

**GUROBI: ALWAYS FREE FOR ACADEMICS**

# GUROBIPY CARD GAME

Learn the basic building blocks needed for optimization modeling with Gurobi in Python

**GET STARTED: PRINTING OUT THE GAME**

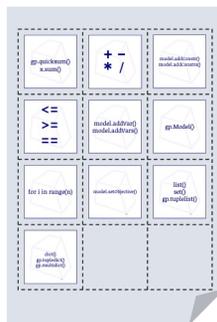
1

Print this document double sided.



2

Cut out the cards along the dashed line on last the four pages.



3

Pick which game you want to play.

Then follow the instructions on pages 3 and 4 to play.

**GAME 1: PAIRING [EASY]**



**GAME 2: MATCHING [HARD]**



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**SOLUTION KEY**

 Model	 gp.Model()	 Objective Function	 model.setObjective()	 Data Coefficients	 dict() gp.tupledict() gp.multidict() pd.Series
 Constraints	 model.addConstr() model.addConstrs()	 Decision Variables	 model.addVar() model.addVars()	 Aggregate Sum Operator	 gp.quicksum() x.sum()
 Sets and Subscripts	 list() set() gp.tuplelist()	 Forall Operator	 for i in range(n)	 Constraint Operator	 <= >= ==
 Arithmetic Operators	 + - × ÷ * /				

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**GAME 1: PAIRING [EASY MODE]**
**1**

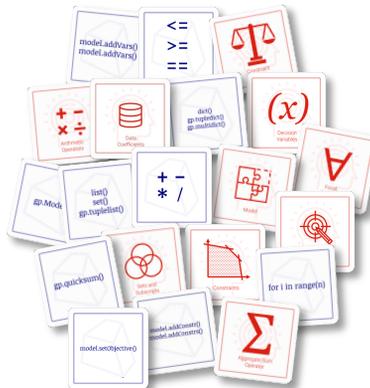
Grab a partner and a deck of cards.

$$\begin{aligned}
 & \max \sum_{i \in I} \sum_{j \in J} c_{i,j} x_{i,j} \\
 \text{s. t. } & \sum_{i \in I} x_{i,j} \leq 1 \quad \forall j \in J \\
 & \sum_{j \in J} x_{i,j} \leq 1 \quad \forall i \in I \\
 & x_{i,j} \in \{0,1\} \quad \forall i \in I, j \in J
 \end{aligned}$$

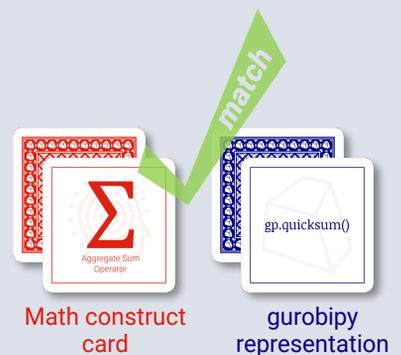
Your goal: Find the **red math construct card** that matches the **blue gurobipy representation** for each of the pieces of the model above

**2**

Flip all the cards face up


**3**

Work with your partner to match the **red math construct cards** with the **blue gurobipy card**.





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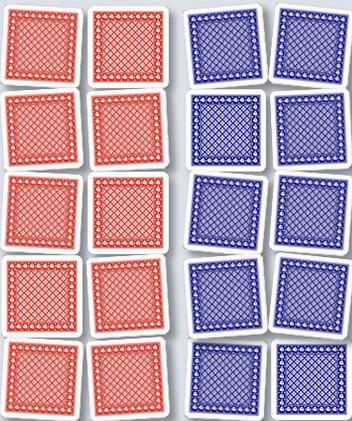
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## GAME 2: MEMORY GAME [HARD MODE]

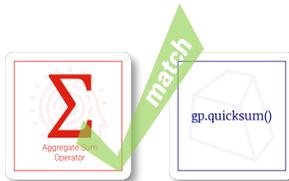
1

Grab a partner or two then lay all the cards out face down.



2

Players take turns turning over any **one red math construct card** and **one blue gurobipy card**.



A match is made if the **red math construct side** matches the **blue gurobipy representation card**.  
Otherwise, it is a miss.

The player who made the match keeps the cards and continues their turn.

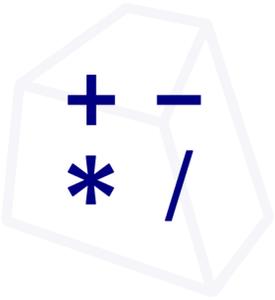
3

The game continues until all cards have been matched.  
All players then count their matching pairs to see who wins.

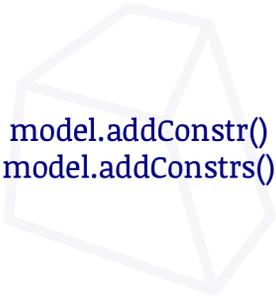




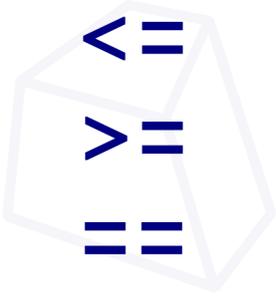
```
gp.quicksum()  
x.sum()
```



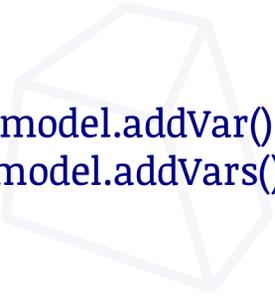
```
+ -  
* /
```



```
model.addConstr()  
model.addConstrs()
```



```
<=  
>=  
==
```



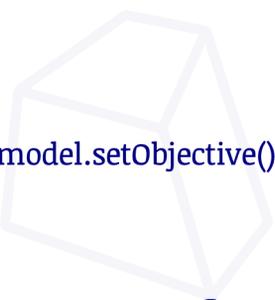
```
model.addVar()  
model.addVars()
```



```
gp.Model()
```



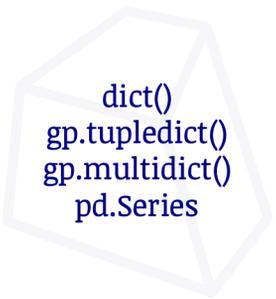
```
for i in range(n)
```



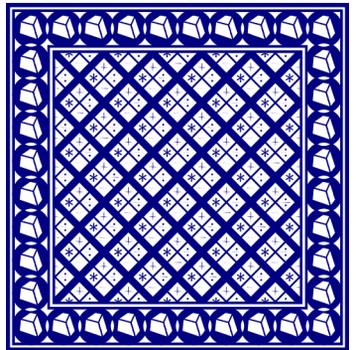
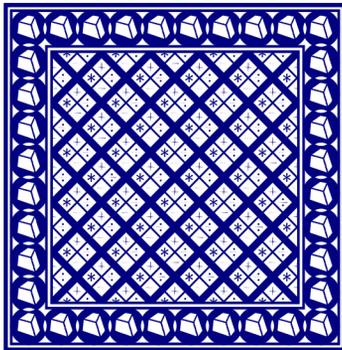
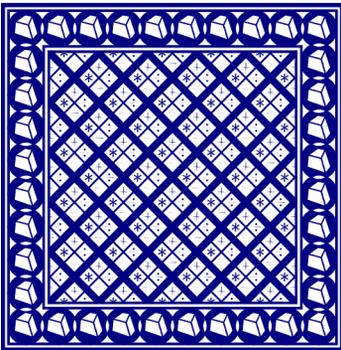
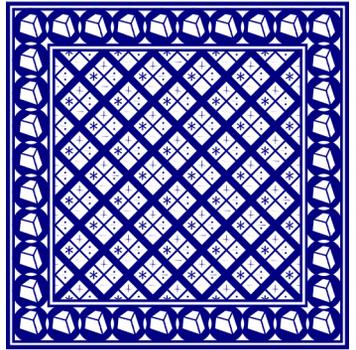
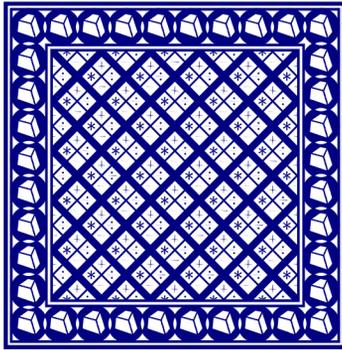
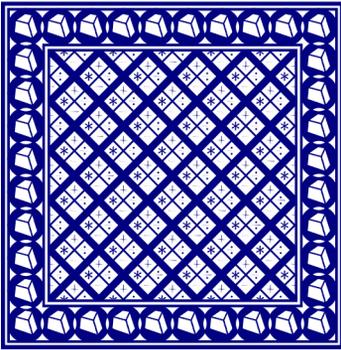
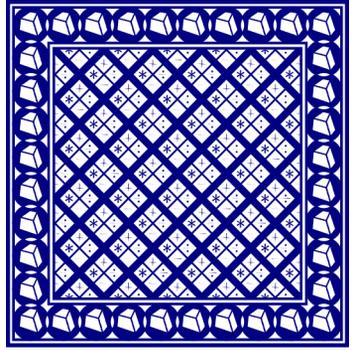
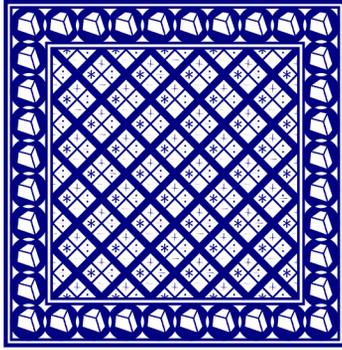
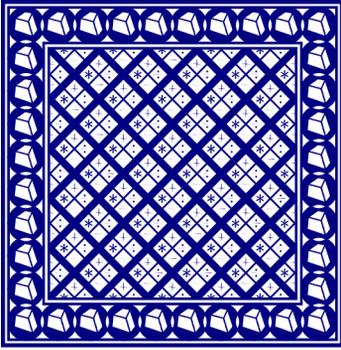
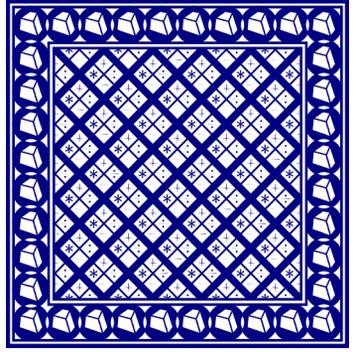
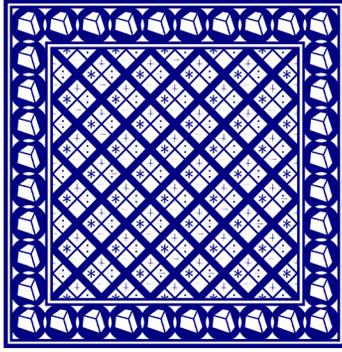
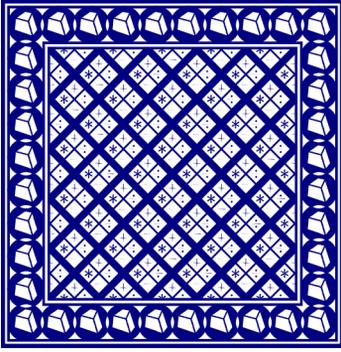
```
model.setObjective()
```



```
list()  
set()  
gp.tuplelist()
```



```
dict()  
gp.tupledict()  
gp.multidict()  
pd.Series
```

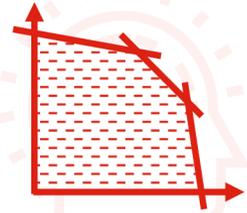




Aggregate Sum Operator



Arithmetic Operators



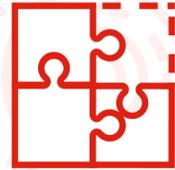
Constraints



Constraint Operator



Decision Variables



Model



Forall Operator



Objective Function



Sets and Subscripts



Data Coefficients

