Solution to 12.13.4.3

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Question: Let X represent the difference between the number of heads and the number of tails obtained when a coin is tossed 6 times. What are the possible values of X?

Solution:

It is given that the coin is tossed 6 times.

Let A be a random variable which denotes the number of heads,

$$A = \{0, 1, 2, 3, 4, 5, 6\} \tag{1}$$

Let B be a random variable which denotes the number of tails,

$$B = 6 - A \tag{2}$$
$$= \{6, 5, 4, 3, 2, 1, 0\} \tag{3}$$

Let C be a random variable which denotes the difference between the number of heads and number of tails,

$$C = A - B \tag{4}$$
$$= A - (6 - A) \tag{5}$$
$$= 2A - 6 \tag{6}$$
$$= \{-6, -4, -2, 0, 2, 4, 6\} \tag{7}$$

Therefore, X can take values from the set {-6,-4,-2,0,2,4,6}.