# INDIAN INSTITUTE OF INFORMATION TECHNOLOGY KALYANI

**Kalyani, Nadia-741235, West Bengal**
**(An institute of National Importance)**

Course Title: Machine Learning Lab  Paper Code: CSC612  Spring 2025

Assignment 11

Date: 08/04/2025  Due date: 08/04/2025  1 PM  5 Marks

Suppose a semester result has come. The pass or fail depends on only two subjects Maths and CS. It is a relative marking. You are given the marks of Maths and CS and the corresponding final result of some students. Considering that the final result depends on the nearest three students you have to decide the final result of a new student having his Maths and CS marks. Here, if nearest is defined as opposite of Euclidean distance. If Euclidean distance between two points is lesser then they are nearer.

Consider the following table as training data.

| Maths | CS | Results |
|---|---|---|
| 4 | 3 | Fail |
| 6 | 7 | Fail |
| 7 | 8 | Pass |
| 5 | 5 | Fail |
| 8 | 8 | Pass |

For a query X = (Maths=6, CS=8)  K=3

Its distance (Euclidean) from the first point is √(6-4)2+(8-3)2 = √29 = 5.38

Its distance (Euclidean) from the second point is √(6-6)2+(8-7)2 = √1 = 1

Its distance (Euclidean) from the third point is √(6-7)2+(8-8)2 = √1 = 1

Its distance (Euclidean) from the fourth point is √(6-5)2+(8-5)2 = √10 = 3.16

Its distance (Euclidean) from the fifth point is √(6-8)2+(8-8)2 = √4 = 2

So, the second, third and fifth points are nearer among which second point is Fail and remaining two are Pass. Therefore, according to the majority the new result is Pass.

Now using Python (specifically matplotlib library) draw the Voronoi diagram and identify the Voronoi regions for each point. Finally find out the final result of the new student by finding out the region in which it falls.