

Q1. 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.

Ans:

```
def is_in_range(value):  
    return 0 <= value <= 100  
  
def validate_input(value):  
    if is_in_range(value):  
        return True  
    else:  
        return False  
  
value= float(input("Enter your value:"))  
print(validate_input(value))
```

Output:

Enter your value:50

True

Q2. 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.

Ans:

```
def count_case(input_string):  
  
    uppercase_count = 0  
    lowercase_count = 0  
    for char in input_string:  
        if char.isupper():
```

```

        uppercase_count += 1
    elif char.islower():
        lowercase_count += 1

    return uppercase_count, lowercase_count

def test_count_case():
    test_string = "Hello World."
    uppercase, lowercase = count_case(test_string)
    print(f"String: {test_string}")
    print(f"Uppercase letters: {uppercase}")
    print(f"Lowercase letters: {lowercase}")

test_count_case()

```

Output:

String: Hello World.

Uppercase letters: 2

Lowercase letters: 8

- Q3. 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.

Ans:

```
def greet_user():
```

```
name = input("Please enter your name: ")
formatted_name = name.capitalize()
print(formatted_name)
```

```
greet_user()
```

Output:

Please enter your name: ghanshyam

Ghanshyam

- Q4. 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.)

```
def remove_last_character(input_string):
```

```
    if len(input_string) > 1:
        return input_string[:-1]
    return input_string
```

```
def test_remove_last_character():
```

```
    test_cases = [
        "Hello, World!",
        "Python",
        "A",
        "",
    ]
```

```
for test in test_cases:

    result = remove_last_character(test)

    print(f"Input: '{test}' | Output: '{result}'")
```

```
test_remove_last_character()
```

Output:

Input: 'Hello, World!' | Output: 'Hello, World'

Input: 'Python' | Output: 'Pytho'

Input: 'A' | Output: 'A'

Input: '' | Output: ''

Q5. *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).*

Ans:

```
def celsius_to_fahrenheit(celsius):
```

```
    return (celsius * 9/5) + 32
```

```
def fahrenheit_to_celsius(fahrenheit):
```

```
    return (fahrenheit - 32) * 5/9
```

```
print("Celsius to Fahrenheit:")
```

```
print(f"0°C = {celsius_to_fahrenheit(0)}°F")
```

```
print("Fahrenheit to Celsius:")
```

```
print(f"32°F = {fahrenheit_to_celsius(32)}°C")
```

Output:

Celsius to Fahrenheit:

$0^{\circ}\text{C} = 32.0^{\circ}\text{F}$

Fahrenheit to Celsius:

$32^{\circ}\text{F} = 0.0^{\circ}\text{C}$

- Q6. 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.

Ans:

```
def c_to_f(c):
```

```
    return (c * 9 / 5) + 32
```

```
def f_to_c(f):
```

```
    return (f - 32) * 5 / 9
```

```
while True:
```

```
    temp = input("Enter a temperature: ")
```

```
    if temp[-1] == 'C':
```

```
        print(temp, "=", c_to_f(float(temp[:-1])), "F")
```

```
    elif temp[-1] == 'F':
```

```
        print(temp, "=", f_to_c(float(temp[:-1])), "C")
```

```
    else:
```

```
print("Invalid Input")
```

Output:

Enter a temperature: 32 C

32 C = 89.6 F

Enter a temperature: -32C

-32C = -25.6 F

Enter a temperature:

Q7. 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.

Ans:

```
def convert_to_fahrenheit(celsius):
```

```
    return (celsius * 9/5) + 32
```

```
temperatures = []
```

```
for i in range(6):
```

```
    temp_input = input(f"Enter temperature {i+1} in Centigrade (e.g., 25 C): ")
```

```
    celsius = float(temp_input[:-1])
```

```
    fahrenheit = convert_to_fahrenheit(celsius)
```

```
    temperatures.append(fahrenheit)
```

```
max_temp = max(temperatures)
```

```
min_temp = min(temperatures)
```

```
mean_temp = sum(temperatures) / len(temperatures)
```

```
print(f"Maximum temperature: {max_temp} F")
print(f"Minimum temperature: {min_temp} F")
print(f"Mean temperature: {mean_temp:.2f} F")
```

Output:

```
Enter temperature 1 in Centigrade (e.g., 25 C): 25C
Enter temperature 2 in Centigrade (e.g., 25 C): 26C
Enter temperature 3 in Centigrade (e.g., 25 C): 27C
Enter temperature 4 in Centigrade (e.g., 25 C): 28C
Enter temperature 5 in Centigrade (e.g., 25 C): 29C
Enter temperature 6 in Centigrade (e.g., 25 C): 30C

Maximum temperature: 86.0 F
Minimum temperature: 77.0 F
Mean temperature: 81.50 F
```

- Q8. 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.

Ans:

```
def convert_to_fahrenheit(celsius):
    return (celsius * 9/5) + 32

temperatures = []

while True:
    temp_input = input("Enter temperature in Centigrade (e.g., 25 C) or press Enter to finish: ")
```

```
if temp_input == "":
    break

celsius = float(temp_input[:-1])
fahrenheit = convert_to_fahrenheit(celsius)
temperatures.append(fahrenheit)

if temperatures:
    print(f"Maximum temperature: {max(temperatures)} F")
    print(f"Minimum temperature: {min(temperatures)} F")
    print(f"Mean temperature: {sum(temperatures)/len(temperatures):.2f} F")
else:
    print("No temperatures entered.")
```

Output:

Enter temperature in Centigrade (e.g., 25 C) or press Enter to finish: 25C

Enter temperature in Centigrade (e.g., 25 C) or press Enter to finish: 26C

Enter temperature in Centigrade (e.g., 25 C) or press Enter to finish: 27C

Enter temperature in Centigrade (e.g., 25 C) or press Enter to finish:

Maximum temperature: 80.6 F

Minimum temperature: 77.0 F

Mean temperature: 78.80 F

