Lecture #21: Tail Bounds
Questions for Review

1. What is **Markov's Inequality**?

2. What is the **variance** of a random variable (with respect to a probability distribution P)? Please give a second (equivalent) formula for the variance that is often used as well.

3. What is the **standard deviation** of a random variable X (with respect to a probability distribution P)?

4. Suppose now that n is an integer such that $n \geq 2$ and

$$X = X_1 + X_2 + \cdots + X_n.$$

   Describe a property of the random variables $X_1, X_2, \ldots, X_n$ (which, unfortunately, does not always hold) that makes it reasonably easy to compute the variance of X from the variances of $X_1, X_2, \ldots, X_n$.

5. What is **Chebyshev's Inequality?**

6. What is **Cantelli's Inequality?** What other name(s) does this bound have?

7. What is the **Chernoff Bound?** This cannot always be applied when some, or all, of the rest of the results (used to bound probabilities), given in this lecture, can. When *can* it be applied?

8. Quite a few of the results, described in the preparatory reading material, depend on an **assumption** about the sample space, Ω. What is this assumption?