UNIDADE CURRICULAR: MULTIMÉDIA E COMPUTAÇÃO GRÁFICA
CURSO: ENGENHARIA INFORMÁTICA

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*Use the Python interpreter to answer the following questions. Where appropriate, provide both the answer and the Python expression you used to get it.*

1. You may have seen a meme that challenges you to find the correct answer for the expression 8 - 2(2 + 2). Use Python to do this.

2. The Library of Congress stores its holdings on 838 miles of shelves. Assuming an average book is one inch thick, how many books would this hold?

3. If I gave you a nickel (0.01€) and promised to double the amount you have every hour for the next 24, how much money would you have at the end? What if I only increased the amount by 50% each hour, how much would you have? Use exponentiation to compute these quantities.

4. The Library of Congress stores its holdings on 838 miles of shelves. How many round trips is this between Granville, Ohio and Columbus, Ohio?

5. What is wrong with each of the following Python names? Suggest a fixed version for each.
   a) word count
   b) here: there
   c) minutes
   d) 4ever
   e) #thisisavariable

6. (a) Assign a variable named radius to have the value 10. Using the formula for the area of a circle ($A = \pi r^2$), assign to a new variable named area the area of a circle with radius equal to your variable radius. (The number 10 should not appear in the formula.)
   (b) Now change the value of radius to 15. What is the value of area now? Why?

7. The formula for computing North American wind chill temperatures, indegrees Celsius, is

$$W = 13.12 + 0.6215\, t + (0.3965\, t - 11.37)\, v^{0.16}$$

   where t is the ambient temperature in degrees Celsius and v is the wind speed in km/h.

   (a) Compute the wind chill for a temperature of -3 C and wind speed of 13 km/h by assigning this temperature and wind speed to two variables temperature and windChill, and then assigning the corresponding wind chill to another variable windChill using the formula above.
   (b) Change the value of temperature to 4.0 and then check the value of windChill. Why did the value of windChill not change? How would you update the value of windChill to reflect the change in temperature?

8. Suppose we want to swap the values of two variables named left and right. Why doesn't the following work? Show a method that does work.
   *left = right*
   *right = left*

9. What are the values of apples and oranges at the end of the following?
   *apples = 12.0*
   *oranges = 2 \* apples*
   *apples = 6*

10. What is the value of number at the end of the following?
    *number = 0*
    *number = number + 1*
    *number = number + 1*
    *number = number + 1*

11. In the previous exercise, what happens if you omit the first statement (number = 0)? Explain why number must be assigned a value before the executing the statement number = number + 1.

12. What are the values of apples and oranges at the end of the following?
    *apples = 12.0*
    *oranges = 6*
    *oranges = oranges \* apples*

13. String values can also be manipulated with the * operator. Applied to strings, the * operator becomes the repetition operator, which repeats a string some number of times. The operand on the left side of the repetition operator is a string and the operand on the right side is an integer that indicates the number of times to repeat the string.
    >>> last * 4
    'PythonPythonPythonPython'
    >>> print (first + ' ' * 10 + last)
    Monty Python

    (a) Explain why 18 * 10 and '18' * 10 give different values.
    (b) Use the repetition operator to create a string consisting of 20 asterisks separated by spaces.
    (c) The special character '\n' (really two characters, but it represents a single character) is called the newline character, and causes printing to continue on the next line. To see its effect, try this:
    >>> print ( 'Hello\nthere')
    Use the newline character and the repetition operator to create a string that will display a vertical line of 20 asterisks when printed.
    (d) Combine the techniques from parts (b) and (c) (with some modification) to create a string that will display a 20 x 20 square of asterisks when printed.

14. Modify your wind chill computation from Exercise 7 so that it gives the wind chill rounded to the nearest integer.

15. Show how you can use the int function to truncate any floating point number to two places to the right of the decimal point. In other words, you want to truncate a number like 3.1415926 to 3.14. Your expression should work with any value of number.

16. Show how you can use the int function to find the fractional part of any positive floating point number. For example, if the value 3.14 is assigned to number, you want to output 0.14. Your expression should work with any value of number.

17. Show how to round a floating point number to the nearest tenth in Python.

18. What happens when you execute the following statements? Explain why.
    >>> value = print (42)
    >>> print (value * 2)

19. Fix the following sequence of statements
    *>>> radius = input ( 'Radius of your circle? ')*
    *>>> area = 3.14159 * radius * radius*
    *>>> print ( 'The area of your circle is ' + area + '.')*

20. Write a sequence of statements that
    (a) prompt for a person's age,
    (b) compute the number of days that person has been alive (assume 365.25 days in a year to account for leap years),
    (c) round the number of days to the nearest integer, and then
    (d) print the result, nicely formatted.

21. Repeat Exercise 14, but this time prompt for the temperature and wind chill using the input function, and print the result formatted like:
    *The wind chill is -2 degrees Celsius.*