Tutorial 3: Logical Database Design
Mapping ER Diagrams to the Relational Model

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1. <u>1:1</u>
   We choose to merge the relation to X side:
   X_R(<u>K1</u>, A1, **K2**)
   K2 REFERENCES Y

   Y(<u>K2</u>, A2)

2. <u>1:M</u>

   X(<u>K1</u>, A1)

   Y_R(<u>K2</u>, A2, **K1**)
   K1 REFERENCES X

3. <u>M:N(Binary Relationship)</u>

   X(<u>K1</u>, A1)

   Y(<u>K2</u>, A2)

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

4. <u>M:N(Ternary Relationship)</u>

   X(<u>K1</u>, A1)

   s Y(<u>K2</u>, A2)

Z(<u>K3</u>, A3)

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

5. <u>1:M Strong Entity with Total Participation</u>

X(<u>K1</u>, A1)

Y_R(<u>K2</u>, A2, **K1**)
```
K1 REFERENCES X, K1 cannot be null
```

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

X(<u>K1</u>, A1)

Y(<u>A2</u>, **K1**, A3)
```
K1 REFERENCES X, ON DELETE CASCADE, ON UPDATE CASCADE
```

7. <u>1:1 and 1:M Unary Relationship</u>

X(<u>K1</u>, A1, **RK1**)
```
RK1 REFERENCES X(K1)
```

8. <u>M:N Unary Relationship</u>

X(<u>K1</u>, A1)

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

9. <u>ISA 1</u>
Assumption: not disjoint and not covering

X(<u>K1</u>, A1)

Y(**<u>K1</u>**, 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)