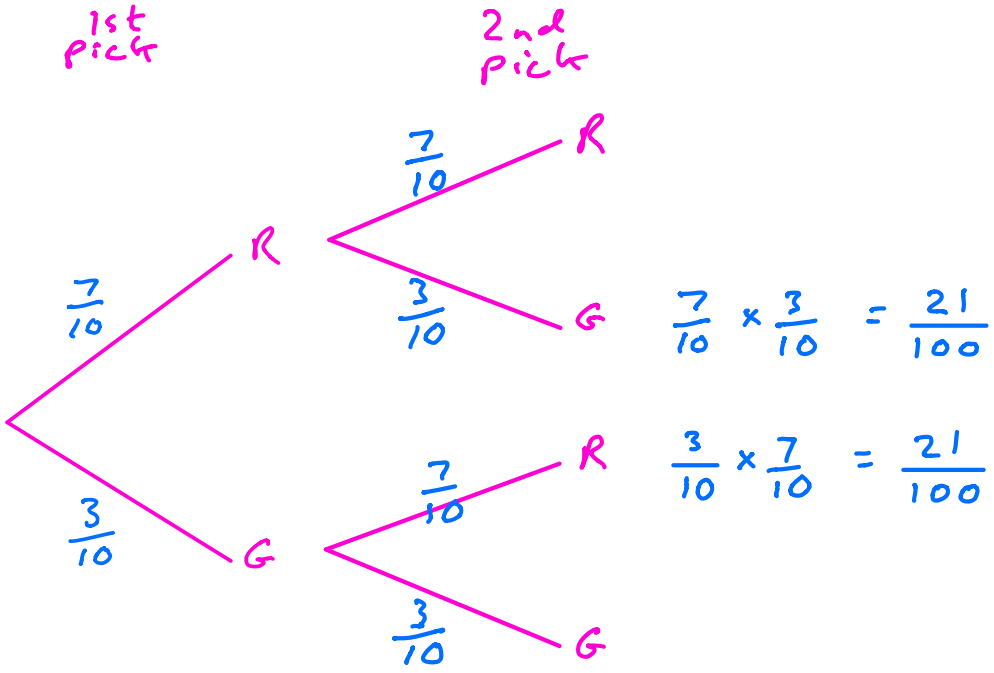
# Probability Trees

Suppose a bag contains 7 red counters and 3 green counters. A counter is chosen at random, its colour is noted and it is replaced in the bag. A second counter is chosen at random and its colour noted.

i) Represent the possible outcomes on a probability tree.




ii) Find probability we choose one of each colour

$$= \frac{21}{100} + \frac{21}{100} = \frac{42}{100}$$

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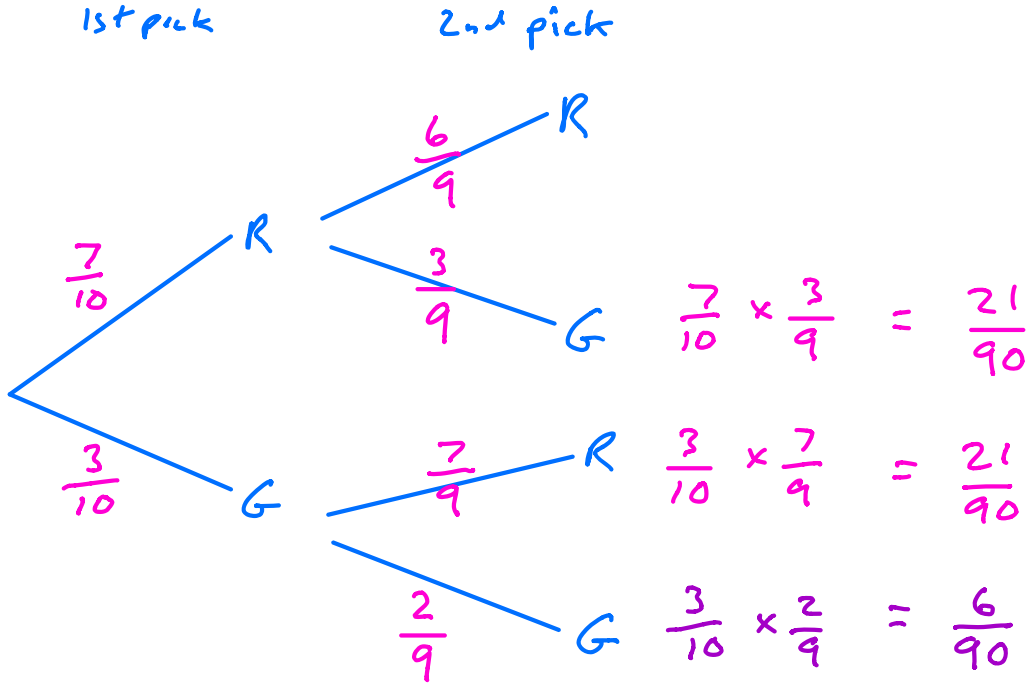
## CONDITIONAL PROBABILITY

Exact same question but do not replace the first counter in the bag.




Prob(one of each colour) $= \frac{21}{90} + \frac{21}{90} = \frac{42}{90}$

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Prob(both green) $= \frac{6}{90}$

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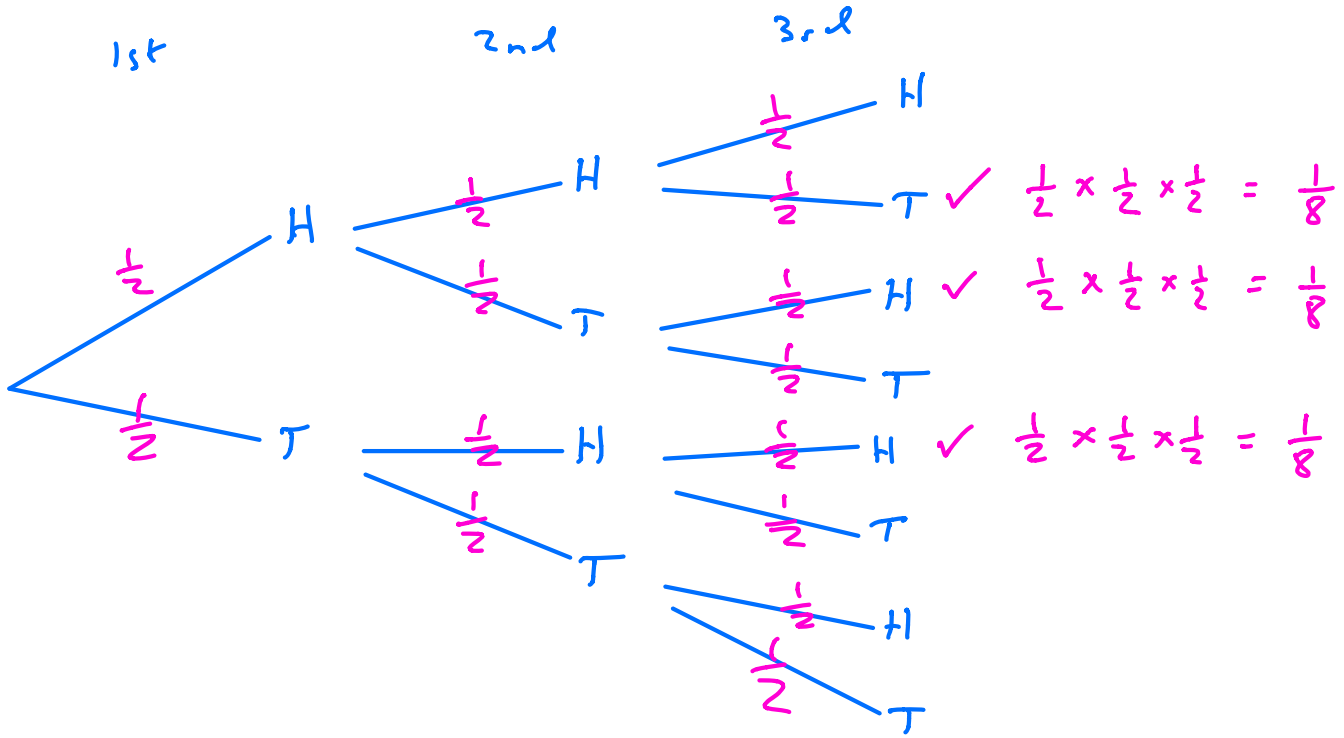
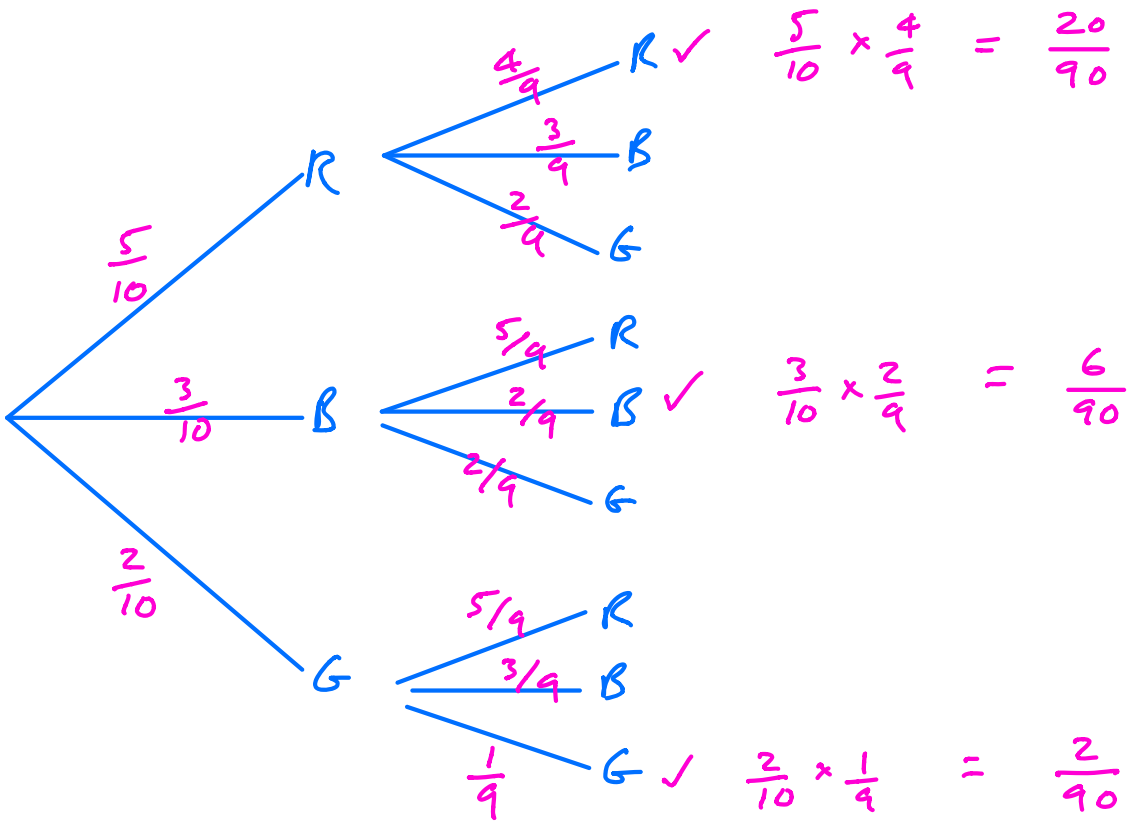
Spin a coin 3 times. What is prob we get exactly 2 heads




P(exactly 2 Heads) $= \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{3}{8}$

5 red, 3 blue, 2 green  Choose 2 without replacement

Draw tree and find P(Both same colour)




$\frac{5}{10} \times \frac{4}{9} = \frac{20}{90}$

$\frac{3}{10} \times \frac{2}{9} = \frac{6}{90}$

$\frac{2}{10} \times \frac{1}{9} = \frac{2}{90}$

$P(\text{Both same colour}) = \frac{20}{90} + \frac{6}{90} + \frac{2}{90} = \frac{28}{90}$

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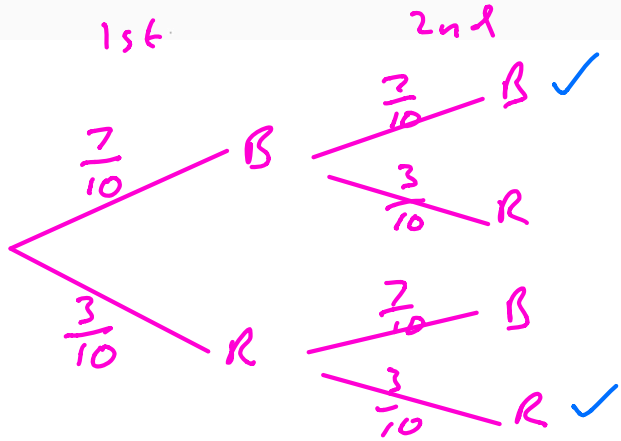
1. A bag contains 7 blue balls and 3 red balls. A ball is selected at random, its colour noted and it is replaced. A second ball is selected at random and its colour noted. Represent the various possible outcomes on a probability tree and calculate:

   a) The probability both balls selected are the same colour.

   b) The probability at least one of the balls is red.




$\frac{7}{10} \times \frac{7}{10} = \frac{49}{100}$

$\frac{7}{10} \times \frac{3}{10} = \frac{21}{100}$ ✓

$\frac{3}{10} \times \frac{7}{10} = \frac{21}{100}$ ✓

$\frac{3}{10} \times \frac{3}{10} = \frac{9}{100}$ ✓

a) $P(\text{Both same colour}) = \frac{49}{100} + \frac{9}{100} = \frac{58}{100}$

b) $P(\text{At least one red}) = \frac{21}{100} + \frac{9}{100} + \frac{21}{100} = \frac{51}{100}$