DBS Extra Credit - Question 2

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1 Practice Problem for Homework 1 Question 2

Consider the following relational algebra expressions.

$$T_1 := \pi_{\text{PassengerId}}(\text{Passengers}) - \pi_{\text{PassengerId}}\Big(\text{Tickets} \bowtie \text{TicketFlights}\Big)$$

$$T_2 := \pi_{\text{FirstName, LastName}}\Big(T_1 \bowtie \text{Passengers}\Big)$$

1.1 Solution

We analyze the query step by step.

First, the relation T_1 computes:

$$T_1 := \pi_{\text{PassengerId}}(\text{Passengers}) - \pi_{\text{PassengerId}}(\text{Tickets} \bowtie \text{TicketFlights})$$

The relation Tickets $\bowtie$ TicketFlights is a natural join on the common attribute `TicketNo`. Therefore, it keeps tickets records of those whose ticket are associated to a flight. Next, T_1 by subtracting this set from $\pi_{\text{PassengerId}}(\text{Passengers})$, we get T_1 as the set of passenger IDs that appear in `Passengers` but do *not* appear in any ticket flight association..

You can refer back to Question 1c for more information.

Next, the relation T_2 is defined as:

$$T_2 := \pi_{\text{FirstName, LastName}}(T_1 \bowtie \text{Passengers})$$

The natural join $T_1 \bowtie$ Passengers matches on `PassengerId`, keeping only those passenger whose IDs are in T_1. Finally, projecting first and last names of those passengers.