Set Theoretic Ops
• Duplicates (Frank Wong) eliminated.
• DEFAULT field names from first relation
Notes on Naming

• We unioned GOOD with WELL PAID.
• GOOD was first, so the attribute names from GOOD are used
• Attributes can be renamed

\[
\text{GOOD OR WELL_PAID(FIRST, LNAME, PAY) } \leftarrow \text{GOOD } \cup \text{ WELL_PAID}
\]

Do Not Use the \( \rho \) Renaming Operator!!!
Intersection

**GOOD**
- Frank Wong 40K
- Alice Zelaya 25K
- Joyce English 25K
- Ahmad Jabbar 25K

**WELL_PAID**
- Frank Wong 40K
- Jenny Wallace 43K
- Ram Narayan 38K
- James Borg 55K

**GOOD_AND_WELL_PAID**
- Frank Wong 40K
### Set Difference

<table>
<thead>
<tr>
<th>GOOD</th>
<th>WELL_PAID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FNAME</strong></td>
<td><strong>LNAME</strong></td>
</tr>
<tr>
<td>Frank Wong</td>
<td>40K</td>
</tr>
<tr>
<td>Alice Zelaya</td>
<td>25K</td>
</tr>
<tr>
<td>Joyce English</td>
<td>25K</td>
</tr>
<tr>
<td>Ahmad Jabbar</td>
<td>25K</td>
</tr>
</tbody>
</table>

Everything in GOOD which is NOT ALSO in WELL_PAID

<table>
<thead>
<tr>
<th>GOOD_NOT_WELL_PAID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FNAME</strong></td>
</tr>
<tr>
<td>Alice Zelaya</td>
</tr>
<tr>
<td>Joyce English</td>
</tr>
<tr>
<td>Ahmad Jabbar</td>
</tr>
</tbody>
</table>
Notes on Difference

• Not Commutative: $A - B \neq B - A$

• You can subtract things which are not there! ---
  $\{A,B,C\} - \{C,D,E,F,G\} = \{A,B\}$
Union Compatibility

• Operands to set ops must have the same domain
  – Fields have same domains
  – Fields in same order
  – Same number of fields
• Do not need to have same names.
• WARNING: due to a bug in RAO, set ops may fail unless the corresponding attributes of both operands have the same or similar names.
Why Union Compatibility?

Ordinary set ops do NOT require compatibility:

\[
\{ \text{“Mom”, } \text{baseball} \} \cup \{ \text{pie, flag} \} \]

yields

\[
\{ \text{“Mom”, } \text{baseball, pie, flag} \}
\]
Ordinary Set Op and Non-Compatible Operands

**GOOD**
- FNAME: Frank Wong
- LNAME: 40K
- Alice Zelaya
- 25K
- Joyce English
- 25K
- Ahmad Jabbar
- 25K

**WELL_PAID**
- FIRST: Frank Wong
- LAST: 40K
- 180
- Jenny Wallace
- 43K
- 125
- Ram Narayan
- 38K
- 173
- James Borg
- 55K
- 265

**GOOD \( \cup \) WELL_PAID**
- Frank Wong 40K
- Alice Zelaya 25K
- Joyce English 25K
- Ahmad Jabbar 25K
- Frank Wong 40K
- Jenny Wallace 43K
- Ram Narayan 38K
- James Borg 55K

Legal Set but Not a Table Extent!

No Intension with Ordinary Set Op

Why Not?

One Domain
- (str,str,int)

Another Domain
- (str,str,int,int)
### Database Set Op and Non-Compatibe Operands

<table>
<thead>
<tr>
<th>GOOD</th>
<th>WELL_PAID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FNAME</strong></td>
<td><strong>FIRST</strong></td>
</tr>
<tr>
<td><strong>LNAME</strong></td>
<td><strong>LAST</strong></td>
</tr>
<tr>
<td>SAL</td>
<td><strong>SAL</strong></td>
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<tr>
<td>---------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Frank Wong</td>
<td>Frank Wong</td>
</tr>
<tr>
<td>Alice Zelaya</td>
<td>Jenny Wallace</td>
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<tr>
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**Syntax Error** (union compatibility)