Fair Foul Play

"Competitive" sports are often, as we know, just not fair. It can be demonstrated, using a variety of analytical methods, that indeed the "better" player has an advantage and will more likely win than lose—and that just ain't fair!!

With this dilemma in mind you can perhaps appreciate the following puzzle:

THIS ISSUE'S PUZZLE

Three actuaries **A**, **B**, and **C** play basketball and decide to have a competition. They will each take turns taking foul shots, one at a time—**A** followed by **B**, followed by **C**. The first to sink the foul shot will win a prize. If all three players do not succeed **A** will start over again, followed by **B**, etc. continuing until one of them sinks a fouls shot.

They express concerns about the "fairness" of the game, given their different abilities and the order of play.

Before they start the contest, **B** announces that he sinks 30 percent of his foul shots, and the other players announce their statistical probabilities of sinking foul shots. The players then concur that indeed, strange as it might seem, the game as played is fair—each has an equal chance of winning.

What percentage of foul shots does **A** sink?

What percentage of foul shots does **C** sink?

Suppose that a fourth player, **D**, came to the court. He is known to sink 50 percent of his foul shots. After some discussion, the players agree upon a method that will ensure each of the four players an equal chance of winning upon sinking the first foul shot. How do they do it?

Please submit your solution via email to PuzZzles@aol.com or by mail to: PUZZLES, 17 Ravine Rd., Great Neck, NY 11023. Please submit answers as soon as possible to make the solvers list Please send any ideas, and new or old favorite puzzles that you think may be useful for future issues, to the same address or e-mail.

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LAST ISSUE'S PUZZLE:

AVERAGE DIFFICULTY. At a recent dinner, a group of seven actuaries, sitting around a table were, oddly enough, discussing actuary compensation issues. Although reticent to divulge their own individual annual compensations, they agreed that it would be useful if they knew the average salary of the group. As fate would have it, they had no paper or writing utensils of any sort to assist them, nor was anyone else available—yet eventually they derived a strategy that would enable themselves to know the group average, without anybody knowing the salaries of anybody else. How'd they do it? *(Note: I was told a variation of this puzzle may have been broadcast on NPR radio.)*

Answer

Solution 1—the most popular solution: One of the actuaries makes up a number and whispers it to the second. Second silently adds his salary to that and whispers the new total to the third. Third adds his salary to this and whispers sum to the fourth. Similarly, fourth whispers to fifth, fifth to sixth, and sixth to seventh. The seventh adds his salary to the sum and whispers to the first. First actuary then deducts the original made up number, adds his salary to the total and then either—1) divides by seven and announces the total, or 2) tells group their group total (and leaves the division by seven to each actuary). As pointed out by some readers, by having no positive or negative limit in the original dummy number, nobody will have any idea of minimum or maximum salaries.

Solution 2—Alternatively, several solvers pointed out variations of the following: Each person arbitrarily divides his salary into two [can use negative numbers and large numbers too], and tells person on left one of the numbers, and person on right the other number. Thereafter, each person is responsible for the sum of the left and right (excluding own salary)—each in turn announces the sum. Sum of all is taken and divided by 7. Any reason to whisper?

Note that I rejected, apologetically, several clever solutions using algorithms whereby each actuary was responsible for tallying a specific digit. I felt such algorithms could potentially give one actuary too much information.

But my favorite submitted solution involved all seven actuaries pounding their fists under the table to reflect positive response to questions about their salaries. As the submitter pointed out, this probably wouldn't work, but they'd sure have a lot of fun trying to solve it this way.

Solvers—September /October

W. Carroll, M. Evans, M. Failor.

Solvers—November/December

Thank you for all your submissions—here are first forty solvers. C. Arnold, C. Baxter, R. Bottelli, L. Cappellano, W. Carroll, H. Carroll, M. Cook. A. Dean, B. Delaney, L. Dyrland, C. Ebersole, C. Erickson, M. Failor, D. Farmer, J. Featherstone, P. Fung, G. Gikis, C. Greeley, K. Hacker, T. Haynes, C. Hulton, D. Jacobs, R. Keefer, P. Koch, C. Kwok, W. Leisinger, G. Ludwig, J. McPhillips, C. Metheny, D. Onnen, J. Peck, D. Promislow, B. Reynolds, D. Roos, R. Shima, A. Spooner, J. Wander, T. Watson, N. White, J. Young.