

Problem 13:

Relational Algebra:

$T1 \leftarrow (Attendee \bowtie Register \bowtie Event \bowtie Organise \bowtie Company)$

$\sigma_{Attendee.city \neq Company.city}$

$\Pi_{Aname}(T1)$

- The natural join (\bowtie) has been used in the first line as we have combined multiple different tables, in order to create a comprehensive dataset where the relevant attributes match across tables.
- We have used the ' $\sigma_{Attendee.city \neq Company.city}$ ' as it filters out the rows from the join that meet the condition where the city of the attendee is not the same as the city of the company.
- The final step we have used ' $\Pi_{Aname}(T1)$ ' which extracts the names of attendees from the filtered dataset T1.

Problem 14:

Relational Algebra:

$T1 \leftarrow \sigma_{City='London'}(Company)$

$T2 \leftarrow \sigma_{City \neq 'London'}(Company)$

$T3 \leftarrow T1 \times T2$

$T4 \leftarrow \sigma_{AgeT2 > AgeT1}(T3)$

$T5 \leftarrow \Pi_{Cname}(T4)$

- The first line you are selecting all the companies that are in London in the tables and putting them in the filtered dataset.
- And then you are selecting all the companies that are not found in London and putting them in the filtered dataset.
- Then in the third line we performed the cartesian product between the companies that are in and outside of London eg. $T1 \times T2$
- This line we filter out the pairs where the age of the company in T2 (outside London) is greater than the age of the company in T1 (London).
- Finally, we have projected the company from the filtered set.