1. (Theoretical exercise 10, 8e)

   Consider a collection of n individuals. Assume that each person's birthday is equally likely to be any of the 365 days of the year and also that the birthdays are independent. Let $A_{i,j}$, $i \neq j$, denote the event that persons i and j have the same birthday. Show that these events are pairwise independent, but not independent. That is, show that $A_{i,j}$ and $A_{r,s}$ are independent, but the $\binom{n}{2}$ events $A_{i,j}$, $i \neq j$ are not independent.

2. (Theoretical exercise 10, 9e)

   Two percent of women age 45 who participate in routine screening have breast cancer. Ninety percent of those with breast cancer have positive mammographies. Eight percent of the women who do not have breast cancer will also have positive mammographies. Given that a woman has a positive mammography, what is the probability that she has breast cancer?