Murick Internship – AI & ML
Python Programming - Week 1

Question 1: Smart Calculator

Create a calculator that takes two numbers and an operator (+, -, *, /) from the user. Handle division by zero with a proper error message and display results in format: "5.0 + 3.0 = 8.0". Add support for power (**) and modulus (%) operations.

Question 2: Circle Properties Calculator

Write a program that takes a circle's radius and calculates both area and circumference using math.pi. Format output to 2 decimal places and validate that radius is positive.

Question 3: Enhanced Number Classifier

Create a program that analyzes a number and tells whether it's positive/negative/zero, even/odd, and if it's a perfect square. Also check if the number is a power of 2.

Question 4: Word Analysis Tool

Analyze a sentence and report total characters, word count, vowels/consonants count, and the longest word. Count the frequency of each letter (case-insensitive).

Question 5: Number Pattern Generator

Create a program that prints numbers 1 to 100, but replaces multiples of 3 with "Boom", multiples of 5 with "Crash", and multiples of both with "BoomCrash". Allow users to customize the range, divisors, and replacement words.

Question 6: Advanced String Checker

Check if a string is a palindrome (ignoring spaces, punctuation, case) and whether it contains only alphabetic characters. Also verify if parentheses () are balanced in the string.

Question 7: Interactive Guessing Game

Build a number guessing game with user-specified range, intelligent hints ("Much too high", "Close!", "Very close!"), attempt tracking, scoring system, and replay option. Implement multiple difficulty levels.

Question 8: Mathematical Sequence Generator

Create a program that generates Fibonacci sequences, prime numbers up to a limit, or perfect squares in a range based on user choice. Generate sequences that combine two types (like Fibonacci primes).

Question 9: Text Pattern Analyzer

Build a program that checks if two strings are anagrams, finds all anagrams of a word from a word list, implements basic spell-checking using edit distance, and finds the longest common subsequence between strings.

Question 10: Multi-Unit Converter System

Develop a comprehensive converter handling temperature (Celsius/Fahrenheit/Kelvin) and length (meters/feet/inches/kilometers/miles) with menu-driven selection.