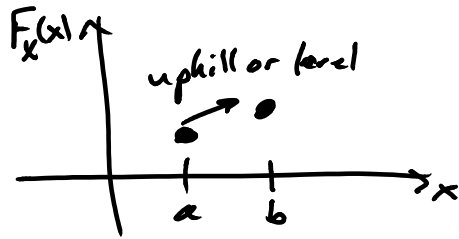


Why is the CDF nondecreasing i.e. increasing as we move from left to right along the x-axis??

In other words, if  $a < b$ , why is  $F_X(a) \leq F_X(b)$ ??



$$F_X(a) = P(X \leq a) \\ = P(\{\omega \mid X(\omega) \leq a\})$$

$$F_X(b) = P(X \leq b) \\ = P(\{\omega \mid X(\omega) \leq b\})$$

$$F_X(a) = P(\{\omega \mid X(\omega) \leq a\}) \leq P(\{\omega \mid X(\omega) \leq b\}) = F_X(b)$$

↑ why? ↑  
 If  $\omega$  is in here then  $\omega$  is in here too ↑  
 i.e. this ↑ is a subset of ↑

e.g. if  $\omega \rightarrow X=3.1$  and  $3.1 \leq a$   
 then  $3.1 \leq b$  too  
 since  $a < b$ .