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1. Find the item id of the item with the name 'Laptop'. [10pts]

a) [6pts] Relational Algebra

$\pi \text{ item\_id}(\sigma \text{ name} = \text{'Laptop'} (\text{Item}))$

b) [1pt] Parse Tree



c) [3pts] Result

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**Item.item\_id**

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'TRLG4'

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'BCCNQ'

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'XZ9IS'

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'JGM3Y'

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'ASXBO'

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'VYKV0'

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'ADJWX'

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'VB4ZC'

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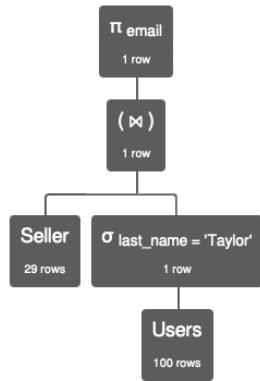
'USYCS'

2. List the email of the sellers whose last name was 'Taylor' [10pts].

a) [6pts] Relational Algebra

$\pi_{\text{email}}(\text{Seller} \bowtie (\sigma_{\text{last\_name} = \text{'Taylor'}}(\text{Users})))$

b) [1pt] Parse Tree



c) [3pts] Result

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**Users.email**

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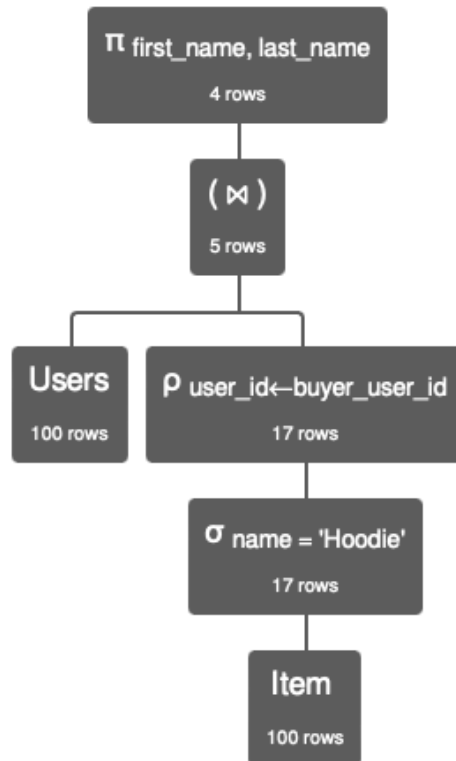
'Amy97@gmail.com'

3. Select the first and last names of users who bought an item with the name 'Hoodie'.  
[10pts].

a) [6pts] Relational Algebra

$\pi$  first\_name, last\_name (Users  $\bowtie$   $\rho$  buyer\_user\_id  $\rightarrow$  user\_id ( $\sigma$  name='Hoodie' (Item)))

b) [1pt] Parse Tree



c) [3pts] Result

Users.first_name	Users.last_name
'Amy'	'Taylor'
'Sarah'	'Lopez'
'Joann'	'Giles'
'Jeremy'	'Boyer'

4. List the user\_id of the buyer who rated a seller who sells an item with item\_id 'DB81G'.  
[10pts].

a) [6pts] Relational Algebra

$\pi \text{ buyer\_id } (\rho \text{ seller\_user\_id} \rightarrow \text{seller\_id } \sigma \text{ item\_id} = \text{'DB81G'} (\text{Item}) \bowtie \text{Ratings})$

b) [1pt] Parse Tree



c) [3pts] Result

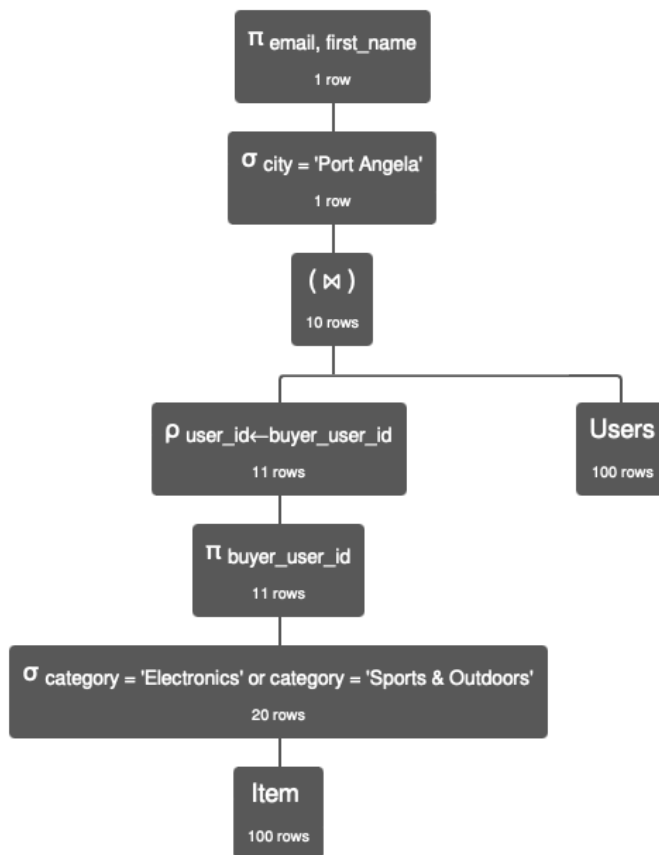
Ratings.buyer_id
'83'
'58'

5. List the user emails and first names of users who bought at least one item of the category 'Electronics' or 'Sports & Outdoors' on the platform and who live in the city "Port Angela".[15pts].

a) [9pts] Relational Algebra

$\pi \text{ email, first\_name}(\sigma \text{ city='Port Angela'} (\rho \text{ buyer\_user\_id} \rightarrow \text{user\_id} (\pi \text{ buyer\_user\_id} (\sigma \text{ category='Electronics' } \vee \text{ category='Sports \& Outdoors'} (\text{Item})))) \bowtie \text{Users}))$

b) [3pt] Parse Tree



c) [3pts] Result

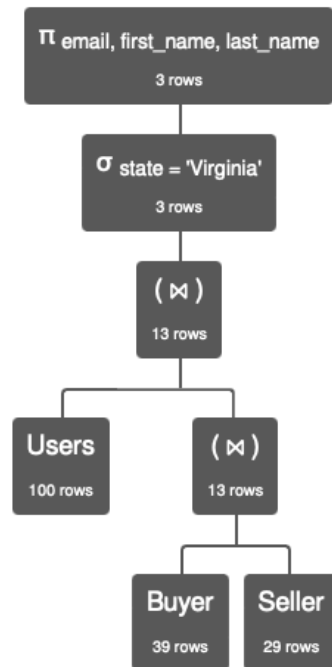
Users.email	Users.first_name
'walter6670@gmail.com'	'Walter'

6. List the emails, first names, and last names of users who are both a buyer and a seller on the platform and who are a resident of the state 'Virginia' [15pts].

a) [9pts] Relational Algebra

$\pi \text{ email, first\_name, last\_name } (\sigma \text{ state='Virginia' } (Users \bowtie (Buyer \bowtie Seller)))$

b) [3pt] Parse Tree



c) [3pts] Result

Users.email	Users.first_name	Users.last_name
'cox_sandra8235@gmail.com'	'Sandra'	'Cox'
'cathy82@gmail.com'	'Cathy'	'Guerrero'
'robinson833@gmail.com'	'Brandon'	'Robinson'

7. List the ad ids of advertisements that have the picture with pic\_num of '3' and are associated with the item with item\_id of 'Q65ZT'. [15pts].

a) [9pts] Relational Algebra

$\pi_{ad\_id} (\sigma_{pic\_num = '3' \wedge item\_id = 'Q65ZT'} Ad)$

b) [3pt] Parse Tree



c) [3pts] Result

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**Ad.ad\_id**

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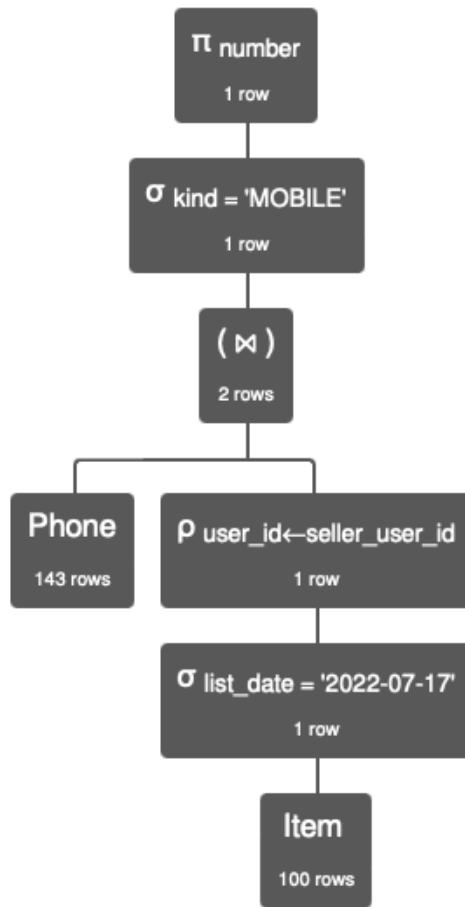
'1GQEO'

8. List the mobile phone numbers (i.e., of kind 'MOBILE') of all the sellers who listed items on the platform on the date "2022-07-17".. [15pts]

a) [9pts] Relational Algebra

$\pi_{\text{number}} (\sigma_{\text{kind}='MOBILE'} (\text{Phone} \bowtie (\rho_{\text{seller\_user\_id} \rightarrow \text{user\_id}} (\sigma_{\text{list\_date}='2022-07-17'} \text{Item}))))$

b) [3pt] Parse Tree



c) [3pts] Result

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**Phone.number**

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'6528222239'