

Pre-class preparation

Please watch the video OR read the following textbook sections from Blitzstein and Hwang's *Introduction to Probability* (second edition):

- Video: Random variables
- Textbook: Sections 3.1-3.2, 3.5 (just the half page that introduces the PMF).

Objectives

By the end of the day's class, students should be able to do the following:

- Provide both the formal and informal definition of a random variable.
- Define the probability mass function (PMF) of a discrete random variable.
- Determine whether a given function can be the PMF for some random variable.
- For Bernoulli, Binomial, and discrete Uniform random variables: define the PMF and provide explicit descriptions of the PMF.
- For Bernoulli and Binomial random variables: provide examples of phenomena/experiments that follow the distribution, and identify when an experimental outcome does not follow the distribution.

Reflection Questions

Please submit your answers to the following questions to the corresponding Canvas assignment by 7:45AM:

1. Suppose that a discrete random variable X has the following PMF:

$$f_X(x) = \begin{cases} cx & \text{for } x = 1, \dots, 5 \\ 0 & \text{otherwise} \end{cases}$$

Find the value of the constant c that makes the above PMF a valid one.

2. Explain why, in the definition of the Discrete Uniform distribution, the assumption that the set $C = \{a_1, \dots, a_n\}$ is a finite set is a necessary assumption. That is, what would go wrong if C were allowed to be an infinite set?
3. (Optional) Is there anything from the pre-class preparation that you have questions about? What topics would you like would you like some more clarification on?