COME103 / CENG111 Computer Programming I

Lab - 10 Before LAB Examples

8 December 2021

1. TRUE / FALSE QUESTIONS

T ___T___ Indexing works with both strings and lists.

T ___F___ Once a string is created, it cannot be changed.

___T___ You can use the `for` loop to iterate over the individual characters in a string.

___T___ In slicing, if the end index specifies a position beyond the end of the string, Python will use the length of the string instead.

T ___F___ Indexing of a string starts at 1 so the index of the first character is 1, the index of the second character is 2, and so forth.

T ___F___ The index -1 identifies the last character of a string.

___F___ The following code will display `'yes + no'`:

```
mystr = 'yes'
yourstr = 'no'
mystr += yourstr
print(mystr)
```

___T___ If a whole paragraph is included in a single string, the `split()` method can be used to obtain a list of the sentences in the paragraph.

___T___ The `strip()` method returns a copy of the string with all the leading whitespace characters removed but does not remove trailing whitespace characters.

___F___ The `isupper` method converts a string to all uppercase characters.

___T___ The repetition operator (`*`) works with strings as well as with lists.

___F___ When you call a string's split method, the method divides the string into two substrings.

2. COMPLETION QUESTIONS: Fill in the blanks.

Index **a)** Each character in a string has a(n) ~~immutable~~ ___ which specifies its position in the string.

b) The `isalpha()` method returns ___true___ if the string contains only alphabetic characters and is at least one character in length.

c) A(n) string slice is a span of characters that are taken from within a string.

repetition **d)** When the operand on the left side of the `*` symbol is a string and the operand on the right side is an integer, the `*` becomes the ___split()___ operator.

e) The third number in string slicing brackets represents the ___step___ value.

f) The ___in___ operator can be used to determine whether one string is contained in another string.

g) The ___isdigit()___ method returns `True` if the string contains only numeric digits.

h) The ___lower()___ method returns a copy of the string with all the alphabetic letters converted to lower case.

i) Method ___trim()___ returns a new string where all leading and trailing whitespace has been removed.

j) Python represents strings as sequences of ___charactres___.

3. ALGORITHM WORKBENCH QUESTIONS

a) Write a loop that counts the number of lowercase characters that appear in the string referenced by `mystring`.

b) Assume `mystring` references a string. Write code that makes a copy of the string with all occurrences of the lowercase letter `'t'` converted to uppercase.

c) Assume `mystring` references a string. Write a statement that uses a slicing expression and displays the last 3 characters in the string.

d) Look at the following statement:

```
levels = 'Beginner, Average, Advanced, Expert'
```

Write a statement that splits this string, creating the following list from `levels`:

```
['Beginner', 'Average', 'Advanced', 'Expert']
```

MULTIPLE CHOICE QUESTIONS

4. What will be assigned to the variable `s_string` after the following code executes?

```
special = '1357 Country Ln.'
s_string = special[ :4]
```

a) `'7'`
b) `'1357'`
c) `5`
d) `'7 Country Ln.'`

5. What will be assigned to the variable `s_string` after the following code executes?

```
special = '1357 Country Ln.'
s_string = special[-3: ]
```

a) `'135'`
b) `'753'`
c) `'Ln.'`
d) `'y Ln'`

6. This string method returns `true` if a string contains only alphabetic characters and is at least one character in length.

a) the `isalpha` method
b) the `alpha` method
c) the `alphabetic` method
d) the `isletters` method

7. What will be assigned to the variable `some_nums` after the following code executes?

```
special = '0123456789'
some_nums = special[0:10:2]
```

a) `'0123456789'`
b) `'24682468'`
c) `'02468'`
d) `'02020202020202020202'`

8. This string method returns a copy of the string with all leading and trailing whitespace characters removed.

a) `clean`
b) `strip`
c) `remove_whitespace`
d) `rstrip`

9. Which method would you use to determine whether a certain substring is present in a string?

a) `endswith(substring)`
b) `find(substring)`
c) `replace(string, substring)`
d) `startswith(substring)`

10. What will be the value of the variable string after the following code executes?

```
string = 'abcd'
string.upper()
```

a) `'abcd'`
b) `'ABCD'`
c) `'Abcd'`
d) Nothing; this code is invalid

11. What list will be referenced by the variable `list_strip` after the following code executes?

```
my_string = '03/07/2018'
list_strip = my_string.split('/')
```

a) `['3', '7', '2018']`
b) `['03', '07', '2018']`
c) `['3', '/', '7', '/', '2018']`
d) `['03', '/', '07', '/', '2018']`

12. What is the return value of the string method `lstrip()`?

a) the string with all whitespaces removed
b) the string with all leading whitespaces removed
c) the string with all leading tabs removed
d) the string with all leading spaces removed

13. Which method would you use to determine whether a certain substring is the suffix of a string?

a) `endswith(substring)`

b) `find(substring)`

c) `replace(string, substring)`

d) `startswith(substring)`

PROGRAMS

14. Write a program that counts the number of digits, non-digit characters, whitespace characters and words in a given string.

15. Write a program that asks the user to enter a sentence and checks whether the sentence contains more than one space between words. If so, the program should remove the extra spaces. For example, "Hello World" should be "Hello World". (Hint: Use split and join.)

16. *(Check SSN)* Write a program that prompts the user to enter a Social Security number in the format ddd-dd-dddd, where d is a digit. The program displays Valid SSN for a correct Social Security number or Invalid SSN otherwise.

17. *(Check substrings)* You can check whether a string is a substring of another string by using the `find` method. Write your own function to implement find. Write a program that prompts the user to enter two strings and then checks whether the first string is a substring of the second string.

18. *(Occurrences of a specified character)* Write a function that finds the number of occurrences of a specified character in a string using the following header:

```
def count(s, ch):
```

The str class has the count method. Implement your method without using the count method. For example, `count("Welcome", 'e')` returns 2. Write a test program that prompts the user to enter a string followed by a character and displays the number of occurrences of the character in the string.

19. *(Occurrences of a specified string)* Write a function that counts the occurrences of a specified non-overlapping string s2 in another string s1 using the following header:

```
def count(s1, s2):
```

For example, `count("system error, syntax error", "error")` returns 2. Write a test program that prompts the user to enter two strings and displays the number of occurrences of the second string in the first string.

20. (Reverse a string) Write a function that reverses a string. The header of the function is:

```
def reverse(s):
```

Write a test program that prompts the user to enter a string, invokes the reverse function, and displays the reversed string.

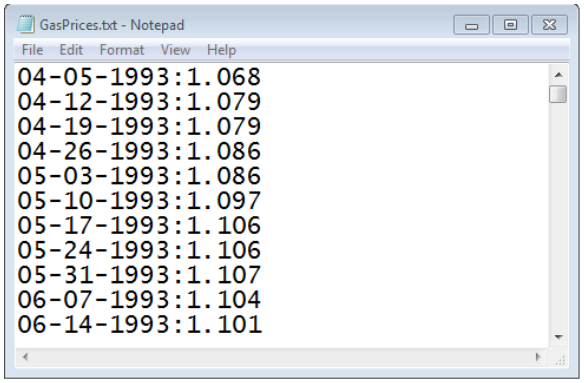
21. (*Bioinformatics: find genes*) Biologists use a sequence of letters **A**, **C**, **T**, and **G** to model a *genome*. A *gene* is a substring of a genome that starts after a triplet **ATG** and ends before a triplet **TAG**, **TAA**, or **TGA**. Furthermore, the length of a gene string is a multiple of **3** and the gene does not contain any of the triplets **ATG**, **TAG**, **TAA**, and **TGA**. Write a program that prompts the user to enter a genome and displays all genes in the genome. If no gene is found in the input sequence, the program displays **no gene is found**. Here are the sample runs:

```
Enter a genome string: TTATGTTTTAAGGATGGGGCGTTAGTT Enter
TTT
GGGCGT
```

```
Enter a genome string: TGTGTGTATAT Enter
no gene is found
```

22. Write a program that gets strings containing a person's first and last name as separate values, and then displays their "initials", "name in address book", and "username". For example, if the user enters a first name of "John" and a last name of "Smith", the program should display "J.S.", "John SMITH", and "jsmith".

23. In the student sample program files for this chapter, you will find a text file named `GasPrices.txt`. The file contains the weekly average prices for a gallon of gas in the United States, beginning on April 5th, 1993, and ending on August 26th, 2013. Below figure shows an example of the first few lines of the file's contents:



Each line in the file contains the average price for a gallon of gas on a specific date. Each line is formatted in the following way:

```
MM-DD-YYYY:Price
```

`MM` is the two-digit month, `DD` is the two-digit day, and `YYYY` is the four-digit year. `Price` is the average price per gallon of gas on the specified date.

For this assignment, you are to write one program that read the contents of the file and prints the dates when the gas prices are highest and lowest along with the prices.
(You can access the `GasPrices.txt` *from Google Classroom)*

24. The file named `text.txt` stores some text as one sentence per line. Write a program that reads the file's contents and calculates the average number of words per sentence.
(You can access the `text.txt` *from Google Classroom)*