CS 1358 Introduction to Programming in Python

Spring Semester 2024

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Self-Check 4

Answer the following questions to check your understanding of your material. Expect the same kind of questions to show up on your tests.

## 1. Definitions and Short Answers

1. Given the command shown on the lecture slide  
   $ uniq mary.txt  
   What is
   * the **prompt**?
   * the **program name**?
   * the **command-line argument**?
2. What does the uniq program do?
3. What does the cat program do?
4. What does the grep program do?
5. Is it possible that uniq and cat produce the same output? How?
6. Given the command shown on the lecture slide  
   $ grep class myfile.py  
   What is the purpose of
   * class
   * myfile.py
7. Given the command  
   $ cat \*.py  
   What is the meaning of \*.py?
8. What does the following command do?  
   $ python3 prog.py
9. What is a **shbang** in a Python program? Where is it placed inside a Python program?
10. What does the command do:  
    $ chmod +x prog.py
11. What is the value of
    * len([3, 7, 2, 0, 8])
    * len(['hello', 'world', 'goodbye'])
    * len('admin')
12. Suppose you run the command  
    $ python3 showargs.py hello world goodbye  
    Inside the showargs.py program, suppose you have  
    import sys
    * What is the value of sys.argv?
    * What is the value of len(sys.argv)?
    * What is the value of sys.argv[1:]?
13. If the command $ python3 showargs.py hello world is used to run the Python program, what is printed by the statement  
    import sys  
    sys.stderr.write('cannot open input file %s\n' % sys.argv[1])  
    ?
14. If the file mary.txt contains the following lines  
    Mary had a little lamb  
    little lamb, little lamb  
    Mary had a little lamb  
    its fleece was white as snow  
    what is the **value** of L after executing the following statements?  
    fh = open('mary.txt', 'r')  
    L = fh.readlines()  
    fh.close()  
    ?
15. What is the purpose of end='' in the statement  
    print(line, end='')  
    ?
16. Explain why  
    'hello'.find('e')  
    results in the integer value of 1, while   
    'hello'.find('a')  
    results in -1.
17. Rewrite the **string literal** "hello, I'm John." using
    * single quotes
    * triple single quotes
    * triple double quotes

instead of double quotes.

1. Rewrite the string literal 'she says, "This is great!" and left' using
   * double quotes
   * triple single quotes
   * triple double quotes

instead of single quotes.

1. Rewrite the string literal '\\n means newline' using a **raw string**.
2. After executing the statement  
   t = 'hello' "world"  
   What is the value of t?
3. What is the value of
   * len("hello")
   * len("I\tam\there")
   * len('McDonald\'s')
4. Rewrite the following triple-quoted string literal using a non-triple-quoted string literal  
   sourceCode = '''<html>  
   <body>Welcome</body>  
   <html>'''
   * on one single line
   * on three separate lines
5. Assume   
   month = 7  
   day = 4  
   year = 2019  
   How do you format the date using % formatting so that it appears as strings (expressed as string literals)
   * '7/4/2019'
   * '07/04/2019'
6. What is the value of
   * '%9.2f' % 13.5
   * '%9.2f' % 123456789.0193
7. What is the meaning of 5e2? What is its data type?
8. What is the value of 5e-2?
9. What is the value of '%c' % 100, given that ord('a') has the value of 97?
10. What is the format string S such that S.format(month, day, year)  
    is equivalent to the traditional formatting of  
     '%d/%d/%d' % (month, day, year)   
    ?
11. What is the value of the expression  
    'one {0}, two {0}s, three {0}s'.format('apple')  
    ?
12. What is the format string S such that   
    S.format(12)  
    evaluates to the string  
    '12 decimal is 0c hex and 14 octal'
13. What is the value of the expression  
    'lastname {1}, firstname {0}'.format('John', 'Smith')  
    ?
14. Rewrite the following expressions as **f-string**:
    * '%d/%d/%d' % (month, day, year)
    * '{:02d}/{:02d}/{:04d}'.format(month, day, year)
15. What is the value of the expression
    * 'www.nthu.edu.tw'.split('.')
    * 'Mary had a\nlittle lamb'.split()
16. Suppose you type the unix command wc (lightblue) and get the output (lightgreen) as shown below:  
    $ wc mult.py  
     9 32 249 mult.py  
    What are the meanings of 9, 32, and 249?
17. What is the value of the expression
    * '(' + ')('.join(['a', 'b', 'c', 'd']) + ')'
    * ''.join('Mary had a little lamb'.split())'
18. Assume you have   
    import string  
    What is the value of
    * string.punctuation
    * string.digits
    * string.ascii\_lowercase
    * string.whitespace
    * string.printable

## 2. Programming Exercises

1. Write a program that prompts the user to input two strings and reports the two strings' lengths, by reporting the shorter string first. But if they are of the same length then keep them in the original order. For example, (blue text = typed input, green highlight = program printout)  
   $ python3 compstr.py  
   Enter a string: Great  
   Enter another string: job  
   Shorter string: job (length 3)  
   Longer string: Great (length 5)  
   $ python3 compstr.py  
   Enter a string: Mary  
   Enter another string: lamb  
   First string: Mary (length 4)  
   Second string: lamb (length 4)  
   $

Note that in case the strings are of different lengths, the program says Shorter and Longer, but in case the strings are of equal length, the program says First and Second. You don't actually print in color… the letters are colored for illustration purpose only.

1. Write a Python program named catn.py by modifying the template code to implement the unix utility command cat with -n option, which adds the line number in front of every line of a file.
   1. First version: support the command with **optional** -n flag and **one file**. Note that the line number is formatted   
      $ python3 catn.py mary.txt  
      Mary had a little lamb  
      little lamb, little lamb  
      Mary had a little lamb  
      its fleece was white as snow  
      $ python3 catn.py -n mary.txt  
       1 Mary had a little lamb  
       2 little lamb, little lamb  
       3 Mary had a little lamb  
       4 its fleece was white as snow  
      $
   2. Second version: handles **one or more files** with optional -n flag. In case of multiple files, the line number restarts from 1.