

DMCommunit.org Challenge June-2021 "Where is Gold?"

Solution using [Pyomo](#)

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The problem is formulated as a milp mathematical problem in Pyomo package:

```
model = AbstractModel()
model.x1 = Var(domain=Binary)
model.x2 = Var(domain=Binary)
model.x3 = Var(domain=Binary)
model.U1 = Var(domain=Binary)
model.U2 = Var(domain=Binary)
model.U3 = Var(domain=Binary)

model.c1 = Constraint(expr=model.x1==model.U1)
model.c2 = Constraint(expr=(1-model.U2)==model.x2 )
model.c3 = Constraint(expr=(1-model.U1)==model.x3 )

model.c4 = Constraint(expr=model.x1+model.x2+model.x3==1 ) # only one of the statements is true
model.c5 = Constraint(expr=model.U1+model.U2+model.U3==1 ) # only one box contains ball
model.obj = Objective(expr=model.x1+model.x2+model.x3, sense=minimize)
```

x_i is a binary variable demonstrating the True/False of statement i

U_i is a binary variable demonstrating the existence of ball in box i or not

Result:

```
U1= 0.0 x1= 0.0
U2= 1.0 x2= 0.0
U3= 0.0 x3= 1.0
```

So the ball is in box 2

the first two statements are wrong and the last one is true.

The complete Pyomo code: <https://nbviewer.jupyter.org/github/alirezasoroudi/Optimization/blob/main/June%20challenge.ipynb>