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1 # =====
2 # LAB 2 Import and Headings
3 # =====
4 import math
5 # Docstrings lines for current exercises are minimized in screenshots and enclosed in double quotes, output still shown
6 # Functions to keep CONSTANTS and variables in local scope to not affect output of lab_2(a-e) code
7 # _Prefix before CONSTANTS for PyCharm and VSCode lowercase naming warnings
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22 # LAB 2A
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```

anguyen798 +1
def lab_2a_print(cansPerPack: int = 6, litersPerBottle: int = 2):
    """..."""
    _OUNCES_PER_CAN = int(12)
    _OUNCES_PER_PACK = cansPerPack * _OUNCES_PER_CAN
    _OUNCES_PER_LITER = 33.814
    _OUNCES_PER_BOTTLE = litersPerBottle * _OUNCES_PER_LITER

    if cansPerPack == 6 and litersPerBottle == 2:
        print(
            f'\033[4mLab2A with default values: {cansPerPack} cans per pack'
            f'and {litersPerBottle} liters per bottle.\033[0m')
    else:
        print(
            f'\033[4mLab2A with custom values: {cansPerPack} cans per pack'
            f'and {litersPerBottle} liters per bottle.\033[0m')
    print("A", cansPerPack, "-pack of soda has %.2f" % _OUNCES_PER_PACK, "ounces")
    print("A", litersPerBottle, "-liter bottle of soda has %.2f" % _OUNCES_PER_BOTTLE, "ounces")
    if _OUNCES_PER_PACK > _OUNCES_PER_BOTTLE:
        print("You should buy the", cansPerPack, "-pack of soda because %.2f" % _OUNCES_PER_PACK,
              "ounces > the", litersPerBottle, "-liter bottle of soda with %.2f" % _OUNCES_PER_BOTTLE, "ounces")
    elif _OUNCES_PER_PACK < _OUNCES_PER_BOTTLE:
        print("You should buy the", litersPerBottle, "-liter of soda because %.2f" % _OUNCES_PER_BOTTLE,
              "ounces > the", cansPerPack, "-pack of soda with %.2f" % _OUNCES_PER_PACK, "ounces")
    print("-" * 50)

lab_2_heading(letter="A")
lab_2a_print()
lab_2a_print(30, 5)
print(lab_2a_print.__doc__)
```

A_Code

```
Run - cs131-47853-homework
Run: nguyen_albert_Lab_2 x
C:\Python311\python.exe "D:\github.com\anguyen798\cs131-47853-homework\Chapter 2\nguyen_albert_Lab_2.py"
*****
LAB_2A
-----
Lab2A with default values: 6 cans per pack and 2 liters per bottle.
A 6 -pack of soda has 72.00 ounces
A 2 -liter bottle of soda has 67.63 ounces
You should buy the 6 -pack of soda because 72.00 ounces > the 2 -liter bottle of soda with 67.63 ounces
-----
Lab2A with custom values: 30 cans per pack and 5 liters per bottle.
A 30 -pack of soda has 360.00 ounces
A 5 -liter bottle of soda has 169.07 ounces
You should buy the 30 -pack of soda because 360.00 ounces > the 5 -liter bottle of soda with 169.07 ounces
-----

Soft drinks are sold in cans and bottles. A store offers a six-pack of
12-ounce cans for the same price as a two-liter bottle.
Which should you buy? (1 liter is 33.814 ounces)

You will need the following variables:
List of variables      Type of #
Number of cans per pack  Whole number
Ounces per can          Whole number
Ounces per bottle       Number with fraction

Write a program that calculates the capacity of soda in a six-pack of soda and print it.
Print a statement at the end that states which is the better buy.
Your program should demonstrate the use of variables and constants.
:param cansPerPack: lab_2a_print(\ **cansPerPack**\;int, litersPerBottle:int)
:param litersPerBottle: lab_2a_print(cansPerPack:int, \ **litersPerBottle**\;int)
:return:
```

A_Console

```
73 # =====
74 # LAB 2B
75 # =====
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77
78 ± anguyen798 +1
79 def lab_2b_print(x: int, y: int):
80     """..."""
81     _LAB_2B_SUM = x + y
82     _LAB_2B_DIFFERENCE = x - y
83     _LAB_2B_PRODUCT = x * y
84     _LAB_2B_AVERAGE = (x + y) / 2
85     _LAB_2B_DISTANCE = abs(x - y)
86     _LAB_2B_MAXIMUM = max(x, y)
87     _LAB_2B_MINIMUM = min(x, y)
88     print("For x =", x, "and y =", y, ":")
89     print("Sum =", _LAB_2B_SUM)
90     print("Difference =", _LAB_2B_DIFFERENCE)
91     print("Product =", _LAB_2B_PRODUCT)
92     print("Average =", _LAB_2B_AVERAGE)
93     print("Distance =", _LAB_2B_DISTANCE)
94     print("Maximum =", _LAB_2B_MAXIMUM)
95     print("Minimum =", _LAB_2B_MINIMUM)
96     print("-" * 50)
97
98
99 lab_2_heading(letter="B")
100 lab_2b_print(x=3, y=8)
101 lab_2b_print(x=-2, y=0)
102 lab_2b_print(x=-5, y=-1)
103 lab_2b_print(x=-4, y=4)
104 print(lab_2b_print.__doc__)
105 # lab_2b_print(x=int(input("Enter x = ")), y=int(input("Enter y = "))) # manual input example
```

B_Code

```
Run - cs131-47853-homework
Run: nguyen_albert_Lab_2 x
*****
LAB 2B
-----
For x = 3 and y = 8 :
Sum = 11
Difference = -5
Product = 24
Average = 5.5
Distance = 5
Maximum = 8
Minimum = 3
-----
For x = -2 and y = 0 :
Sum = -2
Difference = -2
Product = 0
Average = -1.0
Distance = 2
Maximum = 0
Minimum = -2
-----
For x = -5 and y = -1 :
Sum = -6
Difference = -4
Product = 5
Average = -3.0
Distance = 4
Maximum = -1
Minimum = -5
-----
For x = -4 and y = 4 :
Sum = 0
Difference = -8
Product = -16
Average = 0.0
Distance = 8
Maximum = 4
Minimum = -4
-----

Given two integers, write a program that 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)

Hint: Python defines max and min functions that accept a sequence of values, each
separated with a comma.

Test your program with the following integers:
3, 8
-2, 0

Run - cs131-47853-homework
Run: nguyen_albert_Lab_2 x
-5, -1
-4, 4

:param x: lab_2b_print(****, y);
value for equations: **** + y; **** - y; **** * y; (**** + y)/2; abs(**** - y); max(****, y); min(****, y)
:param y: lab_2b_print(x, ****);
value for equations: x + ****; x - ****; x * ****; (x + ****)/2; abs(x - ****); max(x, ****); min(x, ****)
:return: None
```

```
129 # =====
130 # LAB 2C
131 # =====
132
133
134 ± anguyen798 +1
135
136 def lab_2c_print(x: int = 10, y: int = 6, a: int = 2, b: int = 8, c: int = 1):
137     """..."""
138     _LAB_2C_SQRT = math.sqrt(x + y)
139     _LAB_2C_QUADRATIC = -b + math.sqrt(b ** 2 - 4 * a * c) / (2 * a)
140     _LAB_2C_EXPONENT = x ** (y + 7)
141     if x == 10 and y == 6 and a == 2 and b == 8 and c == 1:
142         print(
143             f'\033[4mLab2C with default values: x = {x}, y = {y}, a = {a}, b = {b}, c = {c}.\033[0m')
144     else:
145         print(
146             f'\033[4mLab2C with custom values: x = {x}, y = {y}, a = {a}, b = {b}, c = {c}.\033[0m')
147     print("For x =", x, ", y =", y, ". The square root of x + y =", _LAB_2C_SQRT, # normal format
148           "or %.2f" % _LAB_2C_SQRT) # %f format
149     print("For a =", a, ", b =", b, ", c =", c,
150           ". The quadratic formula for (-b + sqrt(b^2 - 4ac))/2a =", _LAB_2C_QUADRATIC,
151           "or %-10f" % _LAB_2C_QUADRATIC, # %f format but with left-justify and without .2f to show un-rounded value
152           "or", f'_{LAB_2C_QUADRATIC:.2f}') # f-string format
153     print("For x =", x, ", y =", y, ". The formula x ^ (y + 7) =", f'_{LAB_2C_EXPONENT:,}') # f-string format
154     print("-" * 50)
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167
168 lab_2_heading(letter="C")
169 lab_2c_print()
170 lab_2c_print(2, 10, 10, 20, 4)
171 print(lab_2c_print.__doc__)
```

C_Code

```
Run - cs131-47853-homework
Run: nguyen_albert_Lab_2 x
*****
LAB_2C
-----
Lab2C with default values: x = 10, y = 6, a = 2, b = 8, c = 1.
For x = 10, y = 6. The square root of x + y = 4.0 or 4.00
For a = 2, b = 8, c = 1. The quadratic formula for  $(-b \pm \sqrt{b^2 - 4ac})/2a$  = -6.12917130661303 or -6.129171 or -6.13
For x = 10, y = 6. The formula  $x^y$  = 10,000,000,000,000
-----
Lab2C with custom values: x = 2, y = 10, a = 10, b = 20, c = 4.
For x = 2, y = 10. The square root of x + y = 3.4641016151377544 or 3.46
For a = 10, b = 20, c = 4. The quadratic formula for  $(-b \pm \sqrt{b^2 - 4ac})/2a$  = -19.22540330758517 or -19.225403 or -19.23
For x = 2, y = 10. The formula  $x^y$  = 131,072
-----

Find and print the result of the following 3 equations:
x=10
y=6
a=2
b=8
c=1
:param x: value for equations:  $\sqrt{x-y}$  and  $x^{y+7}$ 
:param y: value for equations:  $\sqrt{x-yy}$  and  $x^{yy+7}$ 
:param a: value for equation:  $(-b \pm \sqrt{b^2 - 4c})/2a$ 
:param b: value for equation:  $(-b \pm \sqrt{b^2 - 4ac})/2a$ 
:param c: value for equation:  $(-b \pm \sqrt{b^2 - 4ac})/2a$ 
:return:
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C_Console

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```

226 print("%s" % initials)
227 print("The length of my name is %s letters (without spaces) and %s letters with spaces"
228       % (len(fullName.replace(" ", "")), len(fullName))) # 2nd line due to PEP8 over character limit
229 # print(f'The length of my full name is {len(fullName)}') # length of name in f-string format
230 print("%sers" % 49)
231 # print("{0}ers".format(49)) # using .format instead of %s specifier
232 print("My age in 10 years is %s" % (age + 10))
233 if age > 122:
234     print("Your age is %s. Are you are a vampire?" % age)
235 print(" " * 50 + "'s")
236
237
238 lab_2_heading(letter="D")
239 lab_2d_print()
240 print("-" * 50)
241 print(lab_2d_print.__doc__)
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D_Code


```
Run - cs131-47853-homework
Run: nguyen_albert_Lab_2 x
*****
LAB_2D
*****
Please enter your first name in using lowercase letters: albert123456
Your first name was entered as albert123456. This format is not in lowercase or is a number
Please enter your first name in using lowercase letters: albert
Please enter your last name in using lowercase letters: NGUYEN!!!!!!
Your last name was entered as NGUYEN!!!!!! This format is not in lowercase or is a number
Please enter your last name in using lowercase letters: nguyen
Please enter your age: A90
Your age was entered as A90. This format is not an integer
Please enter your age: 90
*****
          Albert Nguyen
ALBERT NGUYEN
A N
The length of my name is 12 letters (without spaces) and 13 letters with spaces
49ers
My age in 10 years is 100
                                     's
-----

Prompt the user to enter their first name using only lowercase letters and store it into a variable,
then prompt the user to enter their last name (also in all lowercase) and store it.
Prompt the user to enter their age and convert it to an integer and store it.
Concatenate your first and last name and store it in a third variable.
Print the following:
-a line of 50 stars (String repetition)
-your full name by incorporating a format specifier so that your name is left-justified and uses 25 spaces
-your full name in all caps using a string method
-your initials (using the square brackets )
-the length of your name (sample statement: "the length of my full name is 12")
-49ers (convert the number 49 to a string)
-print how old you will be in ten years by adding
-a line of 50 *'s
:param middleName: Boolean; default is False; True to enable input of middle name
:return: None
```

D_Console

```

242 # =====
243 # LAB 2E
244 # =====
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# =====
# LAB 2E
# =====

anguyen798 +1

def lab_2e_print(phoneNumber=0000000000):
    """
    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 concat 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."

    Sample Output:
    The phone number is: 8884554415
    The formatted number is: (888) 455-4415
    :param phoneNumber: lab_2e_print(phoneNumber=\ **phoneNumber(int)**\ )
    :return: None
    """
    phoneNumber = "%09.f" % phoneNumber
    phoneNumberFormatted = "(" + phoneNumber[:3] + ")" + " " + phoneNumber[3:6] + "-" + phoneNumber[-4:]
    # start at array[0] to before array[3], start at array[3] to before array[6], start at array[len(variable) -4 = 9-4]
    # phoneNumberFormatted = f'({phoneNumber[:3]}) {phoneNumber[3:6]}-{phoneNumber[6:]}' # f-string code
    print("The phone number is: " + phoneNumber)
    print("The formatted number is: " + phoneNumberFormatted)
    print("-" * 50)

lab_2_heading(letter="E")
lab_2e_print()
lab_2e_print(phoneNumber=884554415)
print(lab_2e_print.__doc__)

```

E_Code

```
Run - cs131-47853-homework
Run: nguyen_albert_Lab_2 x
*****
LAB_2E
*****
The phone number is: 0000000000
The formatted number is: (000) 000-0000
*****
The phone number is: 884554415
The formatted number is: (884) 554-4415
*****

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 concat 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."

Sample Output:
The phone number is: 8884554415
The formatted number is: (888) 455-4415
:param phoneNumber: lab_2e_print(phoneNumber=\ **phoneNumber(int)**\ )
:return: None

Process finished with exit code 0
|
```

E_Console