A DeVIL-ish Approach to Inconsistency in Interactive Visualizations

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consistent reorderings

sync

?
Partial Evaluation With Nondeterministic Delays

Highlighting and Details on Demand

[Diagram showing views 1 and 2 with highlighted elements and time stamps (T1, T2, T3, T4, T5)]
Relational Model for Interactive Visualization

Mouse event stream:
- **event** | **x** | **y**
- **down**  | 50  | 95
- **up**    | 50  | 95

View 1:

View 2:

Base data:

```
<table>
<thead>
<tr>
<th>city</th>
<th>stores</th>
<th>sales</th>
<th>reps</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF</td>
<td>50</td>
<td>800</td>
<td>5</td>
</tr>
<tr>
<td>NYC</td>
<td>30</td>
<td>300</td>
<td>2</td>
</tr>
<tr>
<td>LA</td>
<td>5</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>BOS</td>
<td>1</td>
<td>50</td>
<td>1</td>
</tr>
</tbody>
</table>
```

View 1 rectangles @ vn-1:

```
<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
<th>width</th>
<th>height</th>
<th>color</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>150</td>
<td>5</td>
<td>20</td>
<td>blue</td>
</tr>
<tr>
<td>60</td>
<td>150</td>
<td>5</td>
<td>30</td>
<td>blue</td>
</tr>
<tr>
<td>90</td>
<td>150</td>
<td>5</td>
<td>60</td>
<td>blue</td>
</tr>
</tbody>
</table>
```
#1: Database Conflict Detection

X bad reorderings  √ good reordering

might be too strict

**Current interaction:** I1, I2
#2 Merge Functions

commutative: $f(x, y) = f(y, x)$

might not cover all semantics

merge_func(p1, p2):
[p1, p2].map(p ->
    p.lineage.mark.transparency = 0.5)
#3 Interaction Constraints

similar to database constraints

\[
\text{lineage(view1).sample_set} == \text{lineage(view2).sample_set}
\]