Mixed models practical

1) RVF serological prevalence
   a. Import the data from file "RVF seroprevalence Senegal.csv"
   b. Build a generalized linear mixed to model to compare prevalence variance amond regions with prevalence variance among villages
   c. Does seroprevalence vary more among regions or among villages
   d. Test the effects of age and region in the presence of a village random effect
   e. Compare the output of the mixed model with that of a glm without random effects
   f. Is there a difference between the models with and without random effects ? Why ?

2) Newcastle disease in poultry from Mali
   a. Read the data flu.csv, the separator is the coma. This data records results of serological tests (Elisa tests) on poultry in two regions of Mali
   b. Look at the different variables and try to understand what is in that data frame
   c. Remove the lines for which ElisaNd is NA (missing value)
   d. Transform the variable ElisaNd into a binary (0 for negative/1 for positive) variable
   e. Build a generalized linear mixed to model to see how the variance ElisaNd is structured accoring to Farmer, Location and Region. Note that farmer is nested in Location and that location is nested in region
   f. At which level does seroprevalence vary the most widely?
   g. Check that the sample is balanced for Species, Sex, Age and Season
   h. Test the effects of Species, Sex and Age in a model including the random effect of location
   i. Use the drop1 function with test="Chisq" as an option to remove non-significant effects
   j. Compare the output of the mixed model with that of a glm without random effects
   k. Use the drop1 function with test="Chisq" as an option to remove non-significant effects
   l. What differs between the selected mixed model and the selected model without random effects?
   m. Can you describe the effects of Age, Sex, Specie and Season?
   n. Try to get estimations from the final mixed model and represent them as box plot as for Diet quality in the lecture