Fundamentals of Computer Programming

Building a Programming Portfolio

Week 4

You should be able to complete the following programs by the end of the week. You should keep the code somewhere safe, in an organised way. GitHub is ideal. Wherever you choose, you should ensure that the work is safe and backed up.

Possible solutions will be uploaded to the main module GitHub repository every week. If you follow that repo you should be able to receive notifications.

1.   Functions are often used to validate input. Write a *function* that accepts a single integer as a parameter and returns `True` if the integer is in the range 0 to 100 (inclusive), or `False` otherwise. Write a short program to test the function.

```
C: > Users > lenovo > AppData > Local > Temp > af33d500-4
    1  ∨  def testcase(x):
    2  ∨       if x >= 0 and x<=100:
    3               print("True")
    4  ∨       else:
  ● 5               print("False")
    6
    7     num = int(input("Enter a number: "))
    8
    9     testcase(num)
   10
```

```
PROBLEMS    OUTPUT    TERMINAL    •••                        ⊵

PS C:\Users\lenovo> & C:/Users/lenovo/AppData/Lo
2/python.exe "c:/Users/lenovo/AppData/Local/Temp
637a5ea9f_week 4.rar.a9f/week 4/Exercise 1.py"
Enter a number: 5
True
PS C:\Users\lenovo> & C:/Users/lenovo/AppData/Lo
2/python.exe "c:/Users/lenovo/AppData/Local/Temp
637a5ea9f_week 4.rar.a9f/week 4/Exercise 1.py"
Enter a number: 101
False
PS C:\Users\lenovo> █
```

2.   Write a function that has a single string as its parameter, and returns the number of uppercase letters, and the number of lowercase letters in the string. Test the function with a short program.

```
Exercise 2.py > ...
  1    def teststring(name):
  2        upper = 0
  3        lower = 0
  4        for x in name:
  5            if ord(x) >= 65 and ord(x)<= 90:
  6                upper = upper + 1
  7            elif ord(x) >= 97 and ord(x) <= 122:
  8                lower = lower + 1
  9            else:
 10                continue
 11        print(f'There are {upper} uppercase letters and {lower} lowercase letters. ')
 12
 13    message = input("Enter a string: ")
 14    teststring(message)
 15    |
```

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS    SEARCH ERROR

PS C:\Users\lenovo\AppData\Local\Temp\3c7b5e6c-5684-4f09-bf72-154e8f25415a_week 4.rar.15a\we
a/Local/Programs/Python/Python312/python.exe "c:/Users/lenovo/AppData/Local/Temp/3c7b5e6c-56
week 4/focp week4/question2.py"
Enter a string: Hot Potato
There are 2 uppercase letters and 7 lowercase letters.
PS C:\Users\lenovo\AppData\Local\Temp\3c7b5e6c-5684-4f09-bf72-154e8f25415a_week 4.rar.15a\we
```

3. Modify your "greetings" program so that the first letter of the name entered is always in uppercase with the rest in lowercase. This should happen even if the user entered their name differently. So if the user entered arthur, ARTHUR, or even arTHur the name should be displayed as Arthur. Code-

```
Exercise 3.py > ...
  1    name = input("Enter your name: ")
  2
  3    def capitalize(text):
  4        if text:
  5            result = text[0].upper() + text[1:].lower()
  6            print(f'{result}')
  7        else:
  8            print("No name entered.")
  9
 10    capitalize(name)
 11
```

Output-

```
Enter your name: arthur
Arthur
PS C:\Users\lenovo\AppDat
```

4. When processing data it is often useful to remove the last character from some input (it is often a newline). Write and test a function that takes a string parameter and

returns it with the last character removed. (If the string contains one or fewer characters, return it unchanged.)

Code-

```python
name = input('Enter a name: ')

name1 = list(name)
n = len(name)

name1.pop(n-1)
name2 = ''.join(name1)

print(f'{name2}')
```

Output-

```
Enter a name: Anushka Thapa
Anushka Thap
PS C:\Users\lenovo\Desktop\FOCP
```

5. Write and test a function that converts a temperature measured in degrees centigrade into the equivalent in fahrenheit, and another that does the reverse conversion. Test both functions. (Google will find you the formulae). Code-

```python
def fartocel(x):
    c = (x- 32) * 5/9
    return c
def celtofar(x):
    f = x * (9/5) + 32
    return f

test = input("Enter a number.\n1.Fahrenheit to Celsius\n2.Celsius to Fahrenheit\n")

if int(test) == 1:
    temp1 = int(input("Enter the temperature in Fahrenheit: "))
    print(f'The temperature in Celsius is {fartocel(temp1)}')
elif int(test) == 2:
    temp2 = int(input("Enter the temperature in Celsius: "))
    print(f'The temperature in Fahrenheit is {celtofar(temp2)}')
else:
    print('Please enter a valid number.')
```

Output-

```
Enter a number.
1.Fahrenheit to Celsius
2.Celsius to Fahrenheit
1
Enter the temperature in Fahrenheit: 77
The temperature in Celsius is 25.0
PS C:\Users\lenovo\AppData\Local\Temp\3c7b!
a/Local/Programs/Python/Python312/python.e:
week 4/focp week4/Exercise 5.py"
Enter a number.
1.Fahrenheit to Celsius
2.Celsius to Fahrenheit
2
Enter the temperature in Celsius: 33
The temperature in Fahrenheit is 91.4
PS C:\Users\lenovo\AppData\Local\Temp\3c7b!
```

6.   Write a program that takes a centigrade temperature and displays the equivalent in fahrenheit. The input should be a number followed by a letter C. The output should be in the same format. Code-

```python
Exercise 6.py > ...
 1    def celtofar(celsius):
 2        return celsius * (9/5) + 32
 3
 4    cent = input("Enter temperature in Celsius (e.g., 25C): ")
 5    if cent.endswith("C") or cent.endswith("c"):
 6        cel = float(cent[:-1])
 7        fahrenheit = celtofar(cel)
 8        print(f"{fahrenheit:.2f}F")
 9    else:
10        print("Please enter in correct format.")
11
```

Output-

```
Enter temperature in Celsius (e.g., 25C): 25C
77.00F
PS C:\Users\lenovo\AppData\Local\Temp\3c7b5e6c-568
```

7.   Write a program that reads 6 temperatures (in the same format as before), and displays the maximum, minimum, and mean of the values.
Hint: You should know there are built-in functions for max and min. If you hunt, you might also find one for the mean. Code-

```python
Exercise 7.py > ...
1    print("Enter temperatures in Celsius (e.g., 36C/36c):")
2
3    celsius = []
4    for x in range(6):
5        temp = input('')
6        if temp.endswith("c") or temp.endswith("C"):
7            try:
8                celsius.append(float(temp[:-1]))
9            except ValueError:
10               print("Invalid input. Please enter a number before the 'C'.")
11       else:
12           print("Please enter the temperature in the correct format. ")
13
14
15   if celsius:
16       min1 = min(celsius)
17       max1 = max(celsius)
18       mean = sum(celsius) / len(celsius)
19       print(f'The minimum is {min1}, the maximum is {max1}, and the mean is {mean:.2f}.')
20   else:
21       print("No temperatures were entered.")
```

Output-

```
Enter temperatures in Celsius (e.g., 36C/36c):
36C
36C
37C
38C
25C
26C
27C
The minimum is 25.0, the maximum is 38.0, and the mean is 31.50.
PS C:\Users\lenovo\AppData\Local\Temp\3c7b5e6c-5684-4f09-bf72-154
```

8. Modify the previous program so that it can process *any number* of values. The input
    terminates when the user just pressed "Enter" at the prompt rather than entering a
    value. Code-

```python
Exercise 8A.py > ...
1    print("Enter temperatures in Celsius (e.g., 36C/36c).\nPress Enter to finish:")
2
3    celsius = []
4    while True:
5        temp = input('')
6        if temp == '':
7            break
8        elif temp.endswith('c') or temp.endswith("C"):
9            try:
10               celsius.append(int(temp[:-1]))
11           except ValueError:
12               print("Invalid input. Please enter a valid number before the 'C'.")
13       else:
14           print("Please enter the temperature in the correct format (e.g., 36C).")
15
16   if celsius:
17       min1 = min(celsius)
18       max1 = max(celsius)
19       mean = sum(celsius) / len(celsius)
20       print(f'The minimum temperature is {min1}°C, the maximum temperature is {max1}°C, and the mean temperature is {mean:.2f}°C.')
21   else:
22       print("No temperatures were entered.")
23
```

Output-

```
Enter temperatures in Celsius (e.g., 36C/36c).
Press Enter to finish:
21c
32c
44c
25c
36c

The minimum temperature is 21°C, the maximum temperature is 44°C, and the mean temperature is 31.60°C.
```

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