Tutorial 3: Logical Database Design

Mapping ER Diagrams to the Relational Model

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1. 1:1
   We choose to merge the relation to X side:
   X_R(K1, A1, **K2**)
   `UNIQUE(K2)`
   `K2 REFERENCES Y`

   Y(K2, A2)

2. 1:M

   X(K1, A1)

   Y_R(K2, A2, **K1**)
   `K1 REFERENCES X`

3. M:N(Binary Relationship)

   X(K1, A1)

   Y(K2, A2)

   R(**K1, K2,** A3)
   `K1 REFERENCES X,`
   `K2 REFERENCES Y`

4. M:N(Ternary Relationship)

   X(K1, A1)

   Y(K2, A2)

   Z(K3, A3)

R(**K1, K2, K3,** A4)
```
K1 REFERENCES X,
K2 REFERENCES Y,
K3 REFERENCES Z
```

5. 1:M Strong Entity with Total Participation

   X(K1, A1)

   Y_R(K2, A2, **K1**)
   ```
   K1 REFERENCES X, K1 cannot be null
   ```

6. 1:M Weak Entity with Total Participation (assume that A2 is the partial key)

   X(K1, A1)

   Y(A2, **K1**, A3)
   ```
   K1 REFERENCES X, ON DELETE CASCADE, ON UPDATE CASCADE
   ```

7. 1:1 and 1:M Unary Relationship

   X(K1, A1, **RK1**)
   ```
   RK1 REFERENCES X(K1)
   ```

8. M:N Unary Relationship

   X(K1, A1)

   R(**R1K1, R2K1**)
   ```
   R1K1 REFERENCES X(K1),
   R2K1 REFERENCES X(K1)
   ```

9. ISA 1
   Assumption: not disjoint and not covering

   X(K1, A1)

   Y(**K1**, A2, A3)
   ```
   K1 REFERENCES X
   ```

   Z(**K1**, A4, A5)

`K1 REFERENCES X`

10. ISA 2 (the "d" means disjoint)
    Assumption: disjoint and covering

    Y(K1, A1, A2, A3)

    Z(K1, A1, A4, A5)