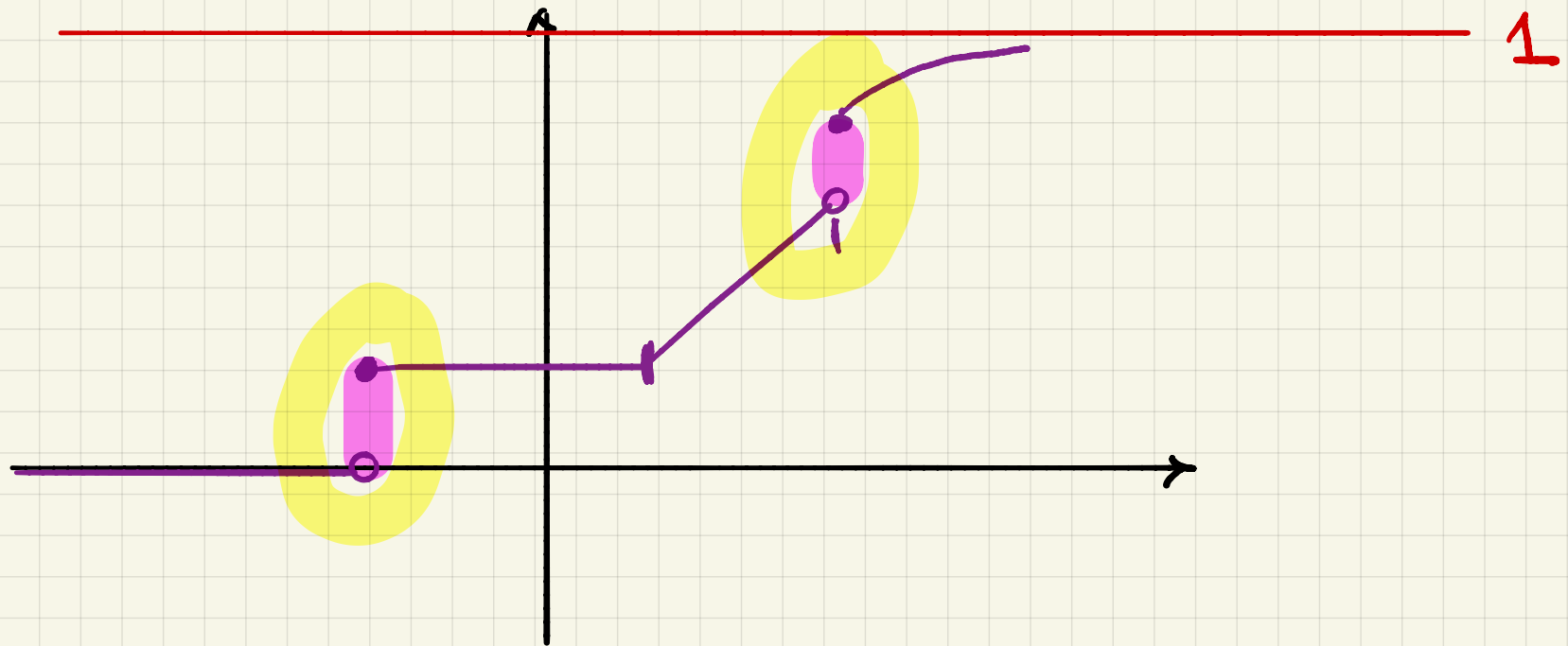Assuming that you know the basics of probability: Go into Chapter 3 from textbook.

For (any) random variable, the cumulative distribution function (cdf) contains all the information about its distribution.
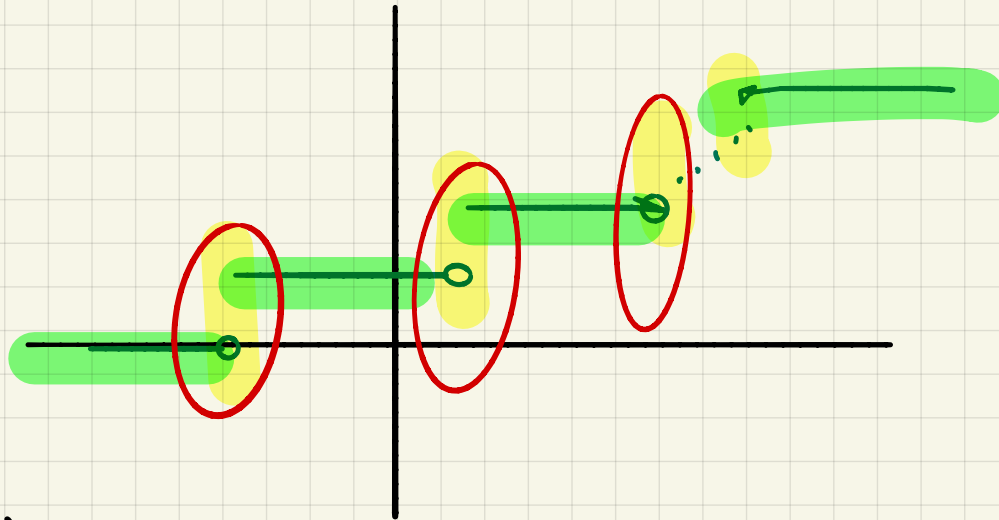
<u>Def'n.</u> For any r.v. $X$, its cdf is a function $F_X : \mathbb{R} \to [0,1]$ given by

$$F_X(x) = \mathbb{P}[X \leq x] \quad \text{for all } x \in \mathbb{R}$$

So, you can "give" somebody the full information about the dist'n of a r.v. by giving them the cdf.

**Q:** What if your cdf is a step function?



Then, your r.v. is called DISCRETE.
It's usually more convenient to
express its dist'n using the
PROBABILITY MASS FUNCTION (pmf)

In general, the **support** of a r.v. is
(vaguely) the set of all values it can
take. For discrete r.v.s it's the set of
all the points where the cdf jumps.
For those points, i.e., for every $x$ in
the support of $X$, the pmf is

$$p_X(x) = \mathbb{P}[X=x] = F_X(x) - F_X(x-)$$

$$= \text{size of the jump.}$$