# Linear Classification Logistic Regression. In-class Exercise 2

*EL-GY 6143 Intro Machine Learning. Prof. Sundeep Rangan*

## Question

We are given the following six data points with binary labels $y_i \in \{0,1\}$.

| $i$ | $x_{i1}$ | $x_{i2}$ | $y$ |
|---|---|---|---|
| **1** | 1 | 1 | 0 |
| **2** | 1 | 3 | 0 |
| **3** | 2 | 2 | 1 |
| **4** | 2 | 3 | 1 |
| **5** | 3 | 2 | 0 |
| **6** | 4 | 1 | 1 |

(a) Draw the points on a graph with different labels for each class

(b) Is the data linearly separable?

(c) Write a classifier for the data that makes a minimum number of errors. You must write a mathematical function describing the classifier output $\hat{y}$ in terms of $x_1$ and $x_2$. Do not just draw the boundary.

(d) Write a short python function that performs the classification on a data matrix. It should output a vector of classification decisions, one for each sample.