

Python Assignment

Tips:

1. Try to first write the code in english steps then convert it to python code.
2. There are many string functions available at the [documentation link](#)
3. First try yourself and then ask others how did they do it?
4. Some exercises are tough and may take more time. So don't worry if it doesn't get solved quickly

1. Consider the following three statements. Do they change the value printed for A?

- a. A = "spam"
- b. B = A
- c. B = "shrubbery"

2. Consider these three statements. Do they change the printed value of A?

- a. A = ["spam"]
- b. B = A
- c. B[0] = "shrubbery"

3. How about these—is A changed now?

- a. A = ["spam"]
- b. B = A[:]
- c. B[0] = "shrubbery"
- d.

4. Write a program that takes the name of an user. The program should respond with a message that says hello to the user, using his or her name.

5. Write a program that takes the width and length of a room. Once the values have been read, your program should compute and display the area of the room. The length and the width will be entered as

floating point numbers. Include units in your prompt and output message; either feet or meters, depending on which unit you are more comfortable working with.

6. Write a program that reads a positive integer, n , from the user and then displays the sum of all of the integers from 1 to n . The sum of the first n positive integers can be computed using the formula:

$$\text{sum} = (n)(n + 1) / 2$$

7. Create a program that reads two integers, a and b , from the user. Your program should compute and display:

- a. Sum of a and b
- b. Difference when b is subtracted from a
- c. Product of a and b
- d. Quotient when a is divided by b
- e. Remainder when a is divided by b
- f. Result of a to the power of b

8. Many people think about their height in feet and inches, even in some countries that primarily use the metric system. Write a program that reads a number of feet from the user, followed by a number of inches. Once these values are read, your program should compute and display the equivalent number of centimeters.

Hint: One foot is 12 inches. One inch is 2.54 centimeters.

9. Create a program that reads three integers from the user and displays them in sorted order (from smallest to largest). Use the `min` and `max` functions to find the smallest and largest values. The middle value can be found by computing the sum of all three values, and then subtracting the minimum value and the maximum value.

10. The length of a month varies from 28 to 31 days. In this exercise you will create a program that reads the name of a month from the

user as a string. Then your program should display the number of days in that month. Display “28 or 29 days” for February so that leap years are addressed.

11. In this exercise you will create a program that computes the average of a collection of values entered by the user. The user will enter 0 as a sentinel value to indicate that no further values will be provided. Your program should display an appropriate error message if the first value entered by the user is 0.

Hint: Because the 0 marks the end of the input it should **not** be included in the average.

12. Write a program that implements Newton’s method to compute and display the square root of a number entered by the user. The algorithm for Newton’s method follows:

```
Read x from the user
Initialize guess to x/2
While guess is not good enough do
    Update guess to be the average of guess and x/guess
```

When this algorithm completes, *guess* contains an approximation of the square root. The quality of the approximation depends on how you define “good enough”. In the author’s solution, *guess* was considered good enough when the absolute value of the difference between *guess* * *guess* and *x* was less than or equal to 10⁻¹².

13. Write a function that takes the lengths of the two shorter sides of a right triangle as its parameters. Return the hypotenuse of the triangle, computed using Pythagorean theorem, as the function’s result. Include a main program that reads the lengths of the shorter sides of a right triangle from the user, uses your function to compute the length of the hypotenuse, and displays the result.

14. Write a function that takes three numbers as parameters, and returns the median value of those parameters as its result. Include a main program that reads three values from the user and displays their median.
Hint: The median value is the middle of the three values when they are sorted into ascending order. It can be found using if statements, or with a little bit of mathematical creativity.
15. Many people do not use capital letters correctly, especially when typing on small devices like smart phones. In this exercise, you will write a function that capitalizes the appropriate characters in a string. A lowercase “i” should be replaced with an uppercase “I” if it is both preceded and followed by a space. The first character in the string should also be capitalized.
16. In a particular jurisdiction, older license plates consist of three letters followed by three numbers. When all of the license plates following that pattern had been used, the format was changed to four numbers followed by three letters.
Write a function that generates a random license plate. Your function should have approximately equal odds of generating a sequence of characters for an old license plate or a new license plate. Write a main program that calls your function and displays the randomly generated license plate.
17. Write a program that reads integers from the user and stores them in a list. Use 0 as a sentinel value to mark the end of the input. Once all of the values have been read your program should display them (except for the 0) in reverse order, with one value appearing on each line.

18. Questions 1-11, assume you have the following representation of the string

Write the answers manually without running the code.

`schoolName = "Washington-Lee H.S."`

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
W	a	s	h	i	n	g	t	o	n	-	L	e	e		H	.	S	.

What is:

1. `schoolName[0]`
2. `schoolName[6]`
3. `schoolName[3:8]`
4. `schoolName[:10]`
5. `schoolName[15:]`
6. `schoolName[19]`
7. `len(schoolName)`
8. `len("")`
9. What range specifies "Lee"?
10. If you had a variable called **sample**, how could you return the last character, even if you didn't know its length?
11. Create a string "The quick brown fox jumps over the lazy dog." in a variable `s`
 - Print out the first letter in `s` using the brackets (e.g. `s[NUM]`)
 - Print out the letter "q" using `s` and the index 4
 - Print out the letter "x" using `s` and the corresponding index
 - Using string slicing, print out the word "brown"
 - Using string slicing, print out the word "lazy"
 - Using string slicing, print out starting at the word "jumps" through the end of the string

12. Use the string variable `s` from Question 11. Create a loop that prints out every letter in the variable `s`
 13. Use the string variable `s` from Question 11. Create a loop that prints out every letter in `s` backwards starting from the end.
 14. Use the string variable `s` from Question 11. Create a loop that prints out every other letter in `s` starting from the beginning
19. Morse code is an encoding scheme that uses dashes and dots to represent numbers and letters. In this exercise, you will write a program that uses a dictionary to store the mapping from letters and numbers to Morse code. Use a period to represent a dot, and a hyphen to represent a dash. The mapping from letters and numbers to dashes and dots is shown in
- Your program should read a message from the user. Then it should translate each letter and number in the message to Morse code, leaving a space between each sequence of dashes and dots. Your program should ignore any characters that are not letters or numbers. The Morse code for Hello, World! is shown below:

. - . . . - . . - - - . - - - - - . - . . - . . - . .

Table 6.1 Morse Code Letters and Numbers

Letter	Code	Letter	Code	Letter	Code	Number	Code
A	. -	J	. - - -	S	. . .	1	. - - - -
B	- . . .	K	- . -	T	-	2	. . - - -
C	- . - .	L	. - . .	U	. . -	3	. . . - -
D	- . .	M	- -	V	. . . -	4 -
E	.	N	- .	W	. - -	5
F	. . - .	O	- - -	X	- . . -	6	-
G	- - .	P	. - - .	Y	- . - -	7	- - . . .
H	Q	- - . -	Z	- - . .	8	- - - . .
I	. .	R	. - .	0	- - - - -	9	- - - - .

20. Create a program that determines and displays the number of unique characters in a string entered by the user. For example, Hello, World! has 10 unique characters while zzz has only one unique character. Use a dictionary to solve this problem.
21. Write a function that takes the lengths of the two shorter sides of a right triangle as its parameters. Return the hypotenuse of the triangle, computed using Pythagorean theorem, as the function's result.
22. Write a function that takes a string of characters as its first parameter, and the width of the terminal in characters as its second parameter. Your function should return a new string that consists of the original string and the correct number of leading spaces so that the original string will appear centered within the provided width when it is printed. Do not add any characters to the end of the string.
23. In this exercise you will write a function named `isInteger` that determines whether or not the characters in a string represent a valid integer. When determining if a string represents an integer you should ignore any leading or trailing white space. Once this white

space is ignored, a string represents an integer if its length is at least 1 and it only contains digits, or if its first character is either + or - and the first character is followed by one or more characters, all of which are digits.

24. A prime number is an integer greater than 1 that is only divisible by one and itself. Write a function that determines whether or not its parameter is prime, returning True if it is, and False otherwise. Write a function that reads an integer from the user and displays a message indicating whether or not it is prime.
25. Write a function that determines how many days there are in a particular month. Your function will take two parameters: The month as an integer between 1 and 12, and the year as a four digit integer. Ensure that your function reports the correct number of days in February for leap years. Include a main program that reads a month and year from the user and displays the number of days in that month.