ST3009: Statistical Methods for Computer Science

Week 3 Assignment - Senán d'Art - 17329580

Question 1

(a)

The event $(1,1)$ is the only one that corresponds to $Y=2$.

(b)

$\{(1,2),(2,1)\}$ correspond to $Y=3$

(c)

$\{(1,3),(2,2),(3,1)\}$ correspond to $Y=4$

(d)

Number of total possible results: 36
Set size: 3
Probability of event: $\frac{3}{36}=\frac{1}{12}$

Question 2

$X=Head-Tails$

(a)

Possible values of X: $\{-3,-1,1,3\}$

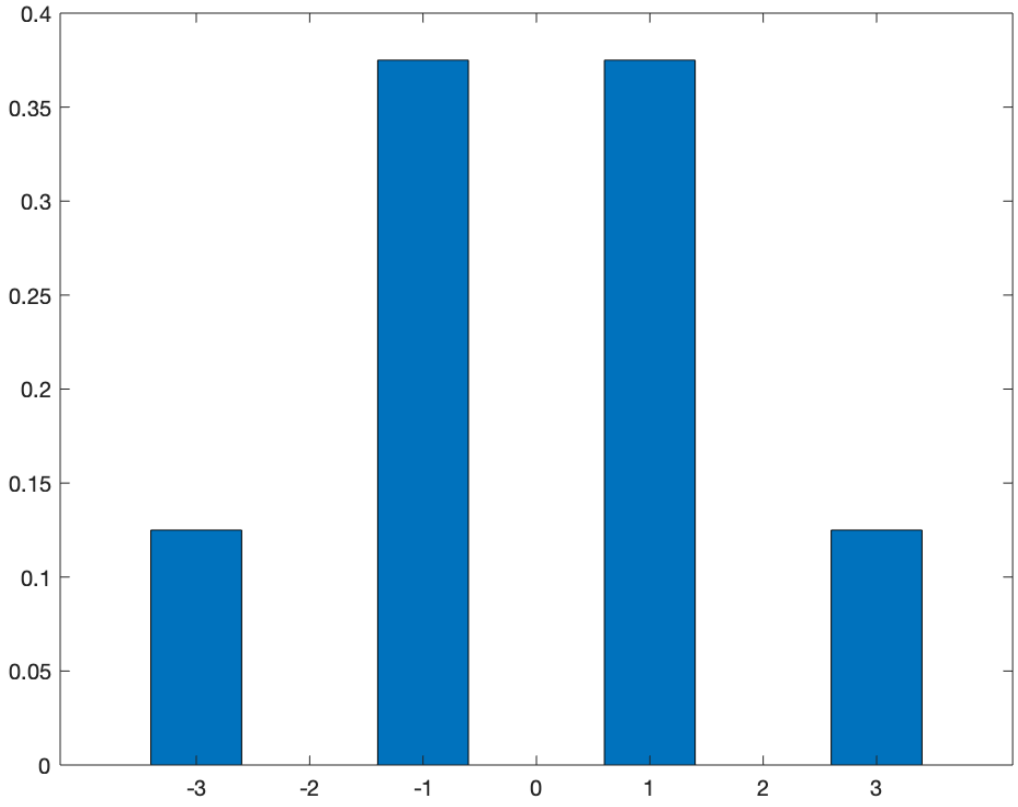
(b)

8 Total Combinations (2^3)
Only one way to roll -3 : $\{Tails,Tails,Tails\}$
Probability: $\frac{1}{8}$

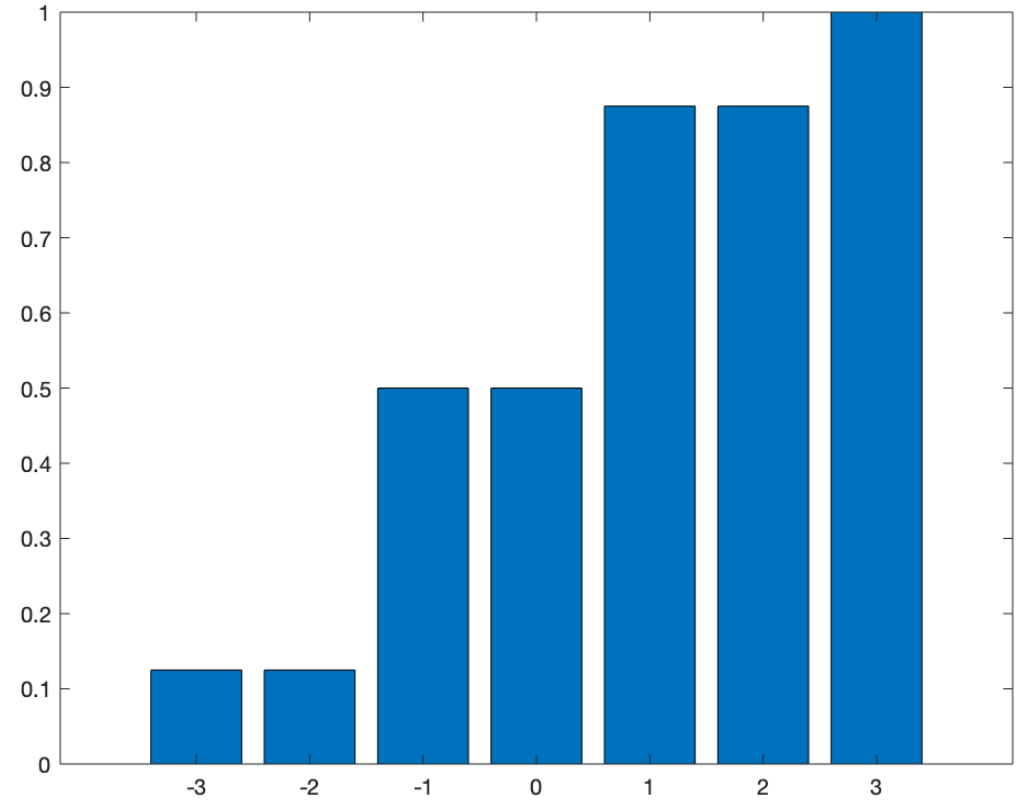
(c)

8 Total Combinations
Three ways to roll -1 : $\{[H,T,T],[T,H,T],[T,T,H]\}$
Probability: $\frac{3}{8}$

(d)



PMF of X



CDF of X

Question 3

(a)

Possible values for X are {1,2,3,4,5,6}.
X will always be >= 1.
Probability is 1.

(b)

For $X >= 2$, no ones must be rolled.

$$\frac{5}{6} * \frac{5}{6} * \frac{5}{6} * \frac{5}{6} = 0.4823$$

(c)

$$X <= 1, K = 1 - (\frac{5}{6})^4 = 0.5177$$

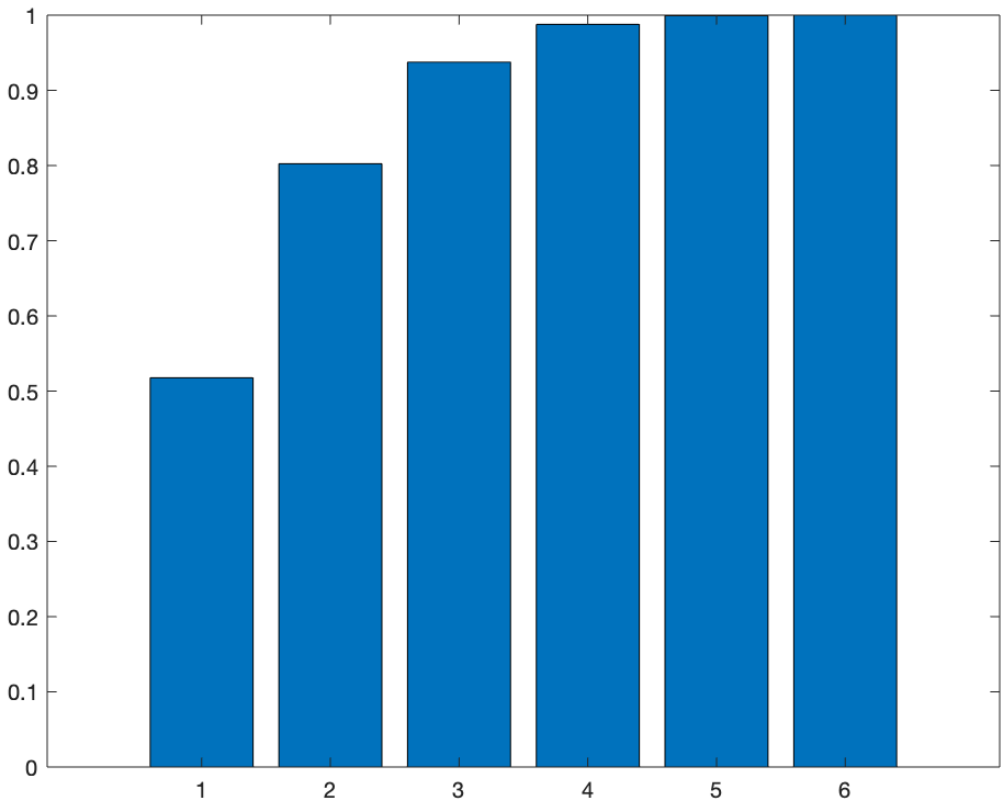
$$X <= 2, K = 1 - (\frac{4}{6})^4 = 0.8024$$

$$X <= 3, K = 1 - (\frac{3}{6})^4 = 0.9375$$

$$X <= 4, K = 1 - (\frac{2}{6})^4 = 0.9877$$

$$X <= 5, K = 1 - (\frac{1}{6})^4 = 0.9992$$

$$X <= 6, K = 1$$



CDF of X