Section 3.4 Computer Exercise

1. We will be working with the Hog data; copy the SAS program (listed as "SAS Code for Chapter 2 contingency table (Measures of Association)" on the webpage) into SAS. Add CMH1 as an option to the TABLES command to obtain the M^2 statistic for the default scores (the original factor levels of 1, 2 and 3).

2. Now run the analysis using the midranks; simply rerun the CMH1 options, but now add the option SCORES=RANK. How do your results compare to what you obtained before?

3. We can also use ridit scores, which are simple linear transformations of the midranks– what should happen to the test statistic in this case? Use the SCORES=RIDIT option and confirm your guess.

4. Given that level 1 means no disturbance for at least 4 months, level 2 means disturbance from 2 to 4 months, and level 3 means disturbance from 0 to 2 months, come up with your own set of row and column scores, and then test for association. It would probably be easiest to do this by including two new variable names in the INPUT statement, entering the scores for these two new variables in each of the 9 data rows following the DATALINES command, and then cross-classifying by the new variables in the TABLES statement, rather than PREVIOUS and CURRENT. Be sure to remove the SCORES option when running this new analysis.

5. Enter the same table in R using the posted commands on the web page.

6. Compute the test statistic for linear-by-linear association with the default scores with the following commands. The `apply` command here basically expands the table from grouped to ungrouped data so that the `cor` function will work.

   ```
   >res=apply(Hog.table[,1:2],2,function(x){rep(as.numeric(x),Hog.table$count)})
   >(cor(res)[2,1]^2)*(nrow(res)-1)
   ```

7. We will skip midranks in R for now; use your other set of scores and compute the test statistic for linear by linear association. You can assign the scores by updating the row and column `levels` statements, and then re-running the above two command lines.