Writing Relational Algebra Queries

What does this relational algebra query compute?

$\pi_{rname}(Sells) - \pi_{rname}((\pi_{rname}(Sells) \times$
$(\pi_{pizza}(\sigma_{cname='Maggie'}(Likes)))) - \pi_{rname,pizza}(Sells)) -$
$\pi_{rname2}(\sigma_{pizza2=pizza}(\rho_{Sells2(rname2,pizza2,price2)}(Sells) \times$
$\sigma_{cname='Ralph'}(Likes)))$

Writing Relational Algebra Queries (cont.)

- A complex relational algebra (RA) query presented as a single lengthy expression can be unreadable
- Two methods to improve readability of RA queries
  - Method 1: Operator trees
  - Method 2: Sequence of steps

Method 1: Operator Trees
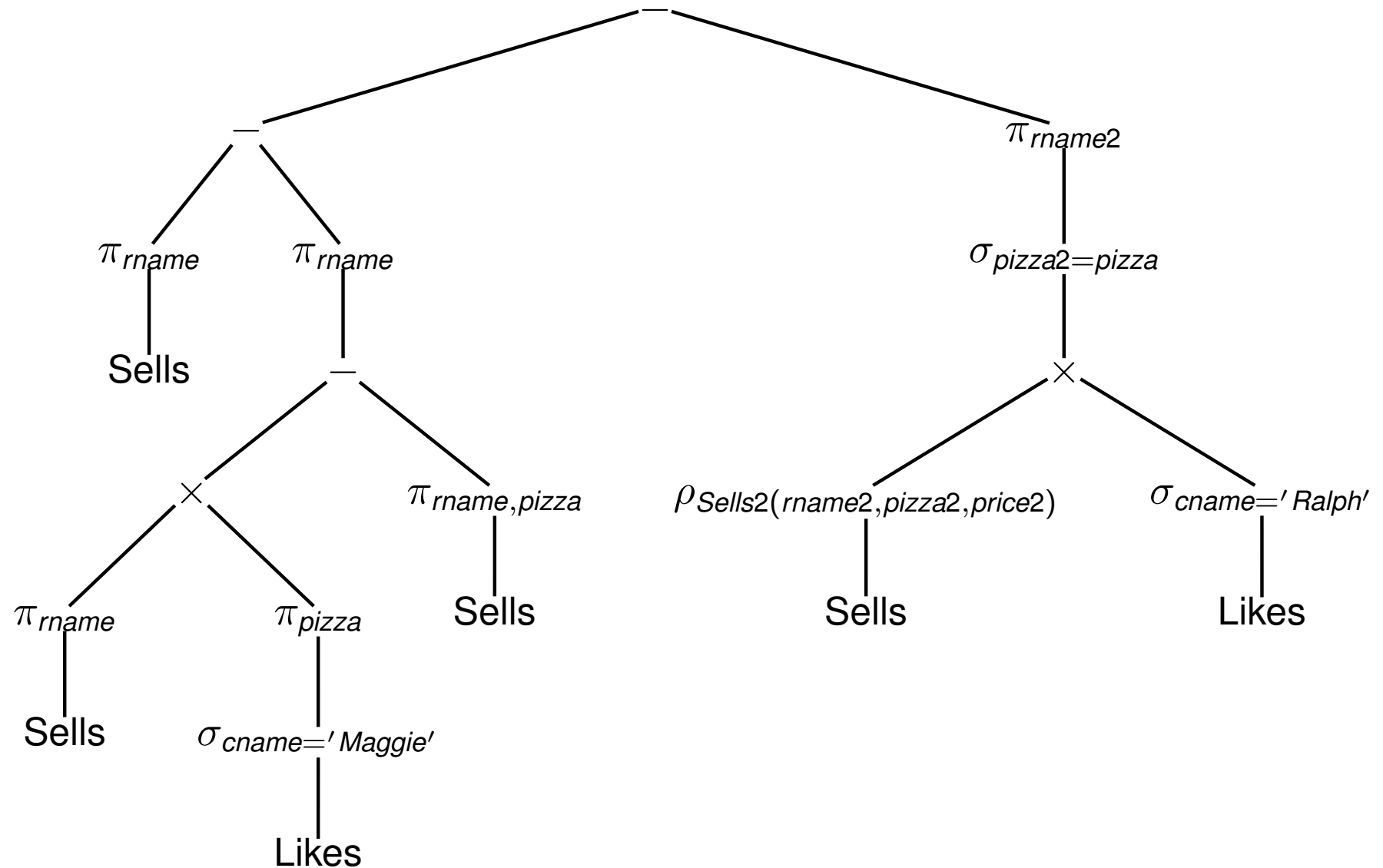
Method 2: Sequence of steps

$$R_1(\text{pizza}) = \pi_{pizza}(\sigma_{cname='Maggie'}(\text{Likes}))$$
$$R_2(\text{rname, pizza}) = \pi_{rname}(\text{Sells}) \times R_1$$
$$R_3(\text{rname}) = \pi_{rname}(R_2 - \pi_{rname,pizza}(\text{Sells}))$$
$$R_4(\text{rname}) = \pi_{rname}(\text{Sells}) - R_3$$
$$R_5(\text{cname5,pizza5}) = \sigma_{cname='Ralph'}(\text{Likes})$$
$$R_6(\text{rname}) = \pi_{rname}(\sigma_{pizza5=pizza}((\text{Sells} \times R_5)))$$
$$\text{Answer(rname)} = R_4 - R_6$$