Python Activity 18: More Lists & Strings

Critical Thinking Questions:

Learning Objectives
Students will be able to:

Content:
- Explain how to send a list as an argument to a function
- Explain the purpose of these functions: lower(), upper(), strip(), replace(), sorted(), join()
- Demonstrate the use of slicing with strings and lists.

Process:
- Write code that uses the following functions: lower(), upper(), strip(), replace(), sorted(), join()
- Write code that uses slicing to access elements of strings and lists

Prior Knowledge
- Python concepts from Activities 1-16

1. Examine the following program and its output. It includes a function that takes a list as an argument.

   ```python
   def orderList(anyList):
       newList = sorted(anyList)
       newList = newList[::-1]
       return newList

   myList = []
   for y in range(10):
       n = int(input("Gimme an int: "))
   myList.append(n)
   print(orderList(myList))
   ```

   a. What is the name of the function defined in this program? __________________________

   b. What does the function do? ___________________________________________

   c. What might `newList = sorted(anyList)` do? _____________________________

   d. What might `newList[::-1]` do? ____________________________

2. Examine the following code:

   ```python
   usrNoun = input("Gimme a plural noun: ")
   madlib = "The mountains! The mountains! We greet them with a song!"
   mSentence = madlib.replace('mountains', usrNoun)
   print(mSentence)
   ```

   a. What inputs might you enter to see what the program does? __________________________
b. Examine the output for some sample inputs below.

Gimme a plural noun: students
The students! The students! We greet them with a song!
Gimme a plural noun: CATS
The CATS! The CATS! We greet them with a song!
Gimme a plural noun: toDay200224
The toDay200224! The toDay200224! We greet them with a song!

What does the program do?

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c. What does the replace() function do? How do the first & second parameter differ?

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3. Examine the following code.

```python
20 befString = input("Enter a string with some spaces: ")
21 aftString = befString.strip()
22 print(aftString, len(befString), 'vs', len(aftString))
```

a. What are some inputs you might use to see what the program does?

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b. Examine the output from the program below.

Enter a string with some spaces: hello world
hello world 11 vs 11
Enter a string with some spaces: hello world
hello world 15 vs 11
Enter a string with some spaces: hello world
hello world 12 vs 11
Enter a string with some spaces: hello world
hello world 30 vs 11

What does the program do?

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c. What does the strip() function do?

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4. Examine the following code.

```python
30 sentence = "This is a sentence with some spaces."
31 numSpaces = 0
32 for index in range(len(sentence)):
33     if sentence[index].isspace():
34         numSpaces += 1
35 print("There are", numSpaces,"spaces in the sentence.")
```

a. What does the program do?

________________________
b. What does the *isspace()* function do? ___________________________________________

c. If we replace the call to *isspace()* with *isalpha()* the program counts ‘29’. What might *isalpha()* do? ___________________________________________
d. If we replace the call to *isalpha()* with *isdigit()* the program counts ‘0’. What might *isdigit()* do? ___________________________________________
e. How could we rewrite line 32 to not use range()? What other line would we have to change? ___________________________________________

5. Examine the following code and its output:

```python
38     username = input("Enter user name: ")
39     if username.upper() == "CSCI134":
40         print("Correct!")
41     else:
42         print("Invalid user name.")
```

a. For each of the following inputs, what might the result of line 39 be?
   - Csci134 ___________________________________________
   - csci134 ___________________________________________
   - CSCI136 ___________________________________________
   - CSCI134 ___________________________________________

b. What does the *upper()* function do? ___________________________________________

c. Use the *lower()* function instead of the *upper()* function in the program above. Revise the line of code so that it still produces the *same* output. Execute the program again with the data listed in ‘a’. (Write the revised code below.)

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```

6. Examine the following code and its output:

```python
40     emadd = input("Email address? ")
41     print("Split:", emadd.split('.'))
42     nospam = ' DOT '.join(emadd.split('.'))
43     print("Spam free: ", nospam)
```

a. What does *split()* do? ___________________________________________

b. What does the argument passed to *split()* represent? __________________________

c. What does *join()* do? ___________________________________________

d. What does the argument passed to *join()* represent? __________________________

e. What does the object right before .join() represent? __________________________
FYI: Slicing is a technique available in Python that allows you to access parts of lists or strings. You can select multiple elements of a list or string.

**Syntax:** `<listOrStringName>[indexOfFirstItem : indexAfterLastItem]`.

7. In this section we are going to try to access parts of a **string** using **slicing**. Enter and execute the following code. Examine the syntax of the code. It uses slicing to access parts of a string.

```
courseName = 'Introduction to Computer Science'
print(courseName)
print(courseName[0])
print(courseName[-2])
print(courseName[0:13])
print(courseName[16:24])
print(courseName[25:])
```

a. What is the output for each print statement in the program?

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b. The first three print statements should be familiar. What does the fourth print statement do? Explain the meaning of `[0:13]`. 

```
print(courseName[0:13])
```

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c. What does the following print statement do? Explain the meaning of `[16:27]`.

```
print(courseName[16:27])
```

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d. What does the following print statement do? Explain the meaning of `[28:]`.

```
print(courseName[28:])
```

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8. Finally, examine **slicing** using **lists**. Enter and execute the following program.

```
courselist = ['CSCI134','CSCI136','CSCI237','CSCI256']
print(courselist)
copylist = courselist[:]
print(copylist)
copylist[1] = "CSCI334"
print(copylist)
print(copylist[1:3])
```
a. What is the output of each print statement in the program?

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b. Explain what the following code does.  `copyList = courseList[:]`

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c. Explain what the following code does: `copyList[1] = “CSCI334”`

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d. Explain what the following code does: `print(copyList[1:3])`

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Application Questions: Use the Python Interpreter to check your work

1. Create a list named “Days” that includes all the days of the week. Print the list.

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2. Create a line of code that uses slicing to print the last three days in the list “Days” which you created in question 1.

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3. Create a list named “Vowels” that includes the vowels ‘a’, ‘e’, ‘i’, ‘o’, ‘u’.

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4. Use the code in question 3, and create a program that analyzes a user’s input. Complete the following steps:  
a. Create code that prompts the user for a vowel.

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b. Create code to determine if the user input is a vowel. If so, congratulate them.

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c. Create code that determines if it is a letter, but not a vowel and prints a message that indicates that.

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d. Add code that determines if the user input is a digit instead of a letter, print a message that indicates that as well.

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e. Otherwise, tell the user that their input was not a vowel, a letter, or a number.

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f. Prevent the program from crashing by terminating the program if the user enters more than one character. This should actually be tested first.

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g. Put all the code together and test the program with several sets of data. List a sample output.

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