Relational Algebra Queries

1. Retrieve usernames and contact details of users who have placed orders after '2024-02-15 12:00:00'.

$$\pi_{\text{Username, ContactDetails}}(\sigma_{\text{DeliveryTime ¿ '2024-02-15 12:00:00'}}(\text{USERS} \bowtie \text{ORDERS}))$$

2. Retrieve order IDs and corresponding ratings for orders placed by users who rated an order with a rating of less than or equal to 2.

$$\pi_{\text{OrderID, Rating}}(\text{USERS} \bowtie_{\text{UserID=UserID}} (\sigma_{\text{Rating}\leq 2}(\text{RATINGS})))$$

3. Retrieve usernames and issue descriptions from the customer support table for open tickets related to late deliveries.

$$\pi_{\text{Username, IssueDescription}}(\text{USERS} \bowtie_{\text{UserID=UserID}} (\sigma_{\text{IssueDescription='Late delivery' AND Status='Open'}}(\text{CUSTOMER\_SUPPORT})))$$

4. Retrieve order IDs and pickup locations for orders with a delivery time after '2024-02-15 12:00:00' and assigned to a delivery partner.

$$\pi_{\text{OrderID, PickupLocation}}(\sigma_{\text{DeliveryTime ¿ '2024-02-15 12:00:00'}}(\text{ORDERS}) \bowtie_{\text{OrderID=OrderID}} (\text{DELIVERY\_ASSIGNMENT}))$$

5. Retrieve order IDs and corresponding payment methods for orders with a payment amount greater than $50 paid via PayPal.

$$\pi_{\text{OrderID, PaymentMethod}}(\sigma_{\text{Amount ¿ 50.00 AND PaymentMethod='PayPal'}}(\text{PAYMENTS}))$$

6. Retrieve order IDs and tracking statuses for orders that are both delivered and have a rating of 5.

$$\pi_{\text{OrderID, Status}}(\text{TRACKING} \bowtie_{\text{OrderID=OrderID}} (\sigma_{\text{Rating=5}}(\text{RATINGS})))$$

7. Retrieve order IDs and corresponding promotions applied for orders placed during the 'Spring Sale'.

$$\pi_{\text{OrderID, Description}}(\text{ORDERS} \bowtie_{\text{StartDate}\leq\text{DeliveryTime}\leq\text{EndDate}} (\sigma_{\text{Description='Spring Sale'}}(\text{PROMOTIONS})))$$

8. Retrieve usernames and feedback for users who rated an order with a rating of 4 or 5 and have open tickets in customer support.

$$\pi_{\text{Username, Feedback}}(\text{USERS} \bowtie_{\text{UserID=UserID}} (\sigma_{\text{Rating}\geq 4}(\text{RATINGS}) \bowtie_{\text{OrderID=OrderID}} (\sigma_{\text{Status='Open'}}(\text{CUSTOMER\_SUPPORT}))))$$

9. Retrieve order IDs and corresponding delivery times for orders with a pickup location not equal to the drop-off location.

$$\pi_{\text{OrderID, DeliveryTime}}(\sigma_{\text{PickupLocation ¡¿ DropOffLocation}}(\text{ORDERS}))$$

10. Retrieve order IDs and tracking statuses for orders that are in transit or out for delivery and have not been assigned to any delivery partner.

$$\pi_{\text{OrderID, Status}}((\sigma_{\text{Status='In Transit' OR Status='Out for Delivery'}}(\text{TRACKING})) - (\text{DELIVERY\_ASSIGNMENT}))$$

11. Retrieve order IDs and corresponding payment amounts for orders paid via credit card or PayPal.

$$\pi_{\text{OrderID, Amount}}((\sigma_{\text{PaymentMethod='Credit Card'}}(\text{PAYMENTS})) \cup (\sigma_{\text{PaymentMethod='PayPal'}}(\text{PAYMENTS})))$$

12. Retrieve usernames and issue descriptions from customer support for tickets with unresolved issues and assigned to admin user 'Priya Khan'.

$$\pi_{\text{Username, IssueDescription}}\left(\text{USERS} \bowtie_{\substack{\text{UserID=UserID} \\ \text{AND} \\ \text{UserID=AdminID}}} \left(\sigma_{\substack{\text{Status='Open'} \\ \text{AND} \\ \text{Resolution='Pending'}}} (\text{CUSTOMER\_SUPPORT}) \bowtie \sigma_{\text{Name='Priya Khan'}}(\text{ADMIN})\right)\right)$$

Note:

? signifies 'greater than'
! signifies 'less than'