ALLAN J. GOTTLIEB, '67

The Shooting Party

With all the commotion about "Puzzle Corner" dying and regenerating, I forgot to thank the Alumni/ae Association for selecting me as a Harold E. Lobdell Award winner for my stewardship of this column. At the September ceremony I had the pleasure of meeting the faces behind the names of some of the frequent contributors to the column. I only wish I could meet you all. The timing was interesting: when the award was presented we had agreed to restart "Puzzle Corner," but the announcement had not yet appeared in the magazine. My introduction included mention of the cancellation, letters, and reinstatement, which seemed to please many of those in attendance (at the least it pleased me). As an extra benefit, the award included a handsome clock, and by coincidence my family really needed one. It occupies an honored place in our living room.

Problems

F/M 1. Robert Rorschach has a novel solitaire game for which he would like a (presumably computer-generated) optimal strategy. The game involves 9 markers numbered 1 to 9, a table, and a standard pair of dice. Each game begins with the 9 markers on the table. A play of the game consists of throwing the dice and removing, if possible, a set of the markers whose total matches the total ɔf the dice throw. When you throw a number that cannot be matched with the narkers left on the table, the game is ɔver and your score is the total of all the narkers taken.

As an example, if you first rolled nake-eyes, your only choice in markers vould be to take "2." A second roll of 3 would allow you to take either the "8" lone, or the "7" and the "1,' or the "5" nd the "3," or the "4" and the "3" and he "1." If you next rolled 2, you would iot be able to make that total from the emaining markers. The game would be ver and your total score would be 10.

As a player, you would like to maximize the expected value of the game. You need a strategy that specifies, for each set of markers that could remain on the table and for each of the possible rolls from 2 to 12, just which set of markers you should pick.

F/M 2. Robert High has apparently studied the art of dueling from a mathematical viewpoint. In this he clearly outclasses me, since the only mathematical statement I can make about dueling is that it robbed us of much of Galois's expected lifetime.

Two duelists take turns firing at each other. They continue until one of them is hit. As is only fair, the weaker (less accurate) duelist goes first. If his accuracy is 1/3, how accurate must his opponent be for the match to be fair?

Now consider three duelists who take turns firing. Assume each knows the accuracy of his opponents. Is it always optimal to fire at the strongest opponent? Can the weakest duelist ever have an advantage, even if he fires last?

Finally, consider four or more duelists, again with perfect knowledge. Is it always optimal to fire at your strongest opponent? Is it necessary to know one's *own* accuracy? Can it ever *improve* one's chances to become *less* accurate, even if the overall ordering of the duelists' accuracies remains the same?

F/M 3. The following problem is from Gordon Rice. Lay out the A, 2, 3, 4, and 6 of spades in that order. Now roll one of the dice from your backgammon set. For each roll of the die, exchange positions between the Ace and the indicated card. (If a 1 is rolled, do nothing.) By repeated rolls, we can generate "random" permutations of the six cards.

For a "trial" of N rolls, a certain set of permutations are possible outcomes. How big does N need to be for every permutation to be a possible outcome? Are there any N such that all possible outcomes have equal probability?

Speed Department

Speedy Jim Landau wants you to find a numerical operation that is commutative but not associative.

Solution To Speed Problem

(Look below Allan's photo)

SEND PROBLEMS, SOLUTIONS, AND COMMENTS TO ALLAN J. GOTTLIEB, '67, THE COURANT INSTITUTE, NEW YORK UNIVERSITY, 251 MERCER ST., NEW YORK, N.Y. 10012, OR TO: gottlieb@nyu.edu

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