Homework 5 – Due Jan 20, 2016

Problem 1
Read pages 16-21 on the method of solving logistic regression http://cs229.stanford.edu/notes/cs229-notes1.pdf. Describe in a few sentences how the solution for theta (i.e. beta parameters) are solved. Feel free to look up the concepts of gradients (i.e. derivatives in vector space) and other materials as well.

Problem 2
In class, we have learned one-vs-all logistic regression. When comparing multiple classes, we can create a binary logistic regression for each class. i.e. If there are 3. classes, we would perform logistic regression on log(P(A)/1-P(A)), log(P(B)/1-P(B)), log(P(C)/1-P(C)). Then we would pick the class with the highest log odds.

There is another type of logistic regression called 'multinomial logistic regression'. Read page 119 from ESL on:
http://www-stat.stanford.edu/~tibs/ElemStatLearn/download.html.

Show that equation (4.17) adds up to 1, and that P(G= K|X=x) does indeed match as it does in equation (4.18).

Problem 3
Discuss some pros and cons to why you would want logistic regression vs. naïve bayes for classifiers. Hints: Consider independence of features as well as speed/size.

Save your response as HW05_YourName.pdf and send to gadschicago@gmail.com