Week 6 - AYU - Individual

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Problem 1.

Given the data.

	Age	Sex	Survived
A	27	M	0
B	30	F	1
C	80	F	1
D	50	M	0
E	60	F	0
F	70	F	1

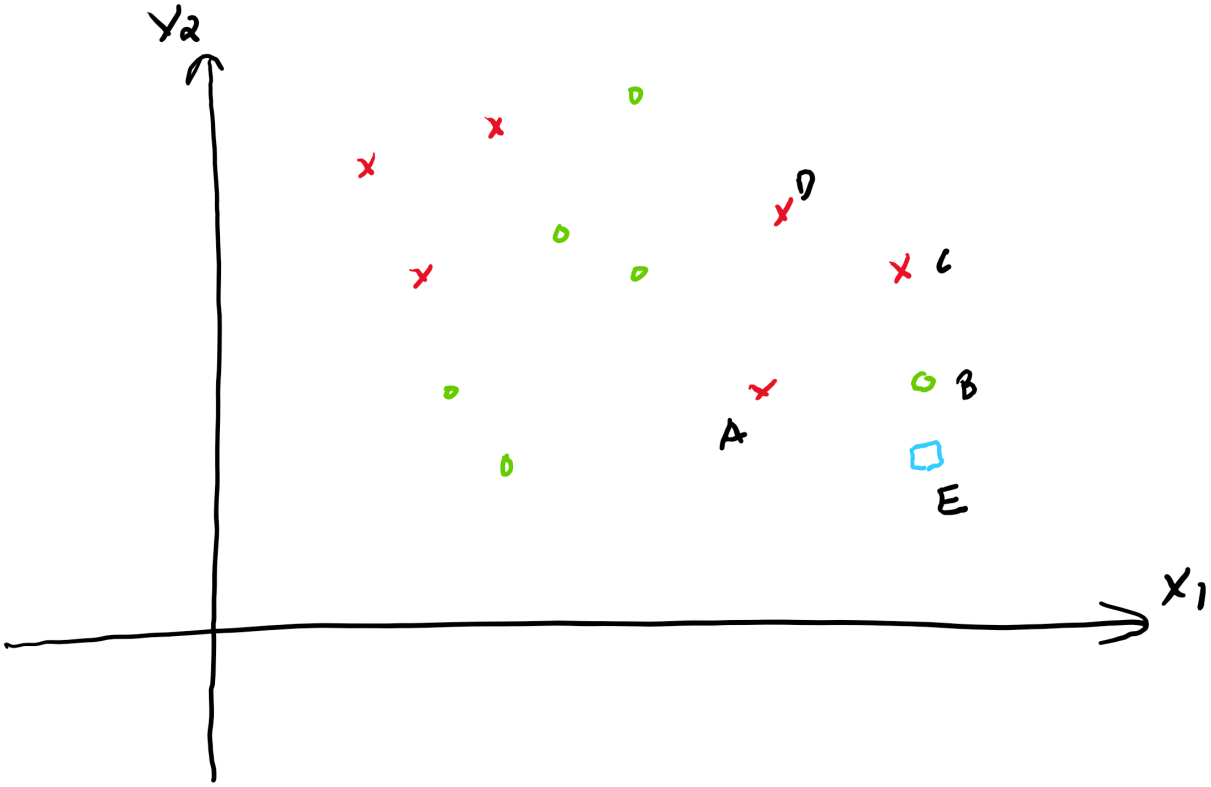
a. Let G be a female of 55 years old. Use 1NN to predict whether G is survived (`Survived =1`) or not (`Survived = 0`). Does the prediction change if used 3NN?

b. Given the following data, use 1NN and 3NN to predict the salary for G (a female of 55 years old).

	Age	Sex	Salary (k)
A	27	M	80
B	30	F	70
C	80	F	90
D	50	M	60
E	60	F	10
F	70	F	100

Problem 2.

Given the data. Consider x as 1 and o as 0.



With EB = 1.4, EA = 3, EC = 3, ED = 4,

a. Use the **uniform weights** to calculate the predicted probability and the prediction of **3NN** for E.

b. Use the **distance weights** to calculate the predicted probability and the prediction of **3NN** for E.

c. Use the **distance weights** to calculate the predicted probability and the prediction of **4NN** for E.

Problem 3

Given the utility matrix

	Item 1	Item 2	Item 3	Item 4	Item 5
Alice	5	3	3	4	
User 1	3	1	2	3	3
User 2	2	3	4	3	5
User 3	3	3	1	4	4
User 4	1	5	5	4	2

Should we recommend Item 5 to Alice? Calculate her estimated rating on Item 5 to answer the question. Recommend the item if Alice's rating is 4 or above.

a. Use user-based KNN, with $k = 2$ and Manhantan distance.

b. Use item-based KNN, with $k = 3$ and cosine similarity.