software

object models: relations

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relationship

kinds of relation
› property
› containment
› association
› naming

a ‘homogeneous’ or ‘recursive’ relation
**does arrow direction matter?**

some relations are symmetric

› **a->b in friend** iff **b->a in friend**

but for non-symmetric relation

› **a->b in r** not same as **b->a in r**

must define & implement direction consistently

› **a->b in invites** : “a send an invitation to b”

and graphical notation may express constraint

› that depends on relation direction

```
Director  appoints  CEO
```
relations on subsets

when you place a relation
› pick the smallest set
multiplicity

how many?
› colors per shape?
› machines per IP?

- A maps \( m \) A’s to each B
- R maps each A to \( n \) B’s

+ one or more
* zero or more
! exactly one
? at most one
omitted = *
function properties

easily expressed with multiplicities

R is a function

R is a total function

R is an injection

R is a surjection

R is a bijection
common mistakes

#1. designation confusion
arrivesAt: Elevator -> Floor
elevator serves floor?
is currently at floor?
will arrive at, or has arrived at floor?

#2. should be split into multiple relations
lines: Address -> AddressLine

#3. relates >2 atoms
salary: Student -> Amount
for which job?