Probability tree (dependent event)

Dependent Events:(With out replacement)

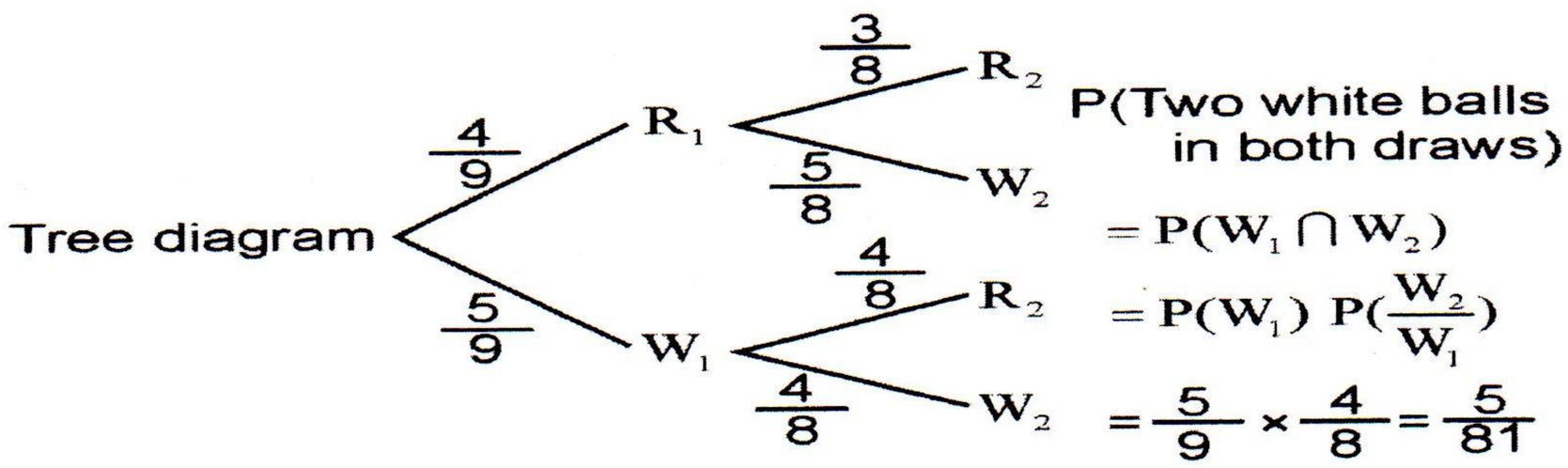
Two or more events are dependent if one event affects the probability of the other event.

For two event A & B

$P(A \text{ and } B) = P(A \cap B) = P(A) \times P(B/A)$.

$= P(A) \times P(A/B)$.

Example 1. In the above example, if a ball is drawn from the bag and not replaced before the 2nd ball is drawn. Then two events are not independent.



Q.1 Ali has ten black and six brown shirts in his drawer. If two shirts are removed (drawn) from the drawer, one after the other, draw tree diagram and calculate the probability that

(a) both shirts are black. _____

(b) both shirts are brown. _____

(c) The first is black and 2nd is brown. _____

(d) The shirts are of different colors. _____

Q.2 The probability that mira passes the driving test on her first attempt is $^6/_7$. If she fails then the probability she passes on any future attempt is $^7/_8$. Draw a tree diagram to represent the probability that she passes the driving test on her third attempt. _____

Q.3 A bag contains four red and six blue balls. One ball is chosen and its color noted. It is chosen and its color noted. It is not put back into the bag. A 2nd ball is chosen and its color noted.

(a) Draw a tree diagram.

(b) Find the probability that

(i) Two red ball appear. _____

(ii) One ball of each colour _____

(iii) Two blue balls appear. _____

4) In a bag, there are 3 red and 2 grey balls. Two balls are chosen at random without replacement. Draw tree diagram.
Find the probability that :
a) 1st is red and 2nd is grey? _____

b) Balls are of different colours _____

c) Balls are of same colours. _____

5) There are 4 bottles of orange juice, 3 bottles of apple juice, 2 bottles of tomato juice. Viv takes a bottle at random and drinks the juice.
Then Caroline takes a bottle at random and drinks the juice.
Work out the probability that they both take a bottle of the same type of juice.

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6) There are seven counters in a bag.
5 counters are red. 2 counters are blue.
Toni takes at random a counter from the bag. She does **not** put the counter back in the bag. Toni then takes at random another counter from the bag.
Work out the probability that Toni takes two counters of the same colour.

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7) There are 8 pencils in a box.5 pencils are blue. 3 pencils are red.
Simon takes a pencil at random from the box. He does not replace the pencil.
Hazel then takes a pencil at random from the box.
Work out the probability that both Simon and Hazel take a red pencil.

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8) A bag contains 5 red and 3 blue balls.
Two balls are taken out and **not** replaced.
What is the probability that **at least one** of them is red?

_____

9) Sam has two bags of marbles.
Bag A contains 9 red marbles and 6 green marbles.
Bag B contains 3 red marbles and 7 green marbles.
Sam rolls a fair six-sided dice once.
If she rolls a six she takes a marble from bag A.
If she does **not** roll a six she takes a marble from bag B.
Calculate the probability that Sam chooses a red marble. _____

10) There are twelve counters in a bag.
4 counters are red. 6 counters are blue. 2 counters are blue.
Sam takes at random a counter from the bag.
He does **not** put the counter back in the bag.
Sam then takes at random another counter from the bag. Work out the probability that Sam takes two counters of the same colour.

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