

Solution to Challenge 11, Fall '04

Let A be the crazy passenger, and let Z be the last passenger. Let's call Z's seat the *bad seat* and A's seat the *good seat*. If A sits in the bad seat, Z will lose his assigned seat. If A sits in the good seat, there will be no displaced passengers, so all remaining passengers, including Z, will get their own seats. Otherwise, A will leave Z's status unresolved, but displace some unseated passenger B.

If A displaces B, then all passengers between A and B will sit in their own seats. The situation when B boards is identical to the starting situation except that there are fewer unseated passengers: if B sits in the bad seat, Z will lose his seat; if he sits in the good seat, Z will get his seat; otherwise B leaves Z's status unresolved but displaces an unseated passenger.

Eventually, all seats will be occupied. The first passenger who sits in either the good or the bad seat will determine whether Z gets his own seat. On each trial, a passenger has the same probability of choosing the good seat as he does of choosing the bad seat. The good seat is occupied before the bad seat with probability $1/2$, so Z get his own seat with probability $1/2$.

Winning solutions were submitted by Ben Joeris (Fort Collins High School), Jeremy Buss (CSU undergrad) Monica Chawathe, Priya Venkataraman, Saravanan Sellappa, (CSU grad students), Andrew Johnson (Colorado School of Mines grad student), Javier Tuason (University of Hawaii grad student), Kevin Garrick, Will Hickey, CSU alumni, Nick Krier, Liz Boese, CSU faculty Bogdan Chlebus, C.U. Denver Faculty, Rocke Verser, Loveland, Byungsoo Kim, South Korea, Mark Darschewski (Denver), Lou Cairoli (Cleveland). The above explanation is based on Nick Krier's exceptionally clear answer. Ben Joeris gets the ice cream.