CS4361/5361 Machine Learning
Fall 2020
Naïve Bayes
Team exercise

Consider a dataset with 3 classes and 5 binary attributes. Let the arrays *p_class* and *p_att_given_class* described in the slides be:

p_class =[0.33,0.33,0.33]

p_att_given_class = [[0.72 0.21 0.89 0.47 0.64]
$\qquad\qquad\qquad\quad$ [0.32 0.82 0.54 0.82 0.17]
$\qquad\qquad\qquad\quad$ [0.76 0.65 0.74 0.31 0.75]]

where *p_class[i]* represents the probability that an example belongs to class i and p_att_given_class[i,j] represents the probability that attribute j in an example of class i is equal to 1.

1. What is the probability that for an example of class 2, attribute 0 is equal to 1?

2. What is the probability that for an example of class 1, attribute 4 is equal to 0?

3. How would the Naïve Bayes classifier classify example [1,1,1,0,0]?

4. Write the functions *fit* and *predict* to complete the implementation of the Naïve Bayes classifier and test it on the binary MNIST dataset (see *naive_bayes_start.py*).