Pre-class preparation

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

- Video: Exponential

- Textbook: Section 5.5

Objectives

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

- Give the PDF, CDF and a story description for an Exponential distribution.

- Show that the PDF for an exponential random variable is valid, and compute the mean and variance for the exponential variable.

- Prove that the exponential variable has the memoryless property and use it to solve problems involving Exponentially-distributed waiting times.

- Derive the distribution of the minimum of n independent Exponential r.v.s.

Reflection Questions

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

1. Let $X \sim \text{Exp}(\lambda)$. Derive the inverse CDF F^{-1} of X, and then use it to find the median of the Exp(1) distribution.

2. Wait times until objects fail are often represented using exponential variables. Suppose the time T from purchase until a harddrive fails is Exponential with rate $\lambda = \frac{1}{6}$ years. If you have owned the computer for 1 year already, what is the expected amount of time you will need to wait from now until the harddrive fails? (You should be able to answer without calculating any integrals).

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?