

# CH3 Relational Algebra关系代数

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## 一、Definition

$$R \rightarrow R'$$

关系到关系的映射

## 二、Set operations

$R$ 和 $S$ 拥有相同的属性组，有序化的列。

### 1. Union

$$R \cup S$$

```
1 | (SELECT * FROM R) UNION (SELECT * FROM S);
```

### 2. Intersection

$$R \cap S$$

```
1 | (SELECT * FROM R) INTERSECT (SELECT * FROM S);
```

### 3. Difference

$$R - S$$

```
1 | (SELECT * FROM R) EXCEPT (SELECT * FROM S);
```

## 三、Query operations

### 1. Selection

$$\sigma_C(R)$$

按条件选择元组

### 2. projection

\*\*\*关系代数自动去重

$$\pi_{A_1, A_2, \dots, A_n}(R)$$

选择列

## 四、Binary operations

## 1. Cartesian product

$$R \times S$$

```
1 SELECT * FROM R CROSS JOIN S; --等价于
2 SELECT * FROM R, S;
```

## 2. Natural Join

$$R \bowtie S$$

```
1 SELECT * FROM R NATURAL JOIN S;
```

```
1 init C to be None
2 for ta in tupleA:
3     for tb in tupleB:
4         if(ta and tb has the same part)
5             C.append(ta or tb - (ta and tb))
```

## 3. Theta-Joins

$$R \bowtie_C S = \sigma_C(R \times S)$$

条件笛卡尔积，而不是条件自然连接

```
1 SELECT * FROM R INNER JOIN S ON <condition>
```

## 五、Renaming

$$\rho_S(A_1, A_2, \dots, A_n)$$

## 六、Basic operations

$$R \cap S = R - (R - S)$$

$$R \bowtie_C S = \sigma_C(R \times S)$$

$$R \bowtie S = \pi_L(\sigma_C(R \times S))$$

六个基本操作：

1. Union
2. Difference
3. Selection
4. Projection
5. Product
6. Renaming

