Red highlights places where students tended to make more mistakes

COGS 18 Exam #1

Fill out your Name and PID here:

Name: _____

PID: _____

<u>Do not begin until instructed by Professor Ellis to do so.</u>

Exam Notes:
- Put your PID at the top of each page.
- This is a closed book test. You may not use any resources other than your own brain and your writing utensil.
- All work should be your own. <u>Keep your eyes on your own exam</u>.
- If you are unsure of what any instructions means, raise your hand to ask a TA, IA or the Professor.
- You'll have until 9:50 to complete the exam.
- Answer all questions.
- Your exam should have 5 pages.
- There are 60 possible points.

Part I: Variables & Operators (22 pts)

Q1. Variable Assignment - In the space below, write three lines of code that define three different variables named `var_float`, `var_str`, and `var_bool`, storing a float, a string, and a boolean, respectively. (You get to choose the specific float, string, or boolean each variable stores.) (3 pts):

```
var_float = 15.4
var_str = 'shannon'
var_bool = True
```

Q2. Math Operators - Write out how each expression will evaluate (3 pts):

`(4 + 2) / 2`	_____ **3** or **3.0** _____
`16 % 5`	_____ **1** _____
`4 ** 2`	_____ **16** _____
`2 * 4`	_____ **8** _____
`'python' + 'love'`	_____ **pythonlove** _____
`2 + 'python'`	_____ **Error (TypeError)** _____

Q3. Comparison Operators - Write out how each expression will evaluate (2 pts):

`3 <= 8`	_____ **True** _____
`2 != 2`	_____ **False** _____
`(3 >= 8) or (20 != 20)`	_____ **False** _____
`(12 < 20) and (20 == 20)`	_____ **True** _____

Q4. Boolean Operators - Write out how each expression will evaluate (3 pts):

`True and False`	_____**False**_____
`False or True`	_____**True**_____
`True or not False`	_____**True**_____

Q5. Membership Operators - Given the following two variables, write out how each expression will evaluate (4 pts):

```
my_string = 'I love COGS18!'
my_list = ['Sarah', 'Titan', 'Zijian']
```

`'sarah' in my_list`	_____ **False** _____
`'love' in my_list`	_____ **False** _____
`'Titan' in my_list`	_____ **True** _____
`'COGS' in my_string`	_____ **True** _____

Q6. Given the following code, what will be the output (2 pts)?

```
val_a = 4
val_b = 2
val_c = 3 + (2 * val_b/val_a)
print(val_c + 2)
```

Your answer: _____ **6** or **6.0** _____

Q7. For each of the types of variables below, specify whether it is *immutable (I)*, *mutable (M)*, or *neither (N)* (2 pts).
For example, if it were mutable, write the letter M on the line to the right of the variable type.

lists   _____ M _____
tuples   _____ I _____
strings   _____ I _____
integers   _____ I _____

Q8. Draw the bracket used to create each of the following (3 pts):
tuple   _____ () _____
dictionary   _____ {} _____
lists   _____ [] _____

Part II: Indexing (11 pts)

Q9. Given a list `my_list`, how would you index each of the following conditions (3 pts):
Fill in your answer within the square brackets to the right. Note that if the list were [19, 8, 7, 6, 5] , the second *element* would be 8.

The fifth element in the list   `my_list[ 4  ]`
The second element from the end of the list   `my_list[ -2 ]`
Starting with the fourth element of the list to the end of the list   `my_list[ 3: ]`

Q10. Given the list below, write the line of code you would use to index the list and return the specified output (4 pts):

```
cogs18 = ['Devendra', 'Shreenivas', 'Andrew', 'Chau', 'Duolan',
          'Byungkwon', 'Severine', 'Stephen', 'Zekria']
```

<u>Output</u> A: ['Duolan', 'Byungkwon', 'Severine']   <- edited to show what this *should* have been
        cogs18[4:7]

<u>Output B</u>: ['Devendra', 'Chau', 'Severine']
        cogs18[0::3] OR **cogs18[0:7+:3]**
        OR **cogs18[::3]** OR **cogs18[:7+:3]** OR **cogs18[:-2/-1:3]**

Q11. Given the following dictionary, write a line of code on the left ***using `cogs18_dict`*** that would return the value at right (3 pts):

```
cogs18_dict = {'Devendra' : 'TA',  'Shreenivas' : 'TA', 'Ellis' : 'Prof'}
```

<u>Code</u>	<u>Output</u>
_____**len(**cogs18_dict**)**_____	3
_____cogs18_dict[**'Ellis'**]_____	'Prof'
_____**type(**cogs18_dict**)**_____	dict

Q12. Multiple Choice: Assuming the code below had executed, which of the following would NOT return an error? (1 pt)

```
var_1 = ('a', 'b', 'c')
var_2 = ['d', 'e', 'f']
```

A) `var_1[3]`
B) `var_2[4]`
C) `var_1[1] = 'z'`
D) `var_2[1] = 'z'`
E) `var_1 + var_2`

Part III: Control Flow - Conditionals & Loops (17 pts)

Q13. Multiple Choice: In Python, which of the following choices is an *optional* component of a conditional statement? (1 pt)
   A) `if`
   B) `elif`
   C) `for`
   D) `while`
   E) `tuple`

Q14. What is the difference between **break** and **continue**? (2 pts)

break-exits loop when encountered ; continue - continues onto next iteration when encountered

Q15. How many iterations of the following loop would execute? (2 pts)

```
ind = 2
while ind < 4:
    ind = ind + 1
```

My answer: _____ 2 _____

Q16. Given the following... (3 pts):

```
if cond_a:
    print('First Condition')
elif cond_b:
    print('Second Condition')
else:
    print('Third Condition')
```

if `cond_a = 7 >= 7` and `cond_b = 'word'`, what would be the output of the code? _____ **First Condition** ____
if `cond_a = 7 > 7` and `cond_b = False`, what would be the output of the code? _____ **Third Condition** ____
if `cond_a = 7 > 7` and `cond_b = 3 == 3`, what would be the output of the code? _____ **Second Condition** ___

PID:

Q17. If the following code executed, what would be the value stored in the **out_val** after execution? (4 pts)

```python
out_val = 0
for val in range(2, 11, 2):
    if(val <= 5):
        out_val = out_val + val
    else:
        break
```

My answer: _____ 6 _____

Q18. In real code, write a **for** loop that initializes a counter and then loops through the letters of your first name, increasing the counter by one for each letter in your name. The value stored in the counter at the end of your loop's execution should be the number of letters in your first name. (5 pts)

`counter = 0`
 	
`for ltr in 'shannon':`
`    counter = counter + 1`
	- **1 pt: counter initialized**
	- **1 pt: for loop used**
	- **1 pt: loop statement correct**
	- **1 pt: counter increments by 1**
	- **1 pt: does not use reserved words for variable names**

Part IV: Concepts (10 pts)

Q19. For each of the following statements, circle _either_ True or False (6 pts):

Python determines/infers the type of the variable during assignment	**True** / False
A single = is used for both assignment and testing equality	True / **False**
Code blocks begin after a colon (:) in Python	**True** / False
Variables can begin with a number	True / **False**
Reserved words in Python are not allowed to be used as variable names	**True** / False
Booleans can be assigned one of three distinct values	True / **False**

Q20. If you are working in a Jupyter notebook and assign integer values to three different variables and then restart your kernel, how many variables are stored in your namespace? (2 pts)
- **A) 0**
- B) 1
- C) 3
- D) Impossible to determine

Q21. In A2, you created a cipher writing code to do encryption and decryption. Explain briefly what encryption and decryption are: (2 pts)

Encryption - take message and store in symbols; Decryption - take symbols and decipher back to original message

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