Assignment Based on Generative Models

Submission Deadline: November 16, 2023

Group Assignment : Each group consists of 7-8 students, and the list of groups has already been shared(As per the class held on Sep 13, 2023).

Total Marks: 8

Distribution of Marks:

(i) Part (a): 6 marks

(ii) Part (b): 2 marks

(a) Activity Based on GitHub Copilot/Code Llama:

Write codes in C for the questions given below using prompts on either GitHub Copilot or Code Llama, or both (links for Code Llama are shared in the other file under Other useful tools section). Cross-check the generated results with your own code or logic and see what can be improved in the generated responses. There are ten questions, and each group member will have at least one question to attempt and understand properly. You are required to discuss all the questions and your findings among your group members as well.

1. Write a program to find all Pythagorean quadruples between two given numbers. (A Pythagorean quadruple (a, b, c, d) satisfies the equation a^2 + b^2 = c^2 + d^2).

2. Write a program to perform modular exponentiation of two numbers x and y modulo m. (Compute (x^y) % m efficiently using the repeated squaring method).

3. Write a program to find all prime factors of a given number using the sieve of Eratosthenes method.

4. Write a program to find the modulo multiplicative inverse of two numbers using the extended Euclidean algorithm.

5. Write a program to check if two numbers are coprime using the Euclidean algorithm to find the greatest common divisor (GCD). Print pairs of coprimes between a given range.

6. Write a program to find Euler's totient function phi(n) for a given number n. Phi(n) is the number of integers less than n that are coprime to n.

7. Write a program to find all prime numbers between two given numbers.

8. Write a program to find the Greatest Common Divisor (GCD) of two given numbers.

9. Write a program to find the Least Common Multiple (LCM) of two given numbers.

10. Write a program to check if two given numbers are coprime or not.

(b) Activity Based on Other Generative Models:

Utilize a minimum of three different websites or tools employing generative AI. You can leverage these tools to test your creativity as well as apply your understanding of topics covered in this course or other subjects. There are no limitations; feel free to experiment and explore the capabilities of these tools.

Things to include in the final submission:

You have to submit a Word or PDF file as a group, mentioning your group members in it. That file should include:

(i) Prompts for all ten questions along with their respective generated responses, as well as your findings/interpretations for each generated response.

(ii) At least three prompts on other generative tools (names with direct links for generative tools are provided in the other file) and their generated responses, along with your findings/interpretations.

Note: Don't forget to engage in discussions with your group members regarding your findings. During the evaluation process, students may be chosen randomly to provide further details about their group's discoveries on any given problem.