**🔹 Section A: Basic Operations on Sets**

1. Write a program to **input two sets A and B** and perform the following operations:
   * Union (A ∪ B)
   * Intersection (A ∩ B)
   * Difference (A − B)
   * Symmetric Difference (A ⊕ B)
2. Given two sets:  
   ( A = {1, 2, 3, 4, 5} ), ( B = {4, 5, 6, 7, 8} )  
   Find:  
   (a) (b) , (c) , (d) , (e)
3. Write a program to **check whether a given element** belongs to a given set or not.
4. Take a universal set ( U = {1,2,3,4,5,6,7,8,9,10} ) and a subset ( A = {2,4,6,8,10} ).  
   Find the **complement** of A with respect to U.

**🔹 Section B: Subsets and Power Sets**

1. Write a program to **generate all subsets** (Power Set) of a given finite set.
2. For the set ( A = {a, b, c} ), list all subsets and verify that the total number of subsets equals ( ).
3. Write a function that checks whether **one set is a subset or superset** of another.
4. Let ( A = {1, 2, 3} ) and ( B = {2, 3, 4} ).  
   Verify the following set identities by programmatically comparing both sides:  
   (i)  
   (ii)

**🔹 Section C: Advanced and Applied Questions**

1. Write a program that accepts **three sets A, B, and C**, and verifies **De Morgan’s Laws**:
2. Given the following student sets in a class:

( A = ) students who like Mathematics

( B = ) students who like Physics

( C = ) students who like Chemistry  
Find students who:

* like all three subjects
* like only two subjects
* like exactly one subject
* do not like any of these subjects

1. Implement a program to find the **Cartesian Product** of two sets and print all ordered pairs.
2. Verify the **Distributive Laws** of sets by code:

**🔹 Section D: Real-Life or Analytical Problems**

1. In a survey of 100 students:

* 45 study Mathematics, 50 study Physics, 40 study Chemistry
* 20 study both Mathematics and Physics
* 15 study both Mathematics and Chemistry
* 10 study both Physics and Chemistry
* 5 study all three subjects  
  Find how many students study **none** of the three subjects using set operations.

1. Implement a program to **compare sets using Venn regions** (use logical relations to determine the number of unique, common, and exclusive elements).
2. Represent the relationship among three sets ( A, B, C ) visually using **Venn diagram data** (using matplotlib\_venn in Python).