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DATE: February 26, 2018

CMPE 320 HW 03

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1. With 3 n-sided rolls, there are n^3 possibilities.

   The probability that either of the pair of persons roll the same face of the die is therefore $n/n^3 = 1/n^2$.

   Therefore

   $$\begin{aligned} P(A_{12}) = P(A_{13}) = P(A_{23}) &= \frac{n}{n^3} \\ &= \frac{1}{n^2} \end{aligned}$$

   But if both the events A_{12} and A_{13} takes place, that is both persons 1 and 2 and persons 1 and 3 roll the same face, then that yields A_{23}.

   That is, if both persons 1 and 2 and persons 1 and 3 roll the same face, then that implies persons 1 and 3 rolled the same face.

   But the outcome of person 3's roll is not dependent on the other persons.

   That is, pairwise A_{12} and A_{13}, A_{12} and A_{23}, and A_{13} and A_{23} are independent.

   But if considered individually, they are dependent. □

2. □

3. □

4. □

5. □

6. □

7. □

8. □

9. $\square$

10. The permutations of a word is given by:

$$\frac{\text{(length of word)!}}{\text{(repetitions of A)!(repetitions of B)!}\ldots\text{(repetitions of Z)!}}$$

(a) Since there are no repeating characters, the permutation is simply:

$$\begin{aligned}\text{permutations} &= length(\text{children})! \\ &= 8! \\ &= 40320\end{aligned}$$ $\square$

(b) Since the characters o repeats 2 times, k repeats 2 times, and e repeats 3 times:

$$\begin{aligned}\text{permutations} &= \frac{length(\text{bookkeeper})!}{\text{(repetitions of o)!(repetitions of k)!(repetitions of e)!}} \\ &= \frac{10!}{2!2!3!} \\ &= 151200\end{aligned}$$ $\square$