Lab assignment 11: Hoff 9.1

The file *swim.dat* contains data on the amount of time, in seconds, it takes each of four high school swimmers to swim 50 yards. Each swimmer has six times, taken on a biweekly basis.

The data is given in
http://www.stat.washington.edu/hoff/Book/Data/hwdata/swim.dat

a) For each swimmer separately, fit a linear regression model of swimming time as the response and week as the explanatory variable. Using the information that competitive times for this age group generally range from 22 to 24 seconds, construct an informative prior distribution for the parameters. Then, generate random samples from the prior predictive distribution and create a scatterplot. If it agree with your belief, report it with your hyper-parameters. Otherwise, change your hyper-parameters and repeat.

b) The coach of the team has to decide which of the four swimmers will compete in a swimming meet in two weeks. Using posterior predictive distributions, compute $\Pr(Y_j^* = \min\{Y_1^*, ..., Y_4^*\} \,|\, \text{data})$ for each swimmer j, and based on this make a recommendation to the coach.