Snake in a Box

Equipment: Pieces numbered 1 through 25 and a 5x5 board.

Number of Players: 2 (a cobra player, and a snake charmer)

Time: 10 minutes

How to play:

- The cobra hides in the box by secretly writing the numbers 1 (head) to 25 (tail) on a 5x5 grid drawn on a scrap of paper. Consecutive numbers must be beside one-another (horizontally or vertically, but not diagonally).
- The snake charmer must find out how the snake is wrapped up in the box. The snake charmer does this by asking about the number in any square of the box. The snake charmer may do this as often as desired, and must then guess exactly how the cobra is wrapped up.
- A snake charmer who requires 6 numbers has good potential.
- A snake charmer who requires 5 numbers can rely on a friendly pet cobra.
- A snake charmer who requires 4 numbers is respected by snakes everywhere.
- A snake charmer who requires only 3 numbers is respected and loved by snakes everywhere.
- A snake charmer who fails to guess exactly how the cobra is wrapped up gets bitten... Ouch!

For Math Fair:
- Create some problems where numbers are placed so that there is one and only one way for the snake to be curled up.
- Create some problems with numbers so that there are at least two ways for the snake to be curled up.
- Create some problems which are impossible to solve.

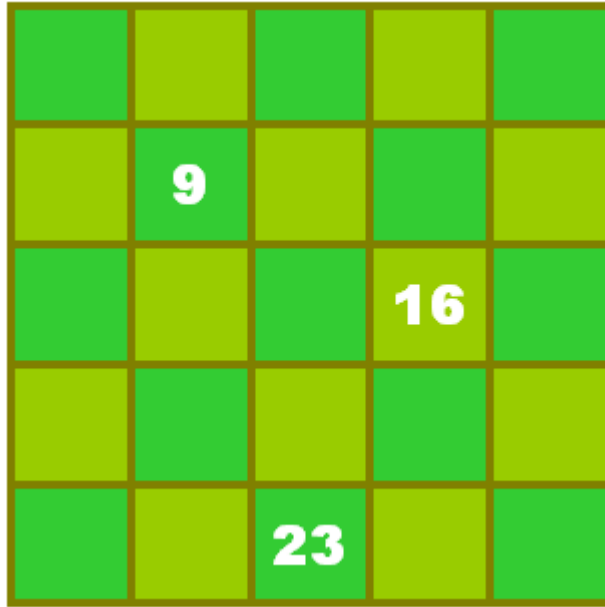- Could a master snake charmer find how a cobra was wrapped up based on only the 3 numbers as seen below?
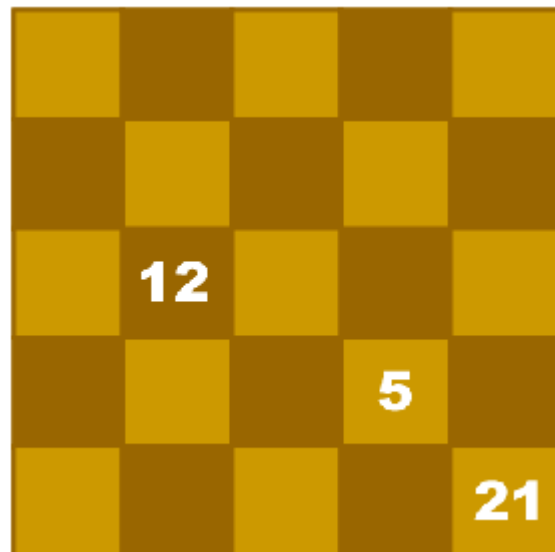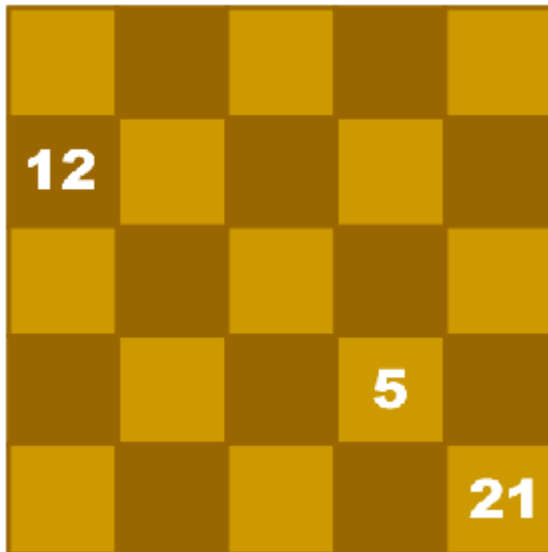

Extensions:

- Amrit and Ephraim of Alice M. Curtis ask you to find how the snake is curled up here:

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- Vanessa and Madison of Alice M. Curtis ask if the snake could be curled up in more than one position here:

- Below are two examples. Do they both have a solution, more than one solution or no solutions?

- If not with these three numbers, are there any three numbers in a 5x5 box which would leave one and only one way for the snake to be wrapped up? (I do not know the answer to this question) Are there any 4 numbers that do this?
- How many numbers in a 5x5 box is it possible to know and still not know how the snake is wrapped up?
- If a master snake charmer knows the position of the numbers 1, 4, 9, 16 and 25 can the master snake charmer determine how the snake is wrapped up? If not, is there another group of numbers that does this? How small can the group of numbers be?

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Game Variations:

- The cobra has a shorter length.
- The head can begin with any integer.
- Two cobras wrap up in the box. Both heads must be the same number, and both must begin on the same colour of square.
- Successive segments are 1 or 2 different.
- A bigger box.

The Math in This Problem:

Snake in a Box requires two players to participate in this board game, in which one is a cobra player and the other is a snake charmer. One goal of this puzzle is to exercise strategic placement of the numbers 1-25 on a 5x5 grid to make it difficult to figure out how the cobra is wrapped up. Meanwhile, the snake charmer applies strategic analysis in order to take as little number clues as possible to find out how his opponent has curled up the cobra.