

# Assignment 4

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Python code link : <https://github.com/ParvezAlam123/Assignment-4/tree/main/code>

$X = -4$ , for  $X_1 = 1$  and  $X_2 = 5$

$X = -6$ , for  $X_1 = 0$  and  $X_2 = 6$

$X \in \{6, 4, 2, 0, -2, -4, -6\}$

## 1 Prob. Sec 3, 7 :

Let  $X$  represents the difference between the number of the heads and the number of the tails obtained when a coin is tossed 6 times. What are possible value of  $X$  ?

**Solution:** Let  $X_1, X_2$  is a binomial random variable

$X_1$	For getting head
$X_2$	For getting tail

$X_1, X_2 \in \{0, 1, 2, 3, 4, 5, 6\}$

$X = X_1 - X_2$

Possible values of  $X$  are

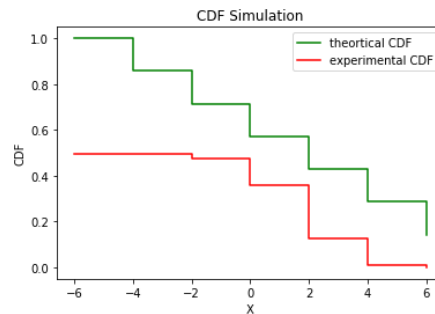
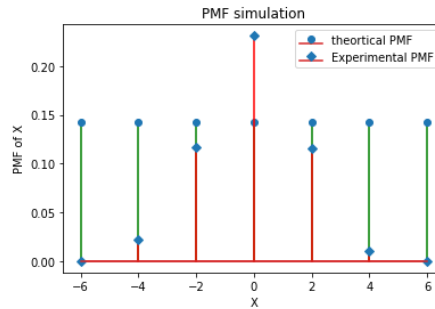
$X = 6$ , for  $X_1 = 6$  and  $X_2 = 0$

$X = 4$ , for  $X_1 = 5$  and  $X_2 = 1$

$X = 2$ , for  $X_1 = 4$  and  $X_2 = 2$

$X = 0$ , for  $X_1 = 3$  and  $X_2 = 3$

$X = -2$ , for  $X_1 = 2$  and  $X_2 = 4$



If the coin is tossed  $n$  times then:

$X \in \{n, n-2, n-4, \dots, 4, 2, 0, -2, -4, \dots, -(n-2), -n\}$

**PMF and CDF for  $n=100$  :**

