PYTHON PROGRAMMING ASSIGNMENT

Coding Exercises

Exercise 1: Prime Numbers

Write a Python program that checks whether a given number is prime or not. A prime number is a natural number greater than 1 that has no positive divisors other than 1 and itself.

Answer

```python
def is_prime(n):
    """Check if a number is prime."""
    if n <= 1:
        return False
    if n <= 3:
        return True
    if n % 2 == 0:
        return False
    i = 3
    while i * i <= n:
        if n % i == 0:
            return False
        i += 2
    return True
```

Exercise 2: Product of Random Numbers

Develop a Python program that generates two random numbers and asks the user to enter the product of these numbers. The program should then check if the user's answer is correct and display an appropriate message.

Answer:

```python
import random
def quiz_product():
    a = random.randint(2, 12)
    b = random.randint(2, 12)
    correct = a * b
    print(f"What is the product of {a} and {b}?")
    ans = int(input("Your answer: ").strip())
    if ans == correct:
        print("Correct! 🎉 ")
    else:
        print(f"Incorrect. The correct answer is {correct}.")
```

Exercise 3: Squares of Even/Odd Numbers

Create a Python script that prints the squares of all even or odd numbers within the range of 100 to 200. Choose either even or odd numbers and document your choice in the code.

Answer:

```python
def squares_even_100_200():
    """Return squares of even numbers between 100 and 200."""
    result = {}
    for x in range(100, 201):
        if x % 2 == 0:  # even
            result[x] = x * x
    return result
```

Exercise 4: Word counter

write a program to count the number of words in a given text.
example:
input_text = "This is a sample text. This text will be used to demonstrate the word counter."
Expected output:
'This': 2
'is': 1
'a': 1
'sample': 1
'text.': 1

Answer:

```python
from collections import Counter

def word_counter(text):
    """Count words in a given text (keeps punctuation)."""
    words = text.split()
    return Counter(words)
```

Exercise 5: Check for Palindrome

Write a Python function called is_palindrome that takes a string as input and returns True if the string is a palindrome, and False otherwise. A palindrome is a word, phrase, number, or other sequence of characters that reads the same forward and backward, ignoring spaces, punctuation, and capitalization.
Example:
Input: "racecar"
Expected Output: True

```python
import re

def is_palindrome(s):
    """Check if string is a palindrome (ignores spaces/punctuation/case)."""
```

```
cleaned = re.sub(r'[^A-Za-z0-9]', '', s).lower()
return cleaned == cleaned[::-1]
```