

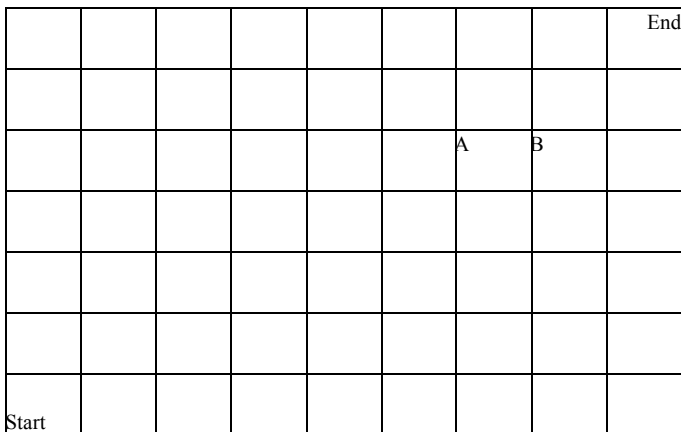
Combinatorics: The Breakfast of Mathletes

ICTM 2010 Annual Meeting and Conference — Friday, October 15, 2010

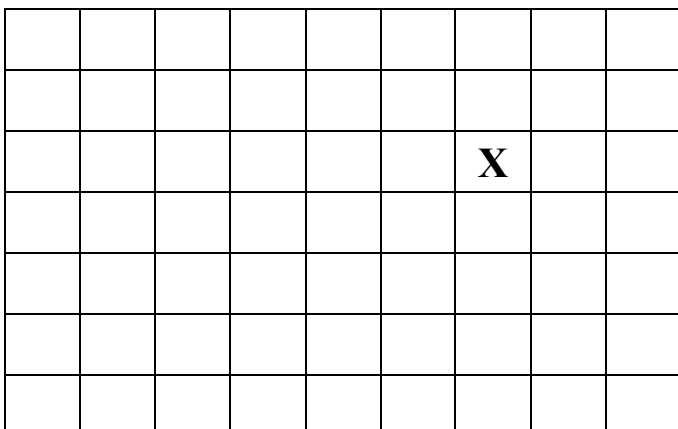
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*Problems marked with the * are more challenging (in some cases, **significantly** more challenging) than the rest.*

1. Consider the grid below, where one is allowed to move along the lines.
 - a. You can get from Start to End in 16 moves. *How many* such paths are there?
 - b. *What is the next-longest-possible path length? How many paths are there of that length?
 - c. How many paths go from the lower left corner to the upper right corner **and** go through point A?
 - d. *If we remove the segment between points A and B, how many paths still exist?



2. Consider the (identical) grid below, where the lines form many rectangles of various sizes.
 - a. How many rectangles are in the grid with their lower-left corner at the lower-left corner of the grid?
 - b. How many rectangles are in the grid?
 - c. *How many rectangles are in the grid that contain the square marked X?
 - d. *How many squares are in the grid?



3. *What is the total number of positive integers whose digits are all distinct?
4. Ten women sit in ten seats in a line. All of the ten get up and then reseal themselves using all ten seats, each sitting either *in* the seat she was in before, or a seat *next* to the one she occupied before. In how many ways can the women be reseated?