Homework 9
Due Tuesday, December 3

Show all your work. Data files available from `alr4` package or on class website.

1. Please locate the file `admitdata.csv`. The `admit` is the response variable (1=admitted, 0=rejected), and the other variables (`gre` and `gpa`) are predictors. Do the following:
   (a) Fit the model with predictors `gre` and `gpa`.
   (b) With Y=`admit`, X_1=`gre`, X_2=`gpa`, find $\hat{p}(x_1, x_2) = \hat{P}(Y = 1|X_1 = x_1, X_2 = x_2)$ using part (a). Plug in some combinations of plausible numbers for x_1 and x_2 to give some examples and interpret the predicted probabilities $\hat{p}$.
   (c) Repeat parts (a) and (b) with probit link.
   (d) Repeat parts (a) and (b) with complementary log-log link.
   (e) Compare all models and see if you find anything interesting. Comment on all parts.

2. Please locate the file `football.txt`. The data consists of `result` (1=good, 0=no good; field goal), and predictors `yard` and `week` (both continuous). The week 1 is in September, and goes in a sequence until the week 17 in January. Fit a logistic regression and compute/interpret some predicted probabilities using the predictor values that make sense.

3. Pleas find the dataset `Downer` from `alr4` package.
   (a) Fit a logistic regression model with the response `outcome` on factors `calving` and `myopathy`, starting with a full model (including an interaction) and select the best model. Justify your choice of the model and comment.
   (b) Fit a logistic regression model with the response `outcome` on predictors (i) `ck` only, (ii) `ck` and `ast`, (iii) `ck` and `ast` and `urea`. Can you explain the "discrepancy" between models (ii) and (iii)? Interpret your models/results and comment.

4. Please locate the file `count.hw.txt`. Fit a log linear model with `count` as a response and `x1` and `x2` as discrete independent variables (include an interaction). Provide interaction plot(s). Interpret and comment.

5. Please locate the file `poisson.hw.txt`. Fit a log linear model with `visit` as a response and all other variables as predictors. What happens if you fit a linear regression model on the same variables? Choose and present your model (justify), interpret and comment.