Problem of the Week #18

Assigned: 1300, 17 FEB 11

Due: 1300, 24 FEB 11

Vive la Revolution!

A tyrant has the fiercest opponents to his regime thrown into prison. They are placed in individual cells with no communication between them. Every day, one of the prisoners, chosen by lot, is to be led into a windowless room for a few minutes. In the room there is a lever which can be put into a high position or a low position. The prisoner can decide to move the lever or to leave it as he found it. He can also, if he wishes, assert that all his companions have been chosen at least once.

If the assertion is correct, then all of the prisoners will be set free. If not, then all will be executed. The lever is initially in the low position. The tyrant lets the prisoners talk to each other for a few minutes before they are placed in their individual cells. Then his scheme is immediately put into action.

Problem: Give a scheme the prisoners could use that would give them a chance to go free, without any risk of being executed, and find the expected number of days until the prisoners are set free.

Email solutions to Christopher.marks@usma.edu with subject line: POTW.

Solutions can be emailed in the form of: an email (plain text) no attachment, a word document, a mathematica file, an excel workbook, or a scanned adobe file of your work.

If none of these options work for you, you may drop a hardcopy off at my office TH239C, just annotate the time of submission.