# LAB 2: Part 1: Cartesian Product

**OBJECTIVE:**

To understand what a Cartesian product is for two sets and perform a Cartesian product using a C program

**THEORY:**

The Cartesian product of two sets A and B is the set of all ordered pairs (a, b) where a is an element of A and b is an element of B. It is denoted as A×B or B×A.

**DISCUSSION:**

This involved asking user for two sets A and B, and then performing a basic Cartesian product operation on the two sets as described in the theory section of this project.

**CONCLUSION:**

From this project, I came to know about Cartesian product and identified the way to perform Cartesian product operation using C program.

# LAB 2: Part 2: Fuzzy Set operations

**OBJECTIVE:**

To understand the basic concepts about fuzzy set and degree of membership of a Fuzzy Set.

**THEORY:**

Fuzzy sets are sets whose elements have a degree of membership.

Membership is represented by a real number between 0 and 1 where 0 indicates no membership and 1 indicates full membership.

The operations that can be performed on fuzzy sets are:

**Union of Fuzzy Sets:**

contains the degrees of membership whose membership is the highest among A and B.

Eg. A = {0.9x, 0.8y, 0.5z}

B = {0.8x, 0.7y, 0.8z}

A U B = {0.9x, 0.8y, 0.8z}

**Intersection of Fuzzy Sets:**

contains the set of corresponding values with lowest degree of membership for the same element placed on both the set

Eg. A = {0.9x, 0.8y, 0.5z}

B = {0.8x, 0.7y, 0.8z}

A B = {0.8x, 0.7y, 0.5z}

**DISCUSSION:**

The programs were coded to perform different set operations (union and intersection) using only the membership values of the fuzzy sets.

**CONCLUSION:**

Writing the C program for these operations helped me better understand the fuzzy set operations and how they relate to computers.

# LAB 2: Relations

**OBJECTIVE:**

To identify different types of relations; symmetric, reflexive, transitive etc.

**THEORY:**

**Symmetric Relations:**

A relation R on a set A is said to be symmetric if:

**Reflexive Relations**

A relation R on a set A is said to be reflexive if:

An irreflexive relation is defined on set if:

**DISCUSSION:**

We used C programming to identify whether a relation on a set is symmetric or reflexive.

**CONCLUSION:**

Writing the C program for this lab clarified different properties of relations, specifically, reflexive and symmetric.