Homework Set 10

Problem1

P(Purchase) = 9/14

P(not Purchase) = 5/14

P(Purchase | Age <= 30, Income = medium, Student = yes, Credit rating = Fair) =

P(Purchase) P(Age <= 30 | Purchase) P(Income = medium | Purchase) P(Student = yes | Purchase) P(Credit rating = Fair | Purchase) =

9/14 * 2/9 * 4/9 * 6/9 * 6/9 = 0.0282186949

P(not Purchase | Age <= 30, Income = medium, Student = yes, Credit rating = Fair) =

P(not Purchase) P(Age <= 30 | not Purchase) P(Income = medium | not Purchase) P(Student = yes | not Purchase) P(Credit rating = Fair | not Purchase) =

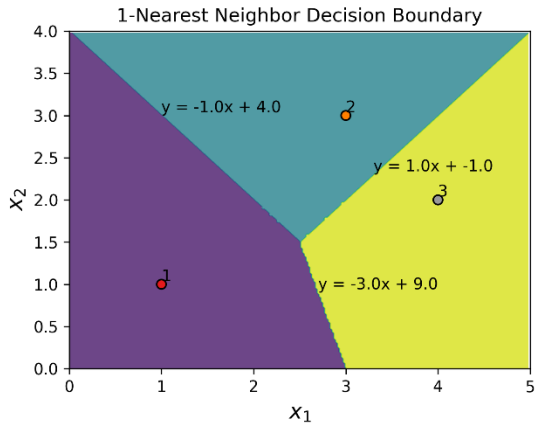
5/14 * 3/5 * 2/5 * 1/5 * 2/5 = 0.0068571429

P(Purchase)= **0.0282186949/(0.0068571429 + 0.0282186949) = 0.804505228382599**

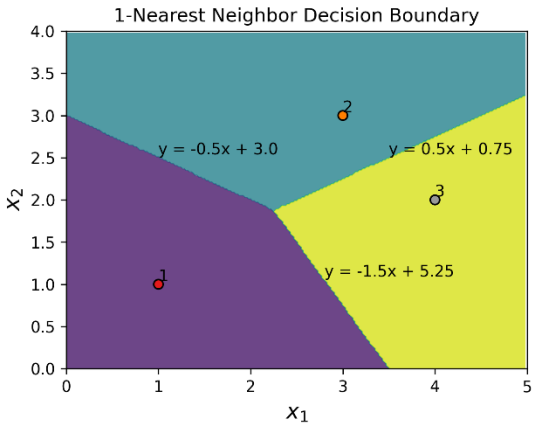
P(not Purchase) = **0.0068571429/(0.0068571429 + 0.0282186949)** = **0.19549477161740095**

Since P(Purchase) > P(not Purchase), the person will but a computer.

Problem 2



1NN with Euclidean distance



1NN with custom distance

Problem 3

(a)

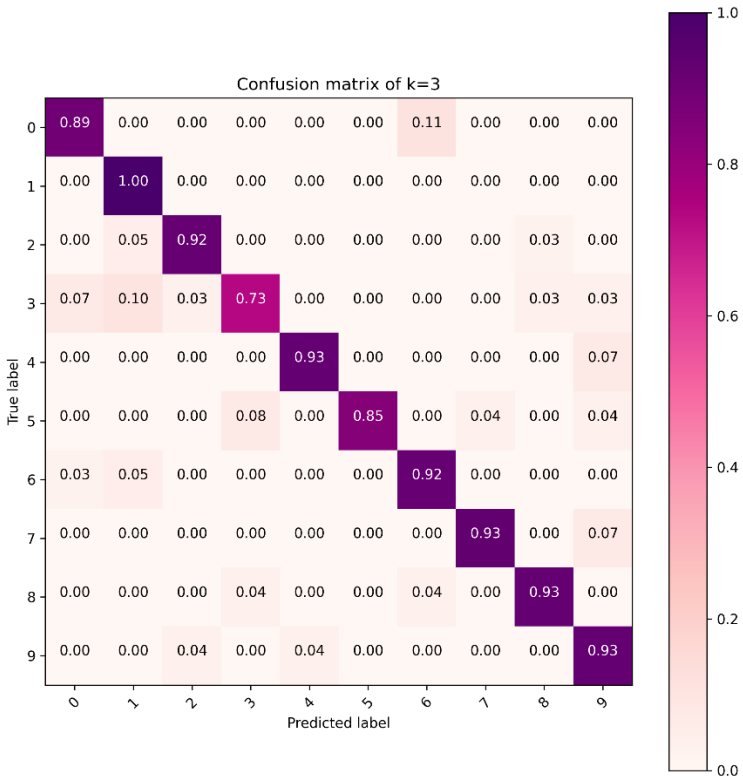
The error values are:

k	Training Error	Validation Error
1	0.0	0.127
3	0.068	0.143
5	0.084	0.13
11	0.118	0.173
16	0.139	0.197
21	0.155	0.203

The best k for validation data is 1 and validation error is 0.127

The test error of this classifier is 0.083

(b)



The easiest to classify is 1

The hardest to classify is 3

(c)

One image from class 2 was classified as class 8.