

Before you turn this problem in, make sure everything runs as expected. First, **restart the kernel** (in the menubar, select Kernel→Restart) and then **run all cells** (in the menubar, select Cell→Run All).

Make sure you fill in any place that says `YOUR CODE HERE` or "YOUR ANSWER HERE", as well as your name and collaborators below:

0.0.1 ICS 104 - Introduction to Programming in Python and C

1 Programming with numbers and Strings 2

1.1 Lab Learning Outcomes

- learn how to use Python strings.
- create programs that read and process inputs, and display the results.

1.2 Some String Methods (Section 2.4.5 in the textbook)

1.2.1 The notion of an object and associated methods

- an object is a software entity that represents a **value** with certain **behavior**.
 - The value can be simple, such as a **string** or complex, such as a **data file**.
 - The behavior of an object is given through its **methods**.
- A method, like a function, is a collection of programming instructions that carry out a particular task.
 - But unlike a function, which is a standalone operation, a method can only be applied to an object of the type for which it was defined.

1.2.2 An example

- Consider the `upper` method associated with strings

```
In [1]: 1 #don't modify the content of this cell just run it
        2 from IPython.core.magic import (register_line_magic,
        3                                     register_cell_magic)
        4 _store = {}
        5 ip = get_ipython()
        6 @register_cell_magic
        7 def code(line, cell):
        8     _store[line.strip()]=cell
        9     ip.run_cell(cell)
```

```
In [2]: 1 name = "John Smith" # name is the object
        2 uppercaseName = name.upper() # upper is the method
        3 print(uppercaseName)
        4 print(name)
```

JOHN SMITH
John Smith

- Note here that the `upper` method results in a new string, i.e., it does NOT UPDATE the current string.

1.2.3 Summary of some string methods

Method	Returns
<code>s.lower()</code>	A lowercase version of string <i>s</i> .
<code>s.upper()</code>	An uppercase version of <i>s</i> .
<code>s.replace(old, new)</code>	A new version of string <i>s</i> in which every occurrence of the substring <i>old</i> is replaced by the string <i>new</i> .

1.3 Exercises

1.3.1 Exercise 1

Write a program that prompts the user for his < first name >, his < middle name > and his < last name >. Then, your program should print the full name as follows: < last name >, < first name > < middle name >, such that all letters of the names are capitalized. For example, the following is a sample run:

```
Please enter your first name: ahmad
Please enter your second name: saleem
Please enter your last name: Al-Jasir
AL-JASIR, AHMAD SALEEM
```

```
In [1]: 1 # YOUR CODE HERE
        2 firstName = input("Please enter your first name: ")
        3 upperFirstName = firstName.upper()
        4 secondName = input("Please enter your second name: ")
        5 upperSecondName = secondName.upper()
        6 lastName = input("Please enter your last name: ")
        7 upperLastName = lastName.upper()
        8 print(upperLastName+',',upperFirstName,upperSecondName)
```

```
Please enter your first name: ahmed
Please enter your second name: fdgsf
Please enter your last name: dsfgdsf
DSFGDSF, AHMED FDGSF
```

In []:

1

In []:

1

In []:

1

1.3.2 Exercise 2

Write a program that computes the first and last digit of a number. For example, if the input is 23456, the program should print 2 and 6. Hint: Use strings.

sample run:

Enter a number: 23134

2 4

In [3]:

1

2 # YOUR CODE HERE

3 string = input("Enter a number: ")

4 n = len(string)

5 print(string[0],string[n-1])

Enter a number: 235436456758875

2 5

In []:

1

In []:

1

In []:

1

1.3.3 Exercise 3

The following pseudocode describes how to turn a string containing a ten-digit phone number (such as "4155551212") into a more readable string with parentheses and dashes, like this: "(415) 555-1212".

Take the string consisting of the first three characters and surround it with "(" and ")" . This is the area code.
Concatenate the area code, the string consisting of the next three characters, a hyphen, and the string consisting of the last four characters. This is the formatted number.

Translate this pseudocode into a Python program that reads a telephone number into a string variable, computes the formatted number, and prints it.

sample run:

Enter a telephone number: 0138604444

(013) 860-4444

In [1]:

1

2 # YOUR CODE HERE

3 telephoneNumber = input("Enter a telephone number: ")

4 print('(' + telephoneNumber[0:3] + ')', telephoneNumber[3:6] + '-' + telephoneNumber[6:10])

Enter a telephone number: 0123456789

(012) 345-6789

In []:

1

In []:

1

In []:

1

1.3.4 Exercise 4

Write a program that prompts the user for two integers and then prints

- The sum
 - The difference
 - The product
 - The average
 - The distance (absolute value of the difference)
 - The maximum (the larger of the two)
 - The minimum (the smaller of the two)
- properly aligned, as shown below.

sample run:

Enter the first number: 20

Enter the second number: 25

Sum:	45
Difference:	-5
Product:	500
Average:	22.50
Distance:	5
Maximum:	25
Minimum:	20

In [2]:

1

2 # YOUR CODE HERE

3 num1= int(input("Enter the first number: "))

4 num2= int(input("Enter the second number: "))

5 theSum = num1 + num2

6 diff = num1 - num2

7 product = num1 * num2

8 average = (num1 + num2)/2

9 dis = abs(num1-num2)

10 maxX = max(num1,num2)

11 miN = min(num1,num2)

12 print("%-10s%10d" % ("Sum:",theSum))

20 25 45 -5 500 22.50 5 25 20

```
13 print("%-10s%9d" % ("Difference:",diff))
14 print("%-10s%10d" % ("Product:",product))
15 print("%-10s%13.2f" % ("Average:",average))
16 print("%-10s%10d" % ("Distance:",dis))
17 print("%-10s%10d" % ("Maximun:",maX))
18 print("%-10s%10d" % ("Minimun:",min))
19
```

```
Enter the first number: 12
Enter the second number: 23
Sum:          35
Difference:   -11
Product:      276
Average:      17.50
Distance:     11
Maximun:      23
Minimun:      12
```

In []: 1

In []: 1

In []: 1

In []: 1

In []: 1

In []: 1

In []: 1