Midterm #1 - Sample Questions

1. Write out the result of this code. If there's output, write out what the code will output. If there's an error, write out why an error happened and how to fix it. (2 points)

   ```python
   distance = 150
   time = 10
   velocity = distance / time
   print("The velocity is " + velocity)
   ```

   The result is an error: adding two types that cannot be added - a float and a string.

2. What is the resulting Boolean value for the following expressions? (4 points)

   a) False or True and False
      a)___False_____

   b) True and not (9 < 5)
      b)___True_____

   c) 24 / 12 >= 2 and "hello" != "goodbye"
      c)___True_____

   d) answer = "yeah"
      answer == "yes" or answer == "yeah"
      d)___True_____

3. Some tricky ones. What is the resulting Boolean value for the following expressions? If there's an error, write error. (3 points)

   a) 55 != "hello"
      a)___True_____

   b) "2" == 2
      b)___False_____

   c) "hello" > 35
      d)___Error_____

4. 00001001 is _________9_______ in decimal, and 38 is ____00100110____ in binary. (1 point)

5. What's the difference between a compiled and an interpreted language? (1 point)

   A compiled language requires and explicit compilations step.

   (When a language is compiled, it means that it has to be translated into a form that the computer can understand by using a program called a compiler. An interpreted language, on the other hand, without the programmer having to run a separate translation process – it is done behind the scenes by the interpreter).

6. What is the output of this code if the user enters 5 (2 points)

   ```python
   n = int(input('Number please!\n'))
   total = 0
   for number in range(1, n + 1):
       total += number
   print(total)
   ```

   The output is 15

7. Create a while loop that prints out "Hi, how are you?" forever. (2 points)

   Example Output:

   ```python
   Hi, how are you? while True:
   . print('Hi, how are you?')
   . Hi, how are you?
   ```
8. You've just been hired by a party planning partnership called Party People Plus (whew, that's a lot of p's). They would like you to write a program that prints out numbers in a count down based on a value entered by the program's user. (6 points)

The program should do the following:

a) ask the user for number (and store the number entered) by saying: "How long before the party!?"
b) print out: "Here's the count down!"
c) count down from the number entered to 1 by printing out each number
d) if the current number in the countdown is less than or equal to three, surround the number with asterisks
e) at the end of the countdown, print out: "Party Time!!!"
f) Example Output:

```
How long before the party!??
> 5
Here's the count down!
  5
  4
*3*
*2*
*1*
Party Time!!!
```

```
party_time = int(input("How long before the party!?\n> "))
for number in range(party_time, 0, -1):
    if number > 3:
        print(number)
    else:
        print("*" + str(number) + "*")
```

9. Write a program that prints out a daily budget for a vacation. (7 points)

a) ask the user for the number of days of their vacation, as well as their destination

b) based on the number of days the vacation is, ask for how much they're spending on each day (x is the day's number):

```
How much are you spending on day x?
```

c) once you're done, print out a report with the destination, total cost, and amount per day

d) hint: how can the printing of the report be delayed until the end of the program?

Example Output:

```
How many days is your vacation?
> 2
Where are you going?
> Ottawa
How much are you spending on day 1?
> 100
How much are you spending on day 2?
> 200
Your vacation to Ottawa is $400
day 1 - $100
day 2 - $200
```

```
days = int(input("How many days is your vacation?\n> "))
where = input("Where are you going?\n> 
report = ''
total = 0
for day in range(1, days + 1):
    amt = int(input('How much are you spending on day ' + str(day) + '\n> '))
total += amt
report += 'day ' + str(day) + ': ' + str(amt) + ' $' + str(amt) + '\n'
print('Your vacation to ' + where + ' is ' + str(total))
print(report)
```
10. Define the following terms (1 and 1/2 points)

**program**: a sequence of instructions that specifies to a computer actions and computations to be performed

**function**: a named sequence of statements that perform a specific task or a useful operation. Functions can optionally have inputs (parameters) and outputs (return value(s)).

**call (as in call a function)**: execute or run a function. To call a function add parentheses after the function name, and within those parentheses optionally add a comma separated list of arguments (leave parentheses empty if no arguments).

11. Answer the questions in the right column about the condition snippet of code in the left column. (6 points)

<table>
<thead>
<tr>
<th>Code</th>
<th>Question 1</th>
<th>Question 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>answer = input(&quot;Type something plz: &quot;)</td>
<td>If a user types in &quot;no&quot;, what – if anything – would this program output?</td>
<td>Write down all of the values that a user could input to prevent the while loop from running.</td>
</tr>
<tr>
<td>while answer != &quot;yes&quot; and answer != &quot;yeah&quot;:</td>
<td>I'm in yr while loop</td>
<td>yes or yeah</td>
</tr>
<tr>
<td>answer = input(&quot;Type something plz: &quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>if answer == &quot;no&quot; and answer == &quot;n&quot;:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>print(&quot;Ohhh no!&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>elif answer == &quot;yes&quot; or another == &quot;y&quot;:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>print(&quot;Yeaaahhh&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>else:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>print(&quot;Huh?&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>answer = input(&quot;Type something plz: &quot;)</td>
<td>If a user types in the word &quot;yes&quot; for the first question and &quot;comfy-pants&quot; for the second, what – if anything – would this program output?</td>
<td>What values must the user enter for this program to print &quot;Ohhh no!&quot;?</td>
</tr>
<tr>
<td>another = input(&quot;Type another thing plz: &quot;)</td>
<td></td>
<td>answer: no</td>
</tr>
<tr>
<td>if answer == &quot;no&quot; and another == &quot;n&quot;:</td>
<td></td>
<td>another: n</td>
</tr>
<tr>
<td>print(&quot;Ohhh no!&quot;)</td>
<td></td>
<td></td>
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<td>print(&quot;Huh?&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>def greet(name, num_exclamation_points):</td>
<td>How many parameters does the function, greet, take?</td>
<td>How would you call this function so that the output is &quot;Hi Harriet!!!&quot;?</td>
</tr>
<tr>
<td>punctuation = '!' * num_exclamation_points</td>
<td>2</td>
<td>greet('Harriett', 3)</td>
</tr>
<tr>
<td>print('Hi ' + name + punctuation)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 12. Write a program that **continually asks for numbers until the user enters three consecutive numbers that are all the same**. Once three consecutive numbers that are equal are entered, the program will print out 'Done!'. Assume that the user only enters numbers.

Hints:
- you will have to keep track of a previous value (but how will you initialize it?)
- 3 consecutive numbers means that the 1st in the series wasn’t equal to a previous, but the next two are

Example Output:
Please enter a number
> 5
Please enter a number
> 5
Please enter a number
> 7
Please enter a number
> 7
Please enter a number
> 7
Done!

consecutive = 0
prev = ''
while consecutive < 2:
    num = int(input('Please enter a number\n> '))
    if prev == num:
        consecutive += 1
    else:
        consecutive = 0
    prev = num
13. Here is a partial implementation of a program that:

a) generates a series of numbers, each a random value from 1 through 11
b) prints out each generated number
c) keeps a running total of the generated numbers
d) stops printing the numbers when the sum of the numbers generated reaches 21 or over

Fill in the blanks to complete the implementation. Example output is provided on the left. (5 points)

Example Run 1: 7 10 5
Example Run 2: 2 8 10 6

```python
import random

total = 0

while total < 21:
    random_value = random.randint(1, 11)
    print(random_value)
    total = total + random_value
```

14. This chart describes the order in which types of operators are evaluated, along with examples of each. Fill in the blanks: (4 points)

<table>
<thead>
<tr>
<th>Order Evaluated (1, 2, 3 or 4)</th>
<th>Type of Operator</th>
<th>Example Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Comparison</td>
<td>&gt;, &lt;, &gt;=, &lt;=, ==, !=</td>
</tr>
<tr>
<td>4</td>
<td>Logical</td>
<td>not, and, or</td>
</tr>
<tr>
<td>1</td>
<td>Parentheses</td>
<td>()</td>
</tr>
<tr>
<td>2</td>
<td>Numeric and/or String Operators</td>
<td>+, *, -, /</td>
</tr>
</tbody>
</table>

15. Use DeMorgan's law to write an equivalent if statement adjacent to the one shown below (1 point):

```python
if not (age >= 21 and has_id == True):
    print("Not allowed in the pub")
```

Use logical opposites to remove nots from you answer above (1 point):

```python
if __________:  
    print("Not allowed in the pub")
```

16. Write a program that asks for a length, width and height. It will calculate volume by multiplying all 3 values. It will output the volume and determine if the dimensions entered make the object larger, smaller or equal to a bread box -which we'll give an arbitrary value of 20. (5 points):

What is the object's length?
> 5
What is the object's width?
> 2
What is the object's height?
> 3
The objects volume is 30.
The object is bigger than a bread box.

```python
length = int(input("What is the object's length?\n> "))
width = int(input("What is the object's width?\n> "))
height = int(input("What is the object's height?\n> "))
volume = length * width * height
print("The object's volume is " + str(volume))
if volume == 20:
    print('This must be a bread box!')
elif volume > 20:
    print('The object is bigger than a bread box')
elif volume < 20:
    print('The object is smaller than a bread box')
```