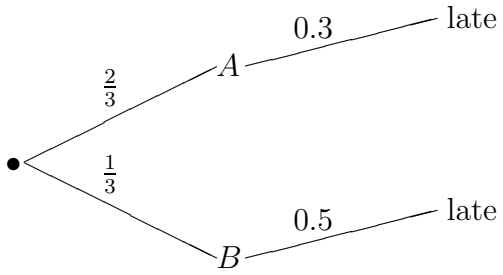
QUESTION
There are two railway routes A and B between two towns. On route A 30% of the trains arrive late, while on route B 50% of the trains arrive late. A businessman travels twice as often by route A as he does by route B. On a certain day his train is late, What is the probability that he traveled by route B that day?

ANSWER



Given $P(A) = 2P(B) \Rightarrow P(A) = \frac{2}{3}, P(B) = \frac{1}{3}$.
$P(\text{late}|A) = 0.3, P(\text{late}|B) = 0.5$ P(late)= $\frac{2}{3} \times 0.3 + \frac{1}{3} \times 0.5 = \frac{11}{30}$ P(B—late)= $\frac{\frac{1}{3} \times 0.5}{\frac{11}{30}} = \frac{5}{11}$ (by Bayes' formula)