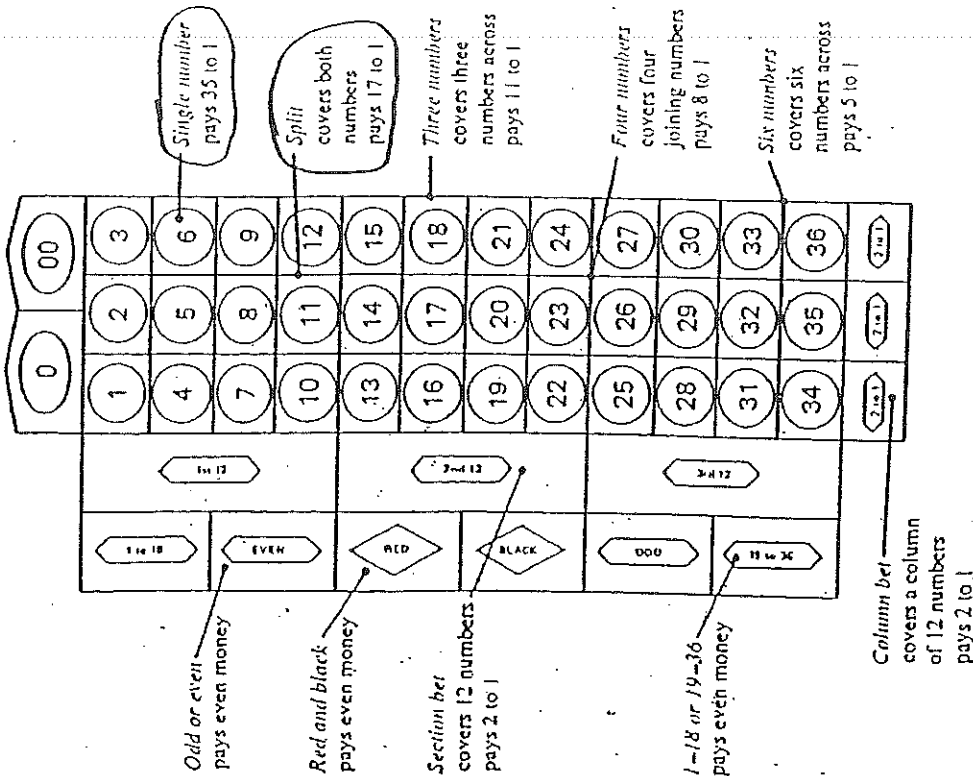Case Study   (gambling): Roulette

In the game of roulette, at least as it is played in Nevada, the roulette wheel has 38 numbered slots into which a spinning ball can fall: the numbers from 1 to 36, alternately painted red and black, and two special numbers, 0 and 00, painted green. The wheel is spun in such a way that all 38 numbers have an equal chance of being chosen. As indicated by the roulette tableau (as it is called) below, there are a lot of different kinds of bets you can make on how any given spin will come out; I am interested here in comparing two of them: betting on a single number, and betting on a split. If you put $1 (say) on a single number, say 6, and it comes up, they give you back your $1 plus $35 in winnings. If you put $1 on a split, say 11/12, and either 11 or 12 comes up, you get back your dollar plus $17 in winnings.

Here are two strategies (it helps in analyzing games like this to imagine making many $1 wagers):

> (A) Make 1000 $1 bets on a single number.

> (B) Make 1000 $1 bets on a split.

What is your chance of coming out ahead with each of these strategies on any given play? About how much money do you expect to win or lose on any given $1 bet? About how much money should you expect to have won or lost after 1000 plays? Give or take about how much? What is your chance of coming out ahead after 1000 plays with each of the two strategies? Which one do you prefer, or are they the same?