$R \{ \{ A_1, A_2, \ldots, A_n \} \}$

decomposition $D = \{ \{ R_1, R_2, \ldots, R_m \} \}$

$\bigcup_{i=1}^{m} R_i = R$

$\Rightarrow$ all $R_i$ is in BCNF

$\Rightarrow$ all FDs exist

$R(A, B, C)$

$A \rightarrow B$
1. Select all employees SSN and project locations
2. Create view EMP_LOC
3.
Figure 3.7
Referential integrity constraints displayed on the COMPANY relational database schema.
Emp-Locs
SSN, Location
123456789 'Houston'
123456789 'Bellaire'

Project
Location, Pname, Pnum
'Houston' A
'Houston' B
'Houston' C

X JOIN Y ON X.A = Y.B
Non-additive (lossless) join

D has a non-additive join w.r.t. F.D.'s F on \( R \) if for every relation state \( r \) that satisfies F

\[ \prod_{R_1}(r) \times \prod_{R_2}(r) \times \ldots \times \prod_{R_m}(r) = r \]
Memory (Storage) Hierarchy

- CPU registers
- Cache:
  - L1
  - L2
  - L3
- Static
- Dynamic

- Main memory
- Flash memory
- Magnetic Disks
- Optical Drives
- Magnetic Tapes

- Random
  - Direct
  - Sequential

- Non-volatile
- Volatile