Example:

A box contains 15 quarters, 5 nickels, 7 dimes and 8 pennies.
You pick a coin at random from the box, what is the average value of the draw?

Solution:

Alternative 1: There are 35 coins in total. We want to find the average value of the drawn coin. Since the coins have **different values**, then we calculate the value of all in **dollars**. Therefore the average value will be as follows:

1 quarter = \$0.25
1 nickel = \$0.05
1 dime =\$0.10
1 cent = \$0.01

$$\frac{0.25*15+0.05*5+0.10*7+0.01*8}{35}\approx 0.14$$

i.e. The average value of the draw is about 14 cents.

Alternative 2: Let **X** be the random variable of **the value of the coin in dollars**. The following table gives the probability distribution of X.

X=x(in dollars)	P(X=x)
X=0.25 (coin is a quarter)	P(X=0.25)= 15/35
X=0.05 (coin is a nickel)	P(X=0.05)= 5/35
X=0.10 (coin is a dime)	P(X=0.10)= 7/35
X=0.01 (coin is a penny)	P(X=0.01)= 8/35

Thus, the expected value of the draw is:

$$E(X)=0.25*\frac{15}{35}+0.05*\frac{5}{35}+0.10*\frac{7}{35}+0.01*\frac{8}{35}\approx 0.14$$

i.e. The average value of the draw is about 14 cents.