Roll Tide, Roll

THIS ISSUE'S PUZZLE

Anne, Bob, and Carol were excited—they were just hours away from being certified as Fellows in the Society of Estuaries (SOE). The SOE, you may know, is a highly selective group for the study of bays, fjords, etc. The trio had only one hurdle left, the dreaded lecture on coastal zone professionalism. The rules were very strict—they had to be at the lecture precisely at 2:00 p.m. and stay awake throughout the whole presentation, or risk public shaming and losing their accreditation.

The lecture was taking place at a hotel a mere nine miles from the famous Klamath River estuary. Since they wouldn't have a chance to visit the estuary after the lecture, they decided to meet at the river mouth that morning. As they marveled at the anti-estuarine flow, the question came up of just how long they could afford to spend there.

Anne had arrived on foot. Bob had come by skateboard. Carol had brought a bicycle. (The study of estuaries, however fascinating, isn't excessively remunerative.) On foot, any of them was capable of traveling at five miles per hour. On the skateboard, any of them was capable of traveling at nine miles per hour. By bicycle, any of them was capable of traveling at 15 miles per hour. Of course, no more than one at a time could use the skateboard or the bicycle, but they could safely leave their vehicles along the route back to the hotel for one another to find. In order to make it possible for the group to stay together at the estuary until the last possible minute, they decided to take turns with the skateboard and bicycle.

Given that they leave simultaneously, how late can they stay at the estuary and still guarantee that the last to arrive is safely at the hotel by 2:00 p.m.?

That's Part A. Part B is the same, except that we suppose that the skateboard traveler is only capable of going six miles per hour. For both parts, please take care that nobody is expected to pick up a vehicle that hasn't yet been dropped off.

Klamath River Estuary

PREVIOUS ISSUE'S PUZZLE

Beating the House

I was running up against my deadline without a good idea for a puzzle, so I decided to pay another visit to my eccentric friend Maxwell Chance and see what he was up to. Having a slightly off-kilter buddy you can call upon is practically indispensable if you want to write puzzles.

Max, I regret to report, was in sad shape. He had recently been discharged from his employer when it was discovered he was spending most of his working hours on an Internet gambling site. Naturally, I scolded him about such behavior, but having access to scenarios involving gambling and/or bad employee behavior is also practically indispensable if you want to write puzzles.

Max explained that he had cracked the code of a particular online casino's roulette game. You may be familiar with roulette (although I hope not from personal experience). For the sake of this puzzle, the key information is that you can bet on the wheel coming up "red" or "black" with a "double-or-nothing" payout, although a fair bet would also include "green." At any rate, Max explained, he had discovered that for this particular online casino, if you recorded the color outcome of 16,342 consecutive spins, and fed it into a computer program he had written, it would tell you the outcome of the next 10 spins with 90 percent accuracy. That is, the algorithm would tell you, in order, what the next 10 spins would be, but exactly one would be wrong, although you couldn't tell which one until it happened.

This seemed to Max to be easy money, so he was spending a lot of time online doing just that. Unfortunately, he told me, it wasn't paying off.

"It's the one error that's killing me. I want to maximize my return, so I bet it all each round and when I hit the error, I go bust. Then I have to go pawn something and start the whole process over again. It takes me hours to get the algorithm set again and by the time I'm ready, I'm unable to think of a smarter betting strategy," Max explained.

"Tell you what," I said. "You start the algorithm over, I'll loan you $100, and I'll come up with a strategy to maximize the outcome without going bust." Now this was unscrupulous behavior—we should have been reporting the data flaw to the casino operator instead of profiting from it. But having loose moral standards is occasionally indispensable if you want to write puzzles.

Two questions:

1. If we have to set the amounts for each of the 10 bets in advance, what is the best we can do?

2. If we can set each bet after seeing the outcome of the prior bet (thus knowing when the one wrong result comes through), what is the best we can do?

Please spell out the strategy, not just the result. And, please hurry! Max has up to 16,311 consecutive spins entered in his algorithm.

Solution

1. The intent of the puzzle was to make you specify the amounts bet for each of Rounds 1 through 10 before Round 1 began. In this case, the best you can do is bet half the available stake in the first round, and the minimum guaranteed amount thereafter. That is, the bets would be 50, 50, 100, 100, 200, 200, 400, 400, 800, and 800. The earlier the error occurs in the 10 predictions, the longer you have to recover—the final stake varies between 1,600 and 3,100.

2. The solution to this one can best be

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found by building backwards through the cases. If you get to Round 9 without having seen the false prediction (so the error is either Round 9 or Round 10), you guarantee yourself a return of +33 percent by betting a third of your stake on Round 9. If you win Round 9, sit out Round 10; if you lose Round 9, bet the remaining two-thirds of your stake on Round 10. Either way, you end up with four-thirds of the starting stake. Working back to the start of Round 8, you can guarantee the same ending position by betting half your stake in that round. In general, for n remaining rounds of bets, the amount you bet should be (n-1)/(n+1); So start with a bet of nine-elevenths of the money available, then eight-tenths, etc. In the particular case given for this puzzle, this guarantees an ending position of 9,309.

Several people suggested you might do better by betting against the predicted outcome on the 10th bet, if the error had not occurred in the first 9. Imagining all the false predictions to be cases where the wheel turned up "green," this isn't a viable strategy, but I grant that wasn't made clear in laying out the puzzle.

Solvers List

My apologies to all who have come to expect a timely notification as to whether or not their solution was correct—I sent no such notifications this month. It's not personal, I assure you.

Robert Bartholomew, Andrew Beamish, Bob Byrne, Mike Crooks, Michael Dalton, Andrew Dean, Bernie Erickson, Mark Evans, Megan Farris, Mark Fowler, Edgar Goral, George Green, Rui Guo, Yehuda Haber, Bob Hupf, Christopher Johnson, Pat Johnston, Curtis Lee, Tim Luker, Jeff Mclane, Lee Michelson, Geoff Moak, Philip Morse, David Oakden, Christoper Perrin, David Promislow, Noam Segal, Lenny Shteyman, Al Spooner

Solutions may be e-mailed to cont.puzzles@gmail.com or mailed to Puzzles, 65 W. 35th Place, Eugene, Ore. 97405.

In order to make the solver list, please make sure that your answers and solutions are received by March 31, 2009. Depending on the response volume, solver lists may contain only the names of people who solved puzzles on the first attempt.