PROBLÈME DES PARTIES

1 Finish the broken off game 20 times, i.e. repeat the following for 20 times:
Give player A 4 and player B 3 points and the toss the coin until one of them has 5 points and note down the result.
What is your suggestion how the money should be divided up?

Game			Game		
1:	heads	A has won	11:	heads	A has won
2:	tails, tails	B has won	12:	heads	A has won
3:	heads	A has won	13:	tails, tails	B has won
4:	tails, tails	B has won	14:	tails, heads	A has won
5:	tails, heads	A has won	15:	tails, heads	A has won
6:	tails, heads	A has won	16:	heads	A has won
7:	heads	A has won	17:	heads	A has won
8:	tails, tails	B has won	18:	tails, heads	A has won
9:	tails, heads	A has won	19:	heads	A has won
10:	tails, heads	A has won	20:	heads	A has won

In this simulation in 16 cases out of 20 A wins the game, so the chances for A to win are around 16/20 = 4/5. Therefore the stake should be divided in the ratio **4:1**.

2 How should the 64 Louis D'or be distributed if A has got 3 points and B 1 point?

Like in example 1 we will finish the game. To get an overview over all possible outcomes it is best to plot a "tree": each possible outcome corresponds with a branch.
Now we do exactly as Pascal suggests:
We assume that 64 Louis D'or are at stake. The score is 3:1 in favour of player A.
The coin is tossed for the fifth time.
In half of all cases the result is a "head", in half of the cases the result is a "tail".
Therefore we distribute the 64 Louis D'or equally to the two branches.
The coin is tossed for the sixth time.
Again in half of all cases the result is a "head", in half of the cases the result is a "tail" and again we distribute to both sides of the tree the 32 Louis D'or equally to the two branches and so on.
Whenever A or B gets 5 points the game and with it the tree in that direction ends.
Now we have to look at all the numbers along the **last** branches and sum up those leading to A and those leading to B:

A: $16 + 8 + 4 + 2 + 8 + 4 + 2 + 4 + 2 + 2 = 52$
B: $2 + 2 + 2 + 2 + 4 = 12$

Finally, player A gets 52 Louis D'or and player B 12 Louis D'or which results in a division of the stake with the ratio **13:3**.