The Problem

<table>
<thead>
<tr>
<th>Buyers</th>
<th>Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

- Match bidders to preferred goods
- What if preferences are private?
- Impossible under differential privacy

Putting it all together

1. Ascending price auctions on each good
2. Publish count of bids on each good
3. Bidders infer prices, submit bids
4. Each bidder knows what to get

In a picture...

- Large supply
  - Private counters, noisy may oversell
  - Solution: distinct types of goods
  - Assume large supply of each

- Extensions and lower bounds
  - Works for gross substitutes valuations
  - Standard differential privacy: impossible
  - Joint differential privacy: large supply

Conclusion

- Prices = “low information” ⇒ privacy
- Other auctions via counters?