NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES
FAST - PESHAWAR CAMPUS

Subject: Software Construction and Development Lab (CL-2001)
Instructor: Muhammad Saood Sarwar
Lab Task : 1

1. Binary Representation Checker

Learning Objectives: Bitwise operators and conditionals.

Task:

- Write a program that prompts the user for a number.
- Print whether the number is even or odd using bitwise operations (no modulus or division allowed).
- **Clean Code Focus**: Clear bitwise logic with meaningful names, concise code, and comments explaining the bitwise operation.

2. Shopping List with Quantity

Learning Objectives: Dictionaries and input validation.

Task:

- Create a dictionary that stores items as keys and their quantities as values.
- Allow the user to input an item and its quantity.
- If the item already exists, update the quantity; otherwise, add it to the dictionary.
- Display the final list of items and their quantities.
- **Clean Code Focus**: Clear variable names (shopping_list, item, quantity), input validation, and ensuring dictionary operations are clean and concise.

3. Recursive Palindrome Checker

Learning Objectives: Functions, recursion, strings, conditionals, and clean code.

Task:

- Write a program that checks whether a given string is a palindrome (a word, phrase, or sequence that reads the same backward as forward, ignoring spaces, punctuation, and case).
- The program should:
    1. Define a function clean_string(s) that removes spaces and converts it to lowercase.
    2. Define a recursive function is_palindrome(s) that:
        - Returns True if the string is a palindrome.
        - Returns False otherwise.

        - The function should compare the first and last characters of the string and then recursively check the substring that excludes these two characters.
    3. In the main part of the program, prompt the user to enter a string, clean it using clean_string(), and then check if it is a palindrome using is_palindrome().
    4. Print the result indicating whether the input string is a palindrome.
- **Clean Code Focus**:
    1. Ensure recursion is used effectively in the is_palindrome() function.
    2. Use meaningful function names and variable names.
    3. Keep the code modular with a clear separation of concerns.
    4. Comment on tricky parts of the code to explain the logic.