

The gold box

Instead of building a mathematical model with the constraints, a simple decision table will do to visualize the solution. Of course, a general formulation of the problem will be better, but I couldn't help it.

Two simple solutions:

1. Starting from the boxes

Every box has two possible values (Gold or empty), leading to 8 permutations. Only permutations with 1 box of gold are allowed (so we can drop the red columns), leaving us 3 columns.

For every statement we indicate the columns where the statement is True ('x'). As only one statement should be True, column 2 (with the Gold in box2) is the only valid solution

goldboxes								
Box1	Gold				Empty			
Box2	Gold		Empty		Gold		Empty	
Box3	Gold	Empty	Gold	Empty	Gold	Empty	Gold	Empty
Box1: here								
Box2: not here								
Box3: Gold not in box1								
U	1	2	3	4	5	6	7	8

goldboxes			
Box1	Gold	Empty	
Box2	Empty	Gold	Empty
Box3	Empty	Empty	Gold
Box1: here	x	.	.
Box2: not here	x	.	x
Box3: Gold not in box1	.	x	x
U	1	2	3

2. Starting from the statements

Every statement has two possible values (True or False), leading to 8 permutations. Only one statement can be True (so we can automatically drop 5 columns again), leaving us 3 columns.

For every column we check the statements and the given values for contradictions. Only 1 configuration is free of contradictions, so the gold is in box 2.

goldstatements			
statement 1 ok	TRUE	FALSE	
statement 2 ok	FALSE	TRUE	FALSE
statement 3 ok	FALSE	FALSE	TRUE
result	Contradiction: in box 1 (stat 1, 3) and in box 2 (stat 2)	Contradiction: not in box 1 (stat 1) and in box 1 (stat 3)	No contradictions: gold in box 2
U	1	2	3

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