A variation to the ruin problem

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ABSTRACT

The classical ruin problem is concerned with two gamblers. Here we consider the following variation. There are three gamblers A, B, C with initial capitals a, b, c dollers, respectively. Games are played between C and A, between C and B, and no game is played between A and B. So, C is a kind of banker. In each game C wins or loses a doller with equal probability, and there is no tie. Unitil the first ruin occurs, we assume that each time C chooses A or B at random as the adversary. If C (banker) goes broke first, the game ends. If one of the others goes broke first, the game continues between the remaining two until one goes broke. Thus, when the game is over, the following four cases are possible as the final survivor(s): $(1)A, B$ $(2)A$ $(3)B$ $(4)C$. What is the probability distribution for these cases? Who goes broke first? We are going to calculate, for each player, the probability that he is ruined first, and the one he is the sole survivor.

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