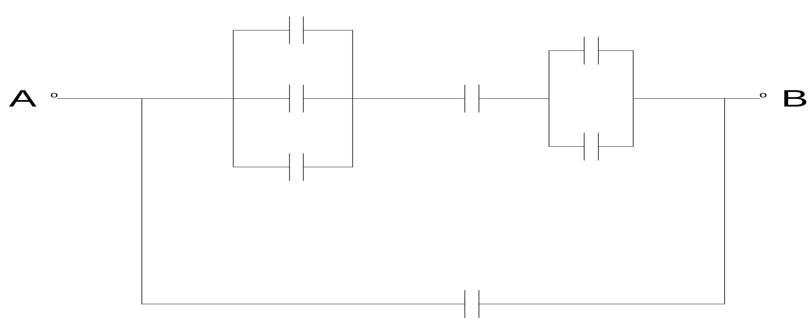
HW #3 Due 2/3/04 Stat 310 D.Scott 7 problems 70 pts

1. 2.5-2
2. 2.5-8
3. Prove that if $\{A, B\}$ are independent events, then so are $\{A, B^*\}$, $\{A^*, B\}$, and $\{A^*, B^*\}$.
4. Show that the following 3 events are pairwise independent, but *not* sotchastically independent:

$$A = \{\text{odd number on first die}\}$$
$$B = \{\text{odd number on second die}\}$$
$$C = \{\text{total of the two dice is odd}\}$$

5. Given 7 independent devices that work with $p = \frac{3}{4}$, what is the probability a signal can travel from A to B?



6. A door is locked with $p = \frac{1}{2}$. Twelve keys in a box in a guard's office include one for the door. The guard allows you to take 2 keys (at random) on your way to the door. What is the probability you can open the door?

7. Consider the game of craps. If you throw a 7 or 11 on the first toss of 2 dice, you *win*. If you throw a 2, 3, or 12, you *lose*. Otherwise, you note the number thrown and keep rolling until

   (a) you throw a 7 (in which case you *lose*), or

   (b) you throw the original number again (in which case you *win*).

   What is the probability of winning at craps?

   (Hint: Partition first on the outcome of the initial toss, then on the outcome that the game ends on the n-th flip. An infinite but countable set of possibilities. The answer is very close to 50%. Craps is almost a fair game.)