PRODUCT RULE for INDEPENDENT EVENTS

If A and B are two independent events, then the probability that the event A will occur, followed by event B, is given by:

$$P(AB) = P(A) \times P(B)$$

$P(A)$ is the probability that event A will occur.

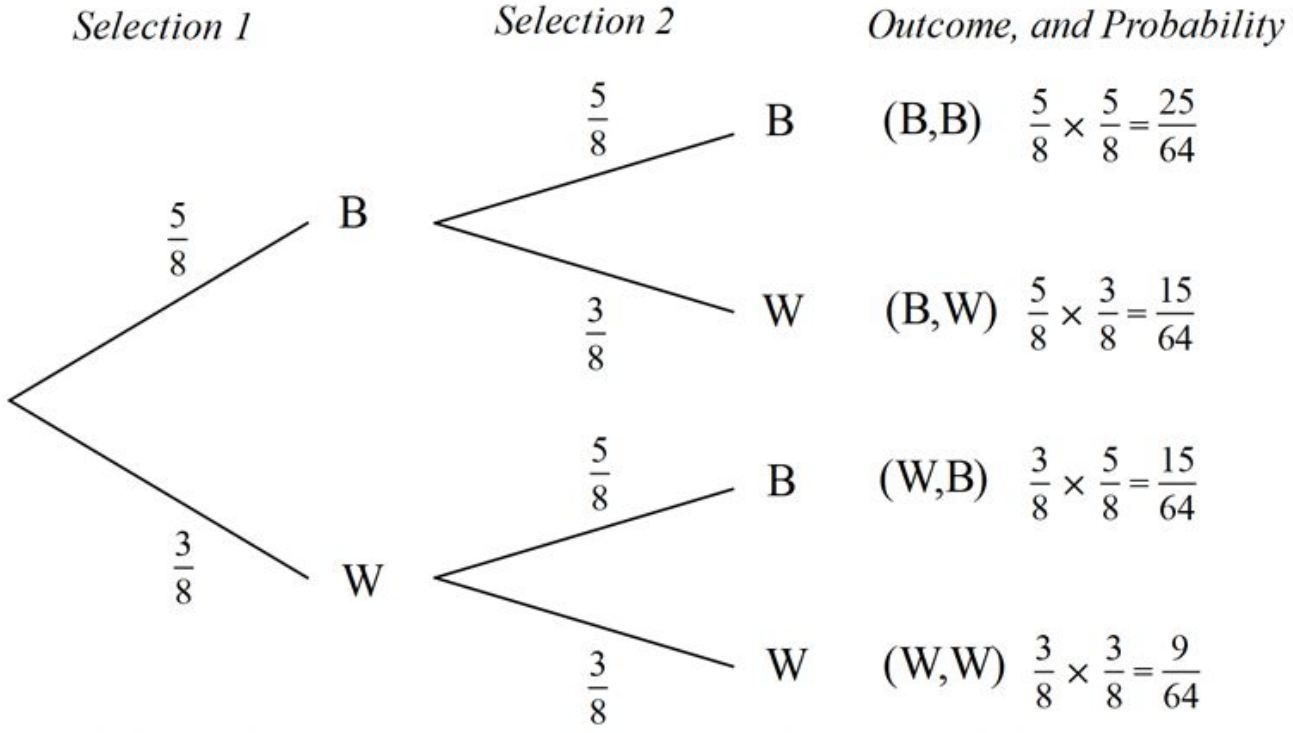
$P(B)$ is the probability that event B will occur.

$P(AB)$ is the probability that events A and B will occur in that order.

TREE DIAGRAM - WITH REPLACEMENT

A bag contains 8 marbles: 5 blue (B) and 3 white (W).

Two marbles are selected WITH replacement.

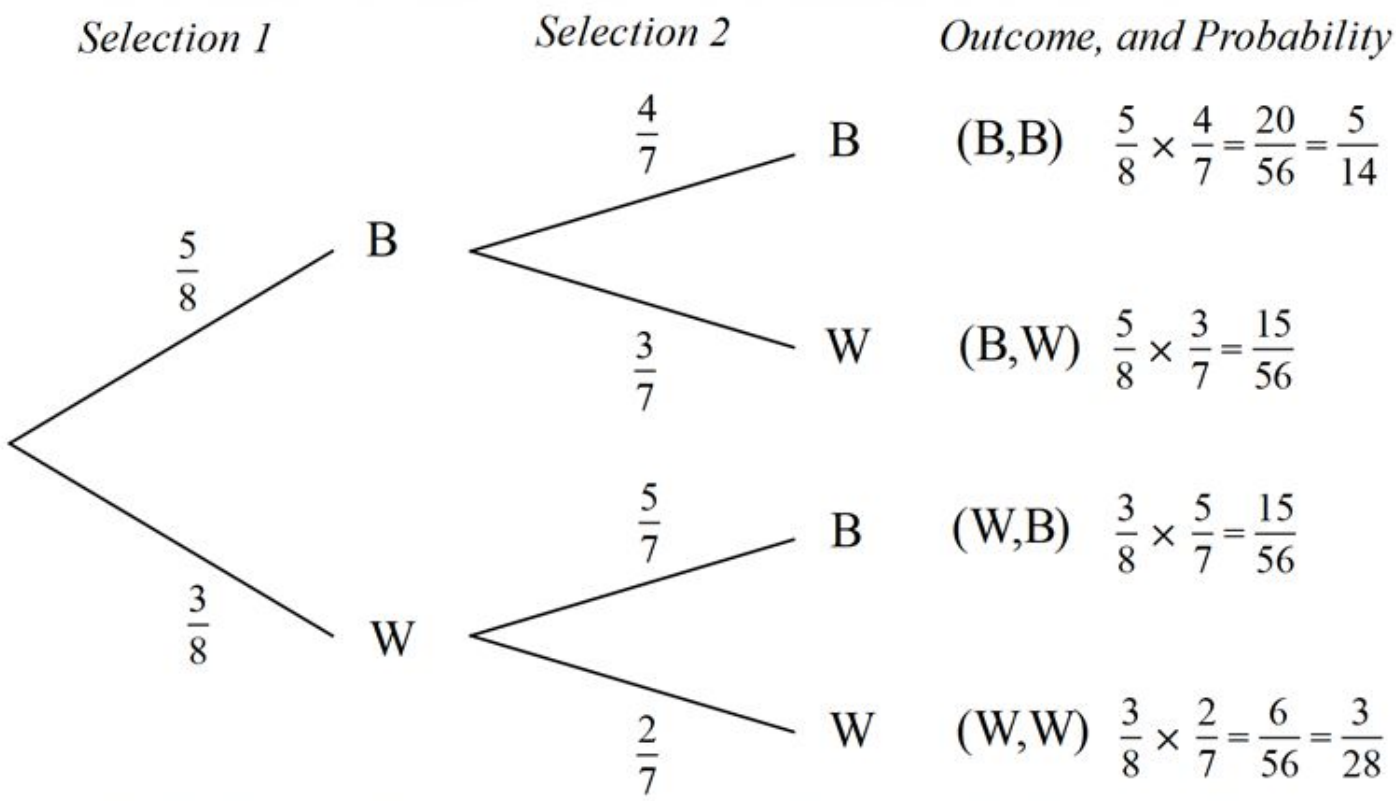


Each outcome for the experiment is obtained by multiplying the branch probabilities.

TREE DIAGRAM - WITHOUT REPLACEMENT

A bag contains 8 marbles: 5 blue (B) and 3 white (W).

Two marbles are selected WITHOUT replacement.



CONDITIONAL PROBABILITY

The probability of Event A occurring given that Event B has occurred is noted $P(A|B)$

That's "the probability of A given that B has occurred".

If events A and B are independent, then: $P(A|B) = P(A)$

(this statement mean that the fact that B has occurred has no influence on the probability of A to occur)

Likewise, if A and B are independents, $P(B|A) = P(B)$