

I U P U I  
MATH CLUB TEASER #57

March 4, 2011  
(due March 11, 2011)

SOLUTION

The first grandmother starts a chain of wrong seats which is closed when her seat is finally taken.

Now consider the last grandmother's turn to enter the plane. Either the chain was closed, or it is still open. In the first case, she is not part of the chain, so she gets her seat. In the second case she, being the last person to board, has to close the chain, thus taking the seat of the first grandmother. In other words:

**She can only get her seat, or that of the first grandmother.**

It rests only to determine the relative chances of either seat being available when her turn comes. Now, before boarding, both of these seats are empty, but when the last grandmother comes in, only one seat is available. This means that before her, somebody along the line took one of the two seats. That person chose with equal probability between the two options, and determined the final outcome.

It follows that the last grandmother gets her seat with probability  $\frac{1}{2}$ .

SOLVED BY:

Captain Nemo.