2.11 Lesson 11 Tree diagrams with Double Grim dice

Consider the random experiment :

> Each players picks two dice of the same color. The one that rolls the highest total wins.

We will work out **theoretical probabilities** of winning using sample space diagrams and tree diagrams.

1) We roll 2 blue dice. What are the possible outcomes? What are the possible totals of the two dice?

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2) Use sample space diagram to work out the probability of each possible outcome.

Blue die						
Blue die						

3) Does it matter whether we roll one dice and then the other OR roll them both at once? Why?

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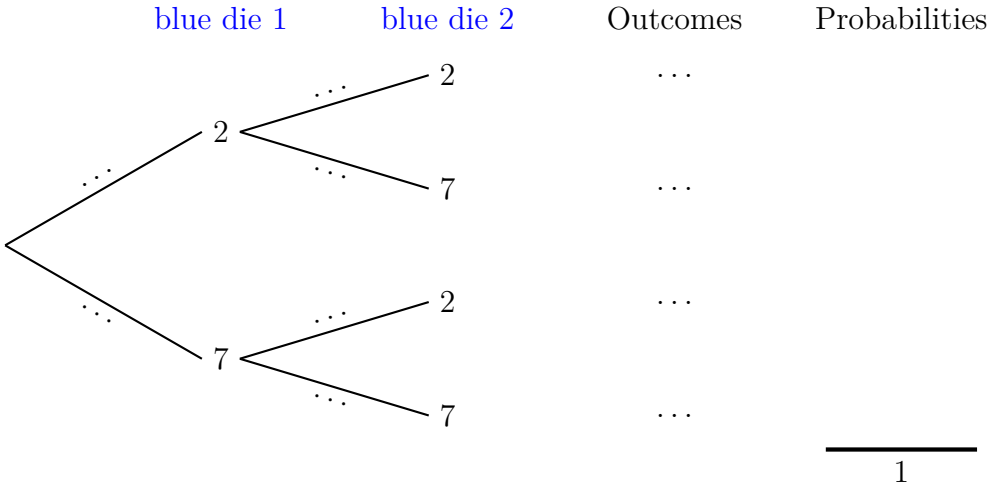
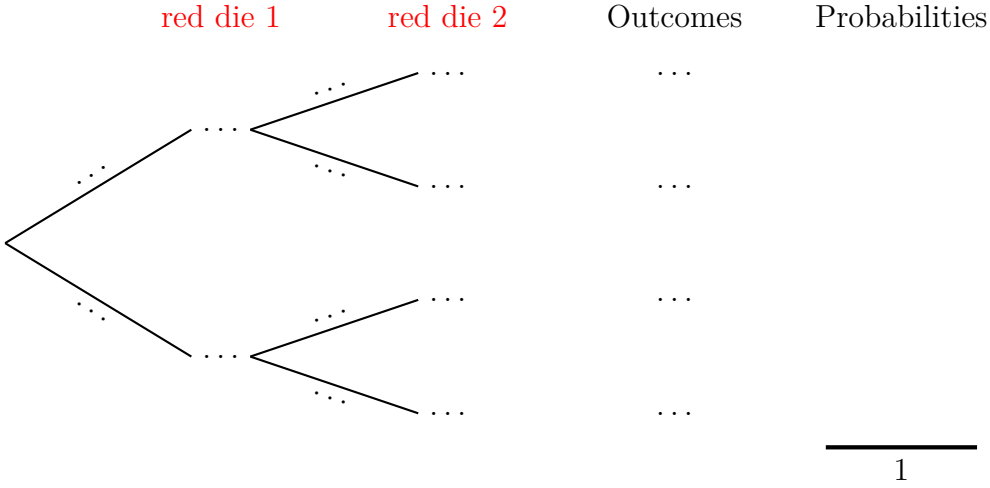
4) Use the tree diagram to work out the probabilities of possible outcomes.



5) We roll two red Grim dice and add the scores. Use the tree diagram to work out the possibles outcomes and the probabilities of each outcome.



6) Why might it be better to keep all the denominators the same?

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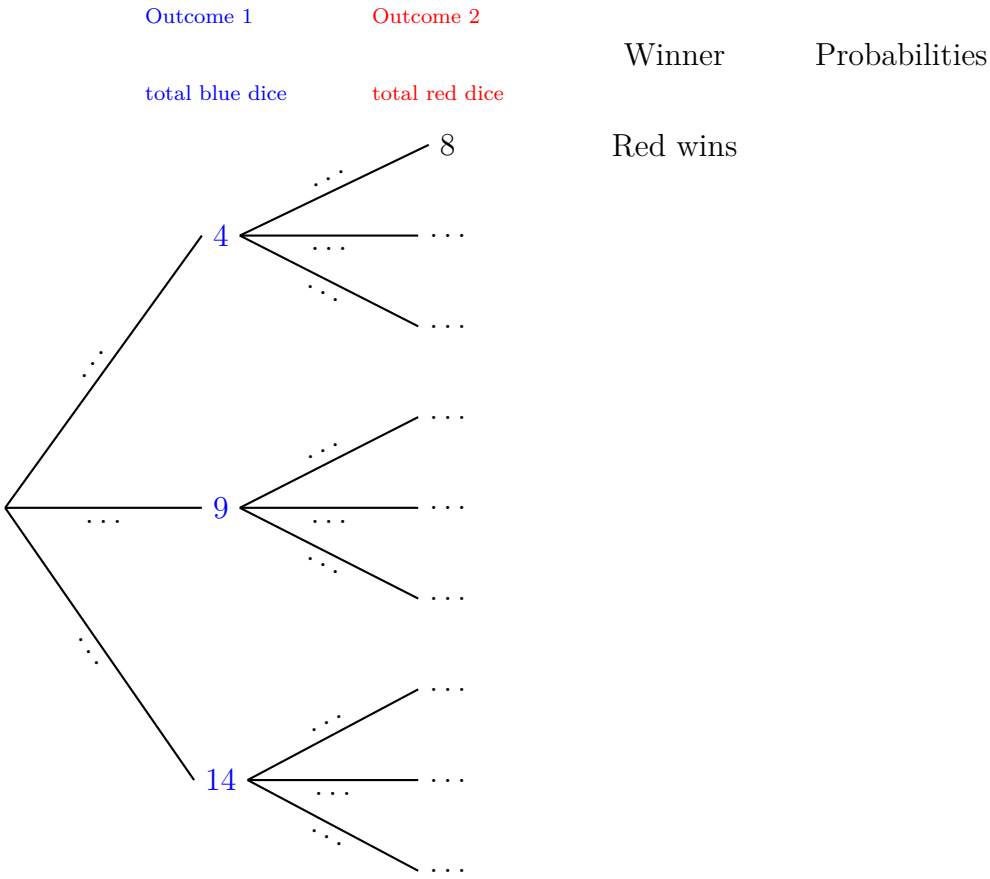
7) Use the tree diagram to work out the probabilities of two blue dice beating two red dice.



8) Which do you think is better - a pair of blue dice, or a pair of red dice?[1]

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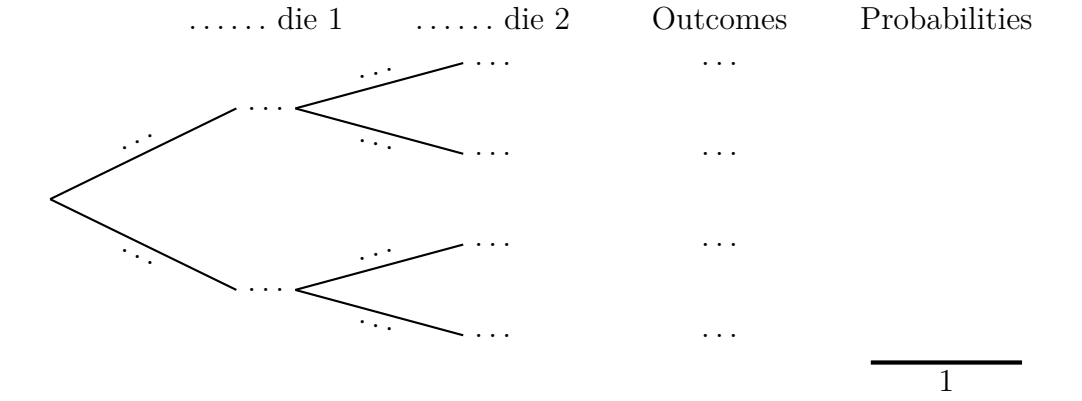
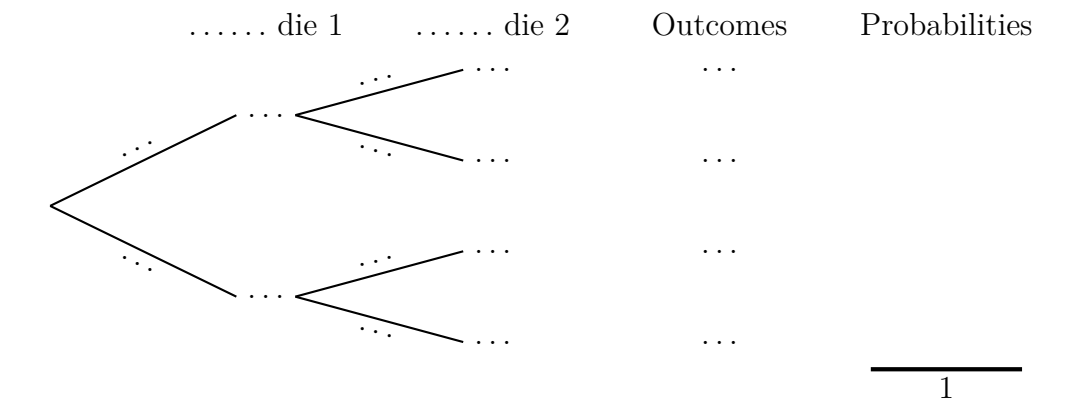
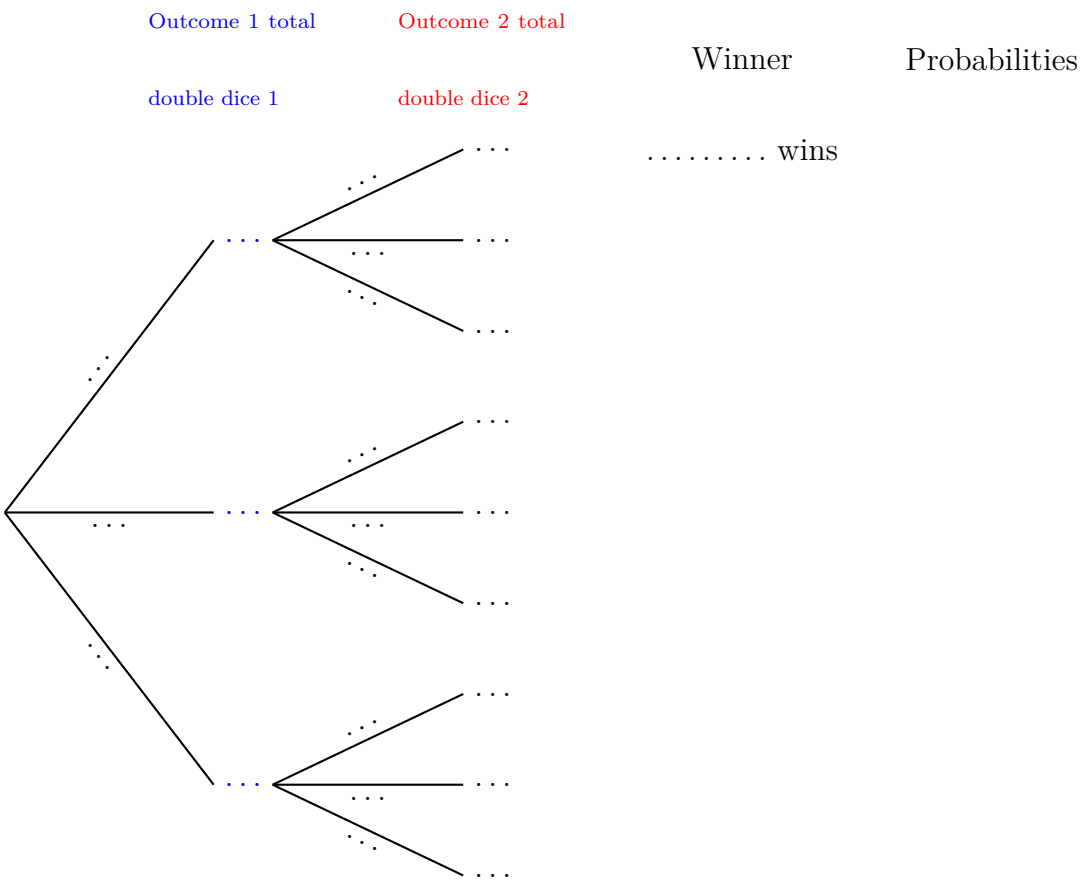
[1] In a previous lesson we found that single red dice beats blue dice with a chance of $\frac{7}{12}$.

9) Pick double dice pair of your choice. Work out the probabilities of the total score outputs, then the probabilities of one pair winning. *Pick different pair from your classmates.*

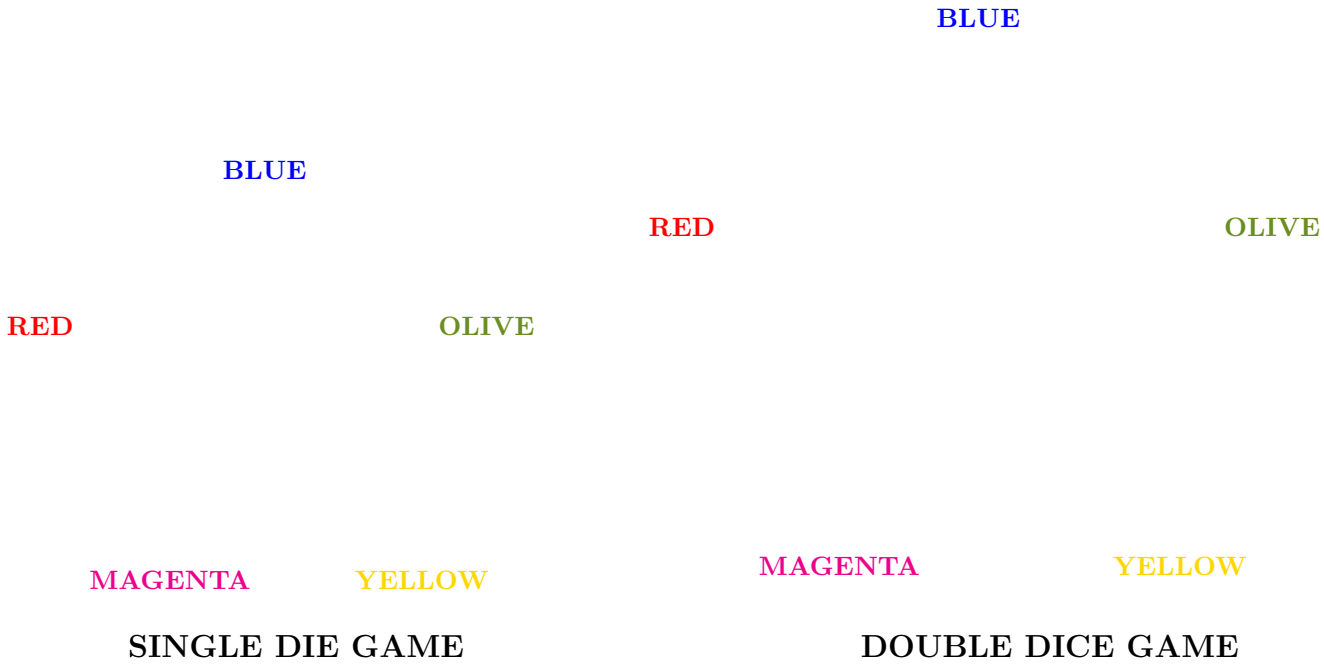
I chose to study double ..... dice and double ..... dice.







10) Using the table answers on the board, can you draw a diagram showing which dice colours beat the others? Compare it to the diagram we had for a single die.



Why are Red and Olive joined with a line instead of an arrow?

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Can you devise a strategy to beat 2 other players when rolling double or single dice?