Solutions for CS174 Homework 2

1. Because $X$ is on the first coin toss and $Y$ is on the second coin toss, so $X$ and $Y$ are independent.

2. The problem is meant to be “not necessarily consecutively” instead of “not consecutively”. In this case, the probability is \( \frac{\binom{n}{3}}{n!} \cdot \frac{(n-3)!}{n!} = \frac{1}{8}. \)

3. $O(n \lg n)$ as in lecture notes.

4. $\leq$.

5. Chebyshev.

6. $\sqrt{2n}$.

7. $n \ln n + \Omega(n)$.