Answer on Question #44240 – Math - Statistics and Probability

Problem.

4.43 Three data entry specialists enter requisitions into a computer. Specialist 1 processes 30 percent of the requisitions, specialist 2 processes 45 percent, and specialist 3 processes 25 percent. The proportions of incorrectly entered requisitions by data entry specialists 1, 2, and 3 are .03, .05, and .02, respectively. Suppose that a random requisition is found to have been incorrectly entered. What is the probability that it was processed by data entry specialist 1? By data entry specialist 2? By data entry specialist 3?

Solution.

The probability that a random requisition is entered by data entry specialist 1 equals 0.3, by data entry specialist 2 equals 0.45, by data entry specialist 3 equals 0.25. From the Bayes's theorem:
the probability, that incorrect requisitions were entered by data entry specialists 1, equals

$$p_1 = \frac{0.3 \cdot 0.03}{0.3 \cdot 0.03 + 0.45 \cdot 0.05 + 0.25 \cdot 0.02} \approx 0.2465;$$

the probability, that incorrect requisitions were entered by data entry specialists 2, equals

$$p_2 = \frac{0.45 \cdot 0.05}{0.3 \cdot 0.03 + 0.45 \cdot 0.05 + 0.25 \cdot 0.02} \approx 0.6164;$$

the probability, that incorrect requisitions were entered by data entry specialists 3, equals

$$p_3 = \frac{0.25 \cdot 0.02}{0.3 \cdot 0.03 + 0.45 \cdot 0.05 + 0.25 \cdot 0.02} \approx 0.137.$$

Answer: $p_1 \approx 0.2465$, $p_2 \approx 0.6164$, $p_3 \approx 0.137$.