

Dance Moves

THIS ISSUE'S PUZZLE

"Come dancing," my sister requested of me one Saturday. My sister used to go dancing every weekend, but she'd never before invited me. So I was, naturally, a little puzzled. She explained that she had joined a folk dancing troupe. Folk dancing, as you might know, is the source of many natural puzzles. Why do it at all? Why do twice as many women as men show up to dance? Has anyone thought to bring cookies?

In this particular case, though, my sister was looking for help with the choreography.

"We're doing a dance called the Dudeny Reel," she explained. "We start off with 11 dancers in a circle but with a gap on the audience's side where a 12th dancer could stand. The dancers are wearing hand-knit sweaters with the letters "s r e c n a d k l o f" embroidered on the front, one letter per dancer..."

"Wait a second," I interrupted. "Who knit the sweaters? And who in the world wears sweaters to dance in?"

"Don't interrupt," she scolded. "In turns, one of the dancers is the mover. The mover must either be next to the gap, in which case they do a side-step-pivot-turn-and-bow into the gap (and their former position becomes the new gap), or the mover can be one person away from the gap, in which case they do a grapevine-hop-and-turn around the person separating them from the gap (and again their former position becomes the new gap)."

"What do the other dancers do?"

"They do a four-count turn in place. Now, the goal of the dance is to have the dancers end with their initial positions reversed and the gap in the same place. So, at the end, their sweaters spell out "folk-dancers," reading clockwise around the circle. It's a dramatic, crowd-pleasing finish. But the problem is, our recording of the song for this dance is only two minutes long. The best I have been able to figure out, we need 50 moves, and the dancers

simply cannot make that many moves in that little time!"

I got out a fresh pencil and set to work. Fortunately, I found a couple of alternatives for her that took a good bit fewer than 50 moves. How well can you do? Number the dancers clockwise 1, 2, 3, ..., 11 starting from the gap. To submit your answer, send me a sequence of numbers indicating which dancer is the mover at each step. There are multiple solutions, but you need submit only one valid solution to make the solvers' list, assuming you take no more moves than I needed.

PREVIOUS ISSUE PUZZLES

State of Confusion

Part 1 of this puzzle takes place in the State of Confusion, where the insurance market is split among four carriers: Adversity Insurance, Bad Luck Insurance, Calamity Insurance, and Disaster Insurance. One day, the state's attorney general noticed that Adversity had a lot more clients than any of the other carriers.

"Hmm, there must be something illegal at work here," he thought, and scheduled a press conference to announce an upcoming lawsuit against Adversity.

The bad publicity caused an immediate reaction—clients abandoned Adversity in droves and switched to one of the other three carriers. By the next day, each of the other three companies had three times the number of clients it previously had.

After the suit was settled, the attorney general noticed that Bad Luck now had more clients than the other carriers. Another press conference followed, and once again the fickle public responded by leaving Bad Luck. The other three companies (including Adversity) saw their business triple.

A few months later, when the attorney general noticed that Calamity was now the largest company, he held another press conference. And, once again, clients moved, tripling the size of the other three

companies. A few months after that, the attorney general struck Disaster. And, as you have probably guessed, the business at the other three carriers tripled.

With these four high-profile cases completed, the attorney general felt pretty pleased with himself. He had brought equality to the State of Confusion's insurance market! This was clearly so, because now that he was done, all four companies had the exact same number of clients.

"Well," he thought, "that's settled! I guess I'll run for governor."

You can assume that no clients entered or left the market over the course of this story and that clients switched carriers only when a suit was brought. What was the original market share of each company? (Since there are an integer number of clients, the answer should be expressed as a fraction.)

That ends Part 1, but I can't stop there or this would be too easy. Part 2 takes place in the next state over from the State of Confusion: the State of Paranoia. There, the insurance market is divided among N carriers, but I'm afraid to tell you what N is. I will tell you that, if they went through the same process as in Part 1, with the largest carrier losing enough business to the others to triple their books N times in succession, in the end, each of the N carriers would have an equal number of clients. What is the market share of the N carriers?

Answer: In Part 1, the original market

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, 2008**. Depending on the response volume, solver lists may contain only the names of people who solved puzzles on the first attempt.

share of each company was:

- Adversity Insurance: 217/324
- Bad Luck Insurance: 73/324
- Calamity Insurance: 25/324
- Disaster Insurance: 9/324

In Part 2, the market share of the m^{th} carrier, m between 1 and N , is $((3^m - 3^{m-1})N + 1)/(N3^N)$.

Solution:

Working backwards from the final market share of 1/4, 1/4, 1/4, 1/4, the shares at the next-to-last step must have been 1/12, 1/12, 1/12, 3/4. In the step before that, they were 1/36, 1/36, 25/36, and 1/4, and so forth.

In Part 2, several solvers pointed out that a similar pattern can be found for other multiples than 3.

E-MAIL ERROR

Part of the challenge for those who solved the puzzles in the January/February issue of *Contingencies* was figuring out where to send their solutions. A typo in the e-mail address slipped through in the printed version, although it was corrected in the online version of the magazine. Fortunately, most readers applied their puzzle-solving skills to the problem and managed to get their solutions to puzzle editor Mark Danburg-Wyld by the Jan. 31 deadline. The correct e-mail address is cont.puzzles@gmail.com.

SOLVER LISTS

Because of an administrative deadline, names of only those people who submitted correct solutions by Jan. 31, 2008, are shown on the lists.

Steve Altschuld, Jon Anderson, Robert

Bartholomew, Andrew Beamish, Bob Byrne, Bob Campbell, Mary Campbell, Bill Carroll, John Edmondson, David Engelmayer, Mark Evans, Mike Faylor, Bill Feldman, Chris Fievoli, Nick Franceschine, Yan Fridman, Christophe Gaboriaud, Robert Giambo, Rui Guo, Samuel Gut, Yehuda Haber, Jacques Hebert, Bob Howard, John Hubenschmidt, Ryan Johnston, Robert Kahn, Alex Kozmin, Chi Kwok, Steve Mathys, Stephen Meskin, Lee Michelson, Geoff Moak, Philip Morse, Paul Navratil, Joshua Nissley, Chris Norman, David Oakden, Don Onnen, Dale Riemer, Randy Rogers, Jason Russ, Steven Russ, Gerry Samp, Bill Scott, Robert Share, Ted Shively, S.Silverhaze, Philip Silverman, Ian Smith, Sally Jane Smith, John Snyder, Al Spooner, Tony Torelli, Kevin Trapp, Fred Upton, Cliff Woodhall

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