CSE 312: Foundations of Computing II
Quiz Section #2: Pigeonhole Principle; equiprobable outcomes

The Pigeonhole Principle says that, if you put n pigeons into k pigeonholes, where $n > k$, then there must be a pigeonhole that has more than 1 pigeon in it.

1. 25 fleas sit on a 5×5 checkerboard, one per square. At the stroke of noon, all jump across an edge (not a corner) of their square to an adjacent square. At least two must end up in the same square. Why?

2. Given 3 spades and 3 hearts, shuffle them. Compute P(E), where E is the event that the suits of the shuffled cards are in alternating order. What is your sample space?

3. In Schnapsen, suppose that ♠J is the face-up trump and you are dealt 5 nontrump cards. Let E be the event that the top 4 cards in the stock are all trumps. Let the sample space be all possible orderings of all the cards in the stock. Compute P(E). (Notice that your solution suggests a different and simpler sample space.)

4. (Challenge problem) n people at a reception give their hats to a hat-check person. When they leave, the hat-check person gives each of them a hat chosen at random. What is the probability that no one gets their own hat back?