

The Squirrel Puzzle

3 January 2018

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					 RED
	 BLACK				
		 GREY			

For a change of pace, here is an early puzzle from Alex Bellos in *The Guardian* ([1]).

Happy New Year guzzlers! Today's first problem concerns squirrels. Have a nibble—it's not too hard a nut to crack.

The Squirrel King has buried the Golden Acorn beneath one of the squares in this 6x6 grid. Three squirrels—Black, Grey and Red—are each standing on a square in the grid, as illustrated.

(Note: for the purposes of today, squirrels can speak, hear, read, count and are perfect logicians. They can also move in any direction horizontally and vertically, not just the direction these cartoons are facing. They all can see where

each other is standing, and the cells in the grid are to be considered squares.)

The Squirrel King hands each squirrel a card, on which a number is written. The squirrels can read only the number on their own card. The King tells them: "Each card has a different number on it, and your card tells you the number of steps you are from the square with the Golden Acorn. Moving one square horizontally or vertically along the grid counts as a single step." (So if the acorn was under Black, Black's card would say 0, Grey's would say 4, and Red's 5. Also, the number of steps given means the shortest possible number of steps from each squirrel to the acorn.)

The King asks them: "Do you know the square where the Golden Acorn is buried?" They all reply "no!" at once.

Red then says: "Now I know!"

Where is the Golden Acorn buried? ...

My Solution

My solution is essentially the same as Bellos's, but I have added a bit more detail to make it easier to see the solution.

I have filled in the squares with the minimum number of steps each squirrel would take to reach that square (Figure 1). The green squares are eliminated before the squirrels' first answer, since they are the squares with duplicate steps (the numbers on the cards all differ). The blue squares are eliminated when all the squirrels answer "No" (because they involved a unique number of steps for their respective squirrel, so that if any squirrel had that number on their card, they would have known where the acorn was and said so). That leaves only the yellow square with a unique number of steps in it—for the red squirrel.

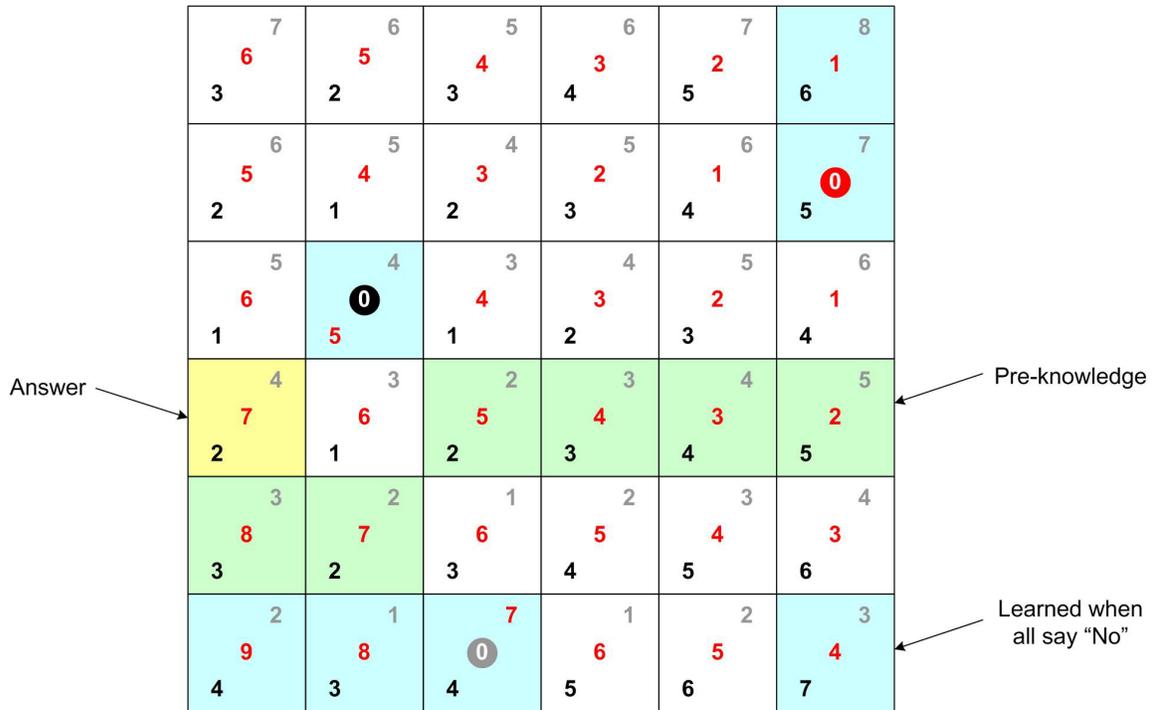


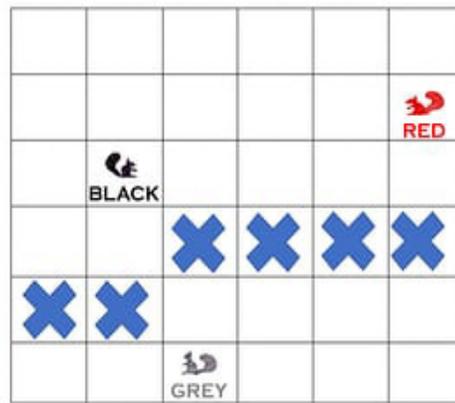
Figure 1 My Solution with the Number of Steps for Each Squirrel Shown

Bellos's Solution

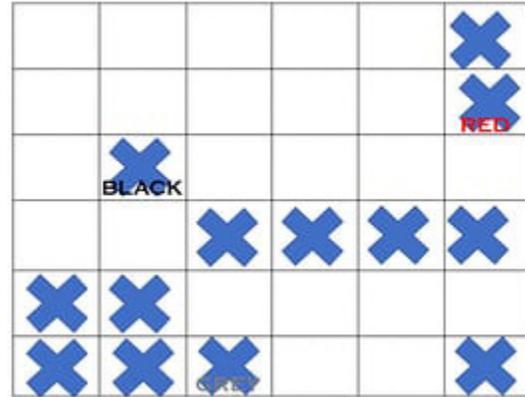
Without recording the squirrels' steps it is a bit more challenging to see the right solution.

Solution: (I'll go step by step, so you can treat each step as hint.)

Step one. The cards have different numbers on them, so we can eliminate the squares that are the same number of steps between any two squirrels. We cross out the six squares equidistant between Black and Grey. (No squares are equidistant between Red and either of the others.)

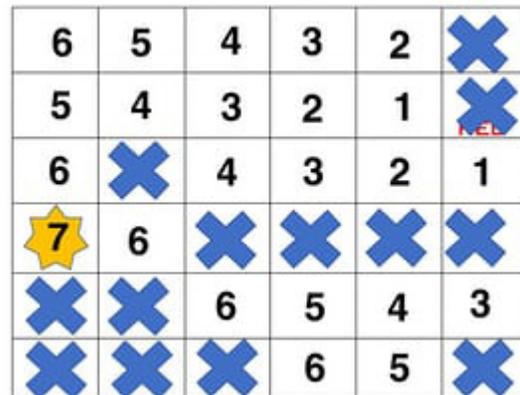


Step two: The animals all say they do not know where the nut is. If any of the squirrels had 0, they would immediately know where it is. They don't, so they don't have 0, and we can eliminate the squares 0 away, i.e. the squares they are standing on. Also, we know that Black cannot have 7, because there is only one square 7 steps away. Likewise, Grey cannot have 8 and Red cannot have 8 or 9, since if either of them had those numbers the square would also be determined, and they would have responded that they did know the correct square.



Each cross eliminates a square

Step three: For Red to know the correct square, Red must have a number that provides the distance to only one possible square. We can rule out the numbers 1, 2, 3, 4, 5 and 6. The solution is the fourth row down the first column, which is the only square exactly 7 steps away.



Each number shows the number of steps from red.

References

- [1] Bellos, Alex, "Can You Solve It? Do Your Nut With The Squirrel Puzzle", Alex Bellos's Monday Puzzle, *The Guardian*, 1 January 2018 (<https://www.theguardian.com/science/2018/jan/01/can-you-solve-it-do-your-nut-with-the-squirrel-puzzle>)

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