

Solution to the Mathematicians on an Island Problem

By Philip Thomas, January 2011

The mathematician at the back of the line computes whether there are an even or odd number of black hats in front of him. If even, he guesses white. If there are an even number he guesses black. Remember that everyone hears his guess. He has a 50% chance of living. We must assume the worst case, so he dies. The next person in line computes whether *he* sees an even or odd number of black hats. If the result is different from what the first person said, he knows his hat is black. Otherwise it is white. Thus, he can guess correctly. The next person in line can repeat this, knowing the colors of the hats in front of him, as well as the colors of everyone behind him (from hearing them guess, and ignoring the color of the first unlucky mathematician). So, everyone else can correctly guess his or her hat color! In the worst case, we save 99 of the 100 people. There is no way to save the first.