CS 161 (Stanford, Winter 2026)　　　　Lecture 8

Pre-lecture exercises will not be collected for credit. However, you will get more out of each lecture if you do them, and they will be referenced during lecture. We recommend writing out your answers to pre-lecture exercises before class. Pre-lecture exercises usually should not take you more than 30 minutes.

Pre-Lecture Exercises

In this pre-lecture exercise, we'll see an example of something subtle that will come up in Lecture 8.

Suppose you are putting n items into six buckets. You decide to use the following randomized scheme:

1. Roll a 6-sided die.

2. If the die came up i, put all n items into bucket i.

Consider the following two quantities:

- Quantity 1: $\mathbb{E}[\text{number of items in bucket 1}]$,

- Quantity 2: $\mathbb{E}[\text{number of items that land in the same bucket as item 1}]$.

While quantities 1 and 2 may seem similar, in fact they have very different values! Using the definition of expectation, compute quantities 1 and 2 and see why they are different.