Partition ◁—! replicates *— Replica
Replica ↑ * stores ? • Broker

! = exactly one
? = zero or one
* = zero or many

Additional Constraints

① No replica can be shared between any two Brokers in "stores" relation.

② No two replicas of a given partition can be on the same broker.

Relational constraints

replicates: some to one
stores: one to many

* Check cardinality of domain and range of a relation: Possible cardinality: [0, 1, 2]

# domain	# range	Name
0	0	N/A
0	1	N1A
0	2	N/A
1	0	N1A
1	1	one - one
1	2	one - many
2	0	N1A
2	1	many - one
2	2	many - many

(v1) → row "one - one"
(v2) → row "one - many"
(v3) → row "many - one"
(v4) → row "many - many"

* **APPROACH**

· For every pair of relations, assign any one of [v1, v2, v3, v4] to each and generate instances with each pairwise combination:

[(v1, v1), (v1, v2), (v1, v3) ....., (v3, v4) ....] (16 pairs / relation)

- For "n_r" relations, check with

$$_{n_r}C_2 \times 16 = \underline{8n(n-1)} \text{ constraints.}$$

TODO

- [x] Create predicates to constrain relation to dome values:
  - isOneOne [$r:$ univ $\rightarrow$ univ] {
    $$\# \text{ dom } [r] = 1$$
    $$\# \text{ ran } [r] = 1$$
    }

  Similarly:
  - is OneMany [$r:$ univ $\rightarrow$ univ]
  - is ManyOne [$r:$ univ $\rightarrow$ univ]
  - is ManyMany [$r:$ univ $\rightarrow$ univ]

- [x] Create 16 constraints for Kotta relation pair (replicates, stores)

- [x] Document Results