

PROBLEM OF THE WEEK
Solution of Problem No. 11 (Spring 2011 Series)

Problem: Prove or disprove that a rook can move from one corner to the diagonally opposite corner of a chessboard and cover every square exactly once.

Solution: (by Ankit Jain, Graduate student, ECE, Purdue University)

No such path exists.

Proof: Since the squares are alternately black and white, the beginning and the ending squares, are of the same color.

Any desired path for the rook to move can be broken into advancing-only-one-square paths which obviously changes color each time for each advancement. For covering every square once and only once 63 moves are required which is an odd number, leaving the rook on the opposite color from which it started which is impossible.

Hence, no such path exists!

The problem was also solved by:

Undergraduates: Sean Fancher (Science), Kaibo Gong (Math), Robert Gustafson (Sr. CS), Jorge Ramos (So. Phys), Yixin Wang (So. ECE), Joselito Wong Yau (So. Civil Engr.)

Graduates: Bharath Swaminathan (ME), Tairan Yuwen (Chemistry)

Others: Manuel Barbero (New York), Max Clark (12th grade student), Gruian Cornel (IT, Romania), Tom Engelsman (Chicago, IL), Elie Ghosn (Montreal, Quebec), Jae Woo Jeon (Seoul, Korea), Brendan Kinnell (Richmond, VA), Steven Landy (IUPUI Physics staff), Denes Molnar (Physics, Assistant Professor), Lou Poulou (Andover, MA), Louis Rogliano (Corsica), Sorin Rubinstein (TAU faculty, Israel), Craig Schroeder (Ph.D. student, Stanford Univ.), Jason L. Smith (Professor, Phys. & Math. Richland Community College), Steve Spindler (Chicago), Sean Wilkinson (Vancouver, Canada), William Wu (JPL), Shiju Zhang (Statistics faculty, St. Cloud State Univ.)