Work Sheet 3: Functions and classes

Writing Python programs that define and use functions and classes to solve problems.

1. Write a Python function to calculate the difference between a given number and 17. If the number is greater than 17, return twice the absolute difference.
2. Write a Python function test_range(n) that returns True if the number is within 100–1000 or 2000, otherwise returns False.
3. Write a Python function to reverse a string. Example: Input = 'robot', Output = 'tobor'.
4. Write a Python function that accepts a string and counts the number of uppercase and lowercase letters. Return the counts as a dictionary.
5. Write a Python function that takes a list and returns a new list with distinct elements from the first list.
6. Write a Python program to return the even numbers from a given list. Sample List : [1, 2, 3, 4, 5, 6, 7, 8, 9] Expected Result : [2, 4, 6, 8]
7. Write a Python program to define a function inside another function and call it. Example: Outer function = robot(), Inner function = move().
8. Define a Python function student(name, age, course). Using function attributes, display the names of all arguments.
9. Write a Python function move_robot(x, y, direction) that takes a robot's current position (x, y) and a direction ('up', 'down', 'left', 'right'). The function should return the new position of the robot. Example: move_robot(0,0,"up") → (0,1)
10. Write a Python function classify_temperature(temp) that classifies a robot's environment: Return "Cold" if temp < 15
    Return "Moderate" if 15 ≤ temp ≤ 30
    Return "Hot" if temp > 30
11. Write a Python function is_goal_reached(path) where path is a list of robot moves (["up", "right", "right", "down"]). The function should return True if the final position is at (2,0) starting from (0,0), otherwise False.

12. Write a Python class named Student with two attributes: student_id, student_name. Add a new attribute: student_class. Create a function to display all attributes and their values in the Student class.
13. Write a Python class named Student with two instances student1, student2 and assign values to the instances' attributes. Print all the attributes of the student1, student2 instances with their values in the given format.
14. Write a Python class named Circle constructed from a radius and two methods that will compute the area and the perimeter of a circle.
15. Write a Python class that has two methods: get_String and print_String , get_String accept a string from the user and print_String prints the string in upper case.
16. Write a Python class named Robot that has attributes: name, task, and battery_level. The class should have methods:

    perform_task() → Prints the task the robot is performing and decreases the battery by 10%.

    recharge() → Sets the battery level back to 100%.

    status() → Prints the robot's name, current task, and battery level.