foobar</td>
<td>YES</td>
<td>Variable name</td>
</tr>
<tr>
<td>123abc</td>
<td>NO</td>
<td>Begins with a number</td>
</tr>
<tr>
<td>ca$h</td>
<td>NO</td>
<td>Contains an illegal character: $</td>
</tr>
<tr>
<td>False</td>
<td>YES</td>
<td>Python reserved word</td>
</tr>
<tr>
<td>STATES</td>
<td>YES</td>
<td>A constant</td>
</tr>
</tbody>
</table>

3. Expression Evaluation

   a) 11
   b) 0
   c) 1.75
   d) False
   e) True
   f) 25heythere
   g) -49True
   h) True
   i) there21
   j) heyTrue
   k) thereTrue
   l) heyFalse

4. Booleans and Branching

   a) YES
   b) NO
   c) NO
   d) YES
   e) YES
   f) NO
   g) NO
   h) YES
   i) YES
   j) NO
5. Repetition Statements and Lists

Output:
*  
** 
*** 
****

Creating a tuple:  nums = (1, 2, 3, 4, 5)
Creating a list:  nums = [1, 2, 3, 4, 5]

Loop:
for num in nums:
    print (num)

6. Writing Programs

num_books = int (input ("How many books? "))

authors = ()
titles = ()

for i in range(num_books):
    print("Book #" + str(i + 1))
    authors += (input("Author: "), )
    titles += (input("Title: "), )

print("Your books (" + str(num_books) + "total):")
for i in range(num_books):
    print(titles[i] + ", by", authors[i])