

ECS 315: In-Class Exercise # 12

Instructions

1. Separate into groups of no more than three persons. **The group cannot be the same as any of your former groups after the midterm.**
2. **Write down all the steps** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
3. **Do not panic.**

Date: 18 / 10 / 2018		
Name	ID <small>(last 3 digits)</small>	
Prapun	5	5

1. Consider a random variable X whose pmf is given by

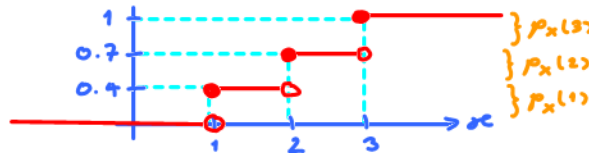
$$p_X(x) = \begin{cases} 0.4, & x = 1, \\ 0.3, & x = 2, 3, \\ 0, & \text{otherwise.} \end{cases}$$

a. Find $P[X \leq \sqrt{2}]$.

≈ 1.414
 The possible values of X are 1, 2, and 3. Among these, only "1" is " $\leq \sqrt{2}$ ".
 Therefore, $P[X \leq \sqrt{2}] = p_X(1) = 0.4$

b. Plot the cdf of this random variable.

Recall that the cdf can be derived from the pmf by using the $p_X(x)$ as the jump amount at x .



2. Consider a random variable X whose cdf is given by

$$F_X(x) = \begin{cases} 0, & x < 0, \\ 0.3, & 0 \leq x < 2, \\ 1, & x \geq 2. \end{cases}$$

a. Find $P[X \leq 1]$.

By definition, $F_X(x) \equiv P[X \leq x]$.
 Therefore, $P[X \leq 1] \equiv F_X(1) = 0.3$.

b. Find $P[X > 1]$.

Because " $x > 1$ " is the opposite of " $x \leq 1$ ",
 we know that $P[X > 1] = 1 - P[X \leq 1] = 1 - 0.3 = 0.7$

c. Plot the pmf of X .

For discrete RV, the pmf can be derived from the jump amounts in the cdf. Here, the jumps in the cdf happen two times: at $x=0$ and at $x=2$. The jump amounts are 0.3 and 0.7, respectively.

Therefore, $p_X(x) = \begin{cases} 0.3, & x = 0, \\ 0.7, & x = 2, \\ 0, & \text{otherwise.} \end{cases}$

Note that we always use stem plot for pmf.

