Case Study 2: True-or-False Exam Scores

1   The data

Suppose a group of 15 people sit an exam made up of 40 true-or-false questions, and each receives a score afterwards. Dataset "TrueFalseScores.csv" on Moodle.

2   Some questions

1. Some analyses claim that these scores suggest that the first 5 people were just guessing, but the last 10 had some level of knowledge. What do you think?

2. What are your Bayesian methods? What assumptions are you making? Are the assumptions justified?

   Possible direction: 1) people come from two groups (i.e. guessing group vs knowledge group), and these groups have different probabilities of success; 2) one step further is to consider whether people have individual-specific success probability.

3. What are the parameter(s) in your model(s)? What prior distribution(s) do you use? Are full conditional distribution(s) recognizable?

4. What is your computation scheme? Some useful JAGS function:

   (a) equals(x, y): test for equality (logical)

   (b) T(a, b): truncate $[a, b]$.
       e.g. dbeta(1, 1)T(0.5,1) assigns a Uniform distribution on $[0.5, 1]$.
       (recall that Uniform(0,1)=Beta(1,1))

5. What's your posterior summary of your parameter(s)? (Don't forget MCMC diagnostics to make sure your chain has converged.)

6. What is your conclusion?