

# ROW

## Around King Arthur's Table

King Arthur was the ruler in Camelot who had all of those knights and a round table. He loved inviting the knights over for parties around his round table.

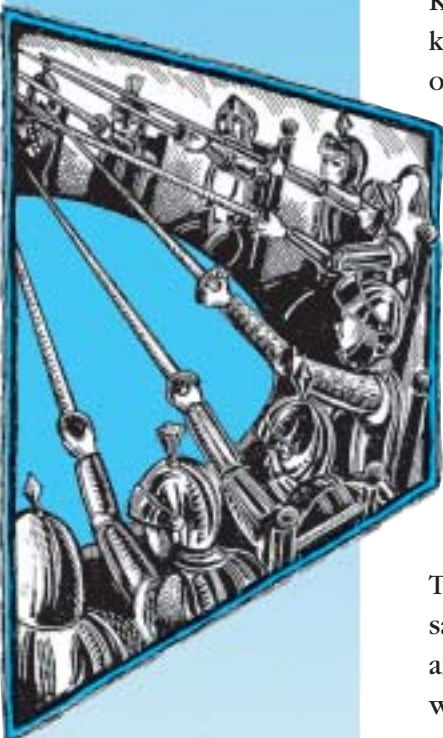
If there was something pleasant that the king could give to only one knight (an extra dessert, a dragon to chase, and so on), he had them play a game to determine who would get it.

The game went like this.

First, King Arthur put numbers on the chairs beginning with 1 and continuing around the table, with one chair for each knight. He had the knights sit down so that every chair was occupied. King Arthur himself remained standing.

Then King Arthur stood behind the knight in chair 1 and said, "You're In." Next, he moved to the knight in chair 2 and said, "You're Out," and that knight left his seat and went off to stand at the side of the room to watch the rest of the game. Next, he moved to the knight in chair 3 and said, "You're In." Then he said, "You're Out" to the knight in chair 4, and that knight left his seat and went to the side of the room.

The king continued around the table in this manner. When he came back around to the knight in chair 1, he said either "You're In" or "You're Out," depending on what he had said to the previous knight. (If the previous knight was "In," then the knight in chair 1 was now "Out," and vice versa.)



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The king kept moving around and around the table, alternately saying, “You’re In” or “You’re Out” to the knights who remained at the table. (If a chair was now empty, he simply skipped it.) He continued until only one knight was left sitting at the table. That knight was the winner.

## Your Task

Of course, the number of knights varied from day to day, depending on who was sick, who was out chasing dragons, and so on. Sometimes there were only a handful, and sometimes there were over a hundred!

Here’s the big question of the POW.

*If you knew how many knights were going to be at the table, how could you quickly determine which chair to sit in so that you would win?*

Your task is to develop a general rule, formula, or procedure that will predict the winning seat in terms of the number of knights present. Be sure to explain why your rule works.

## Write-up

1. *Problem Statement*
2. *Process*
3. *Solution*
4. *Evaluation*
5. *Self-assessment*