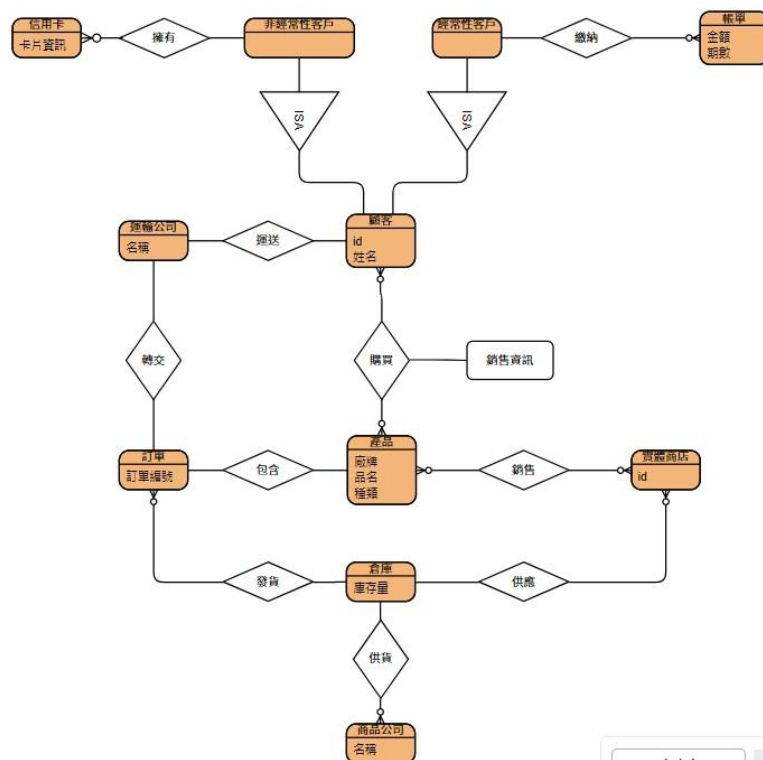ER 圖：

Schema Diagram：

信用卡：credit_card
卡號：card_number
顧客帳號：account
有效期限：expDate

倉庫庫存：warehouse_inventory
產品 ID：product_ID
庫存量：inventory
是否已經向廠商訂購：replenish_state

商品：commodity
名稱：name_of_product
價格：price

商店：store
名稱：name_of_store
是否線上商店：is_online

商店庫存：store_inventory
產品 ID：product_ID
商店 ID：store_ID
庫存量：inventory

套裝：package
套裝名稱：package_name
產品 ID：product_ID
商品 ID：commodity _ID

帳單：bill
顧客帳號：account
金額：money

產品：product
製造商：manufactory
品名：name_of_product
種類：type

簽帳金融卡：debit_card
卡號：card_number
顧客帳號：account
有效期限：expDate

線上訂單：online_order
運輸公司名稱：delivery_company
追蹤號碼：trace_num
顧客帳號：account
銷售商品 ID：sale_commodity_ID
出貨時間：shipping_time
預計送達時間：estimated_time
送達時間：delivery_time
付款方式：pay_method

線下訂單：offline_order
顧客帳號：account
銷售商品 ID：sale_commodity_ID
付款方式：pay_method

銷售商品：sale_commodity
商品 ID：commodity _ID
商店 ID：store_ID

顧客：customer
帳號：account
密碼：password
是否為經常性客戶：is_frequent

顧客資訊：customer_information
顧客帳號：account
姓名：name
性別：gender
電子郵件：email
電話：phone
住家地址：adress

Query：
- **Find the customer who has bought the most (by price) in the past year.**

  WITH priceList(ID, name, price) AS (

  SELECT DISTINCT commodity_ID, name_of_commodity, price

  FROM sale_commodity JOIN commodity

  WHERE   sale_commodity.commodity_ID   =

  commodity.ID),onlineAndOffline(account, price) AS (

  SELECT online_order.account, SUM(priceList.price)

  FROM online_order, sale_commodity, priceList

  WHERE online_order.sale_commodity_ID = sale_commodity.ID AND

  sale_commodity.commodity_ID = priceList.ID

  GROUP BY online_order.account

  UNION ALL

  SELECT offline_order.account, SUM(priceList.price)

  FROM offline_order, sale_commodity, priceList

  WHERE offline_order.sale_commodity_ID = sale_commodity.ID AND

  sale_commodity.commodity_ID = priceList.ID

  GROUP BY offline_order.account)

  SELECT account, SUM(price) AS total

  FROM onlineAndOffline

  GROUP BY account

  ORDER BY total DESC

  LIMIT 1;

```
1  WITH priceList(ID, name, price) AS (
2      SELECT DISTINCT commodity_ID, name_of_commodity, price
3      FROM sale_commodity JOIN commodity
4      WHERE sale_commodity.commodity_ID = commodity.ID),onlineAndOffline(account, price) AS (
5          SELECT online_order.account, SUM(priceList.price)
6          FROM online_order, sale_commodity, priceList
7          WHERE online_order.sale_commodity_ID = sale_commodity.ID AND sale_commodity.commodity_ID = priceList.ID
8          GROUP BY online_order.account
9          UNION ALL
10         SELECT offline_order.account, SUM(priceList.price)
11         FROM offline_order, sale_commodity, priceList
12         WHERE offline_order.sale_commodity_ID = sale_commodity.ID AND sale_commodity.commodity_ID = priceList.ID
13         GROUP BY offline_order.account)
14 SELECT account, SUM(price)
15 FROM onlineAndOffline
16 GROUP BY account
17 ORDER BY price DESC
18 LIMIT 1;
```

account	total
411077012@mail.nknu.edu.tw	165990

- **Find the top 2 products by dollar-amount sold in the past year.**

WITH priceList(ID, name, price) AS (

    SELECT DISTINCT commodity_ID, name_of_commodity, price

    FROM sale_commodity JOIN commodity

    WHERE   sale_commodity.commodity_ID   =

commodity.ID),onlineAndOffline(name, price) AS (

      SELECT priceList.name, SUM(priceList.price)

      FROM online_order, sale_commodity, priceList

      WHERE online_order.sale_commodity_ID = sale_commodity.ID AND

sale_commodity.commodity_ID = priceList.ID

      GROUP BY online_order.account

      UNION ALL

      SELECT priceList.name, SUM(priceList.price)

      FROM offline_order, sale_commodity, priceList

      WHERE offline_order.sale_commodity_ID = sale_commodity.ID AND

sale_commodity.commodity_ID = priceList.ID

      GROUP BY offline_order.account)

SELECT name, SUM(price) AS total

FROM onlineAndOffline

GROUP BY name

ORDER BY total DESC

LIMIT 2;

```
1  WITH priceList(ID, name, price) AS (
2      SELECT DISTINCT commodity_ID, name_of_commodity, price
3      FROM sale_commodity JOIN commodity
4      WHERE sale_commodity.commodity_ID = commodity.ID),onlineAndOffline(name, price) AS (
5          SELECT priceList.name, SUM(priceList.price)
6          FROM online_order, sale_commodity, priceList
7          WHERE online_order.sale_commodity_ID = sale_commodity.ID AND sale_commodity.commodity_ID = priceList.ID
8          GROUP BY online_order.account
9          UNION ALL
10         SELECT priceList.name, SUM(priceList.price)
11         FROM offline_order, sale_commodity, priceList
12         WHERE offline_order.sale_commodity_ID = sale_commodity.ID AND sale_commodity.commodity_ID = priceList.ID
13         GROUP BY offline_order.account)
14 SELECT name, SUM(price) AS total
15 FROM onlineAndOffline
16 GROUP BY name
17 ORDER BY total DESC
18 LIMIT 2;
```

name	total
【ROG Zephyrus G15】 ASUS GA503RM-0062E6800HS 日蝕灰 1...	201896
Razer BLADE 18 (i9-13950HX/32GB/RTX 4090/1TB+1TB(2...	165990

- **Find those products that are out-of-stock at every store in Kaohsiung.**

```
SELECT name_of_product
FROM product
WHERE ID in (
    SELECT store_inventory.product_ID
    FROM store, store_inventory
    WHERE store_inventory.store_ID = store.ID AND store.county LIKE '%高雄%'
    GROUP BY store_inventory.product_ID
HAVING SUM(store_inventory.inventory) = 0);
```

```
1 SELECT name_of_product
2 FROM product
3 WHERE ID in (
4     SELECT store_inventory.product_ID
5     FROM store, store_inventory
6     WHERE store_inventory.store_ID = store.ID AND store.county LIKE '%高雄%'
7     GROUP BY store_inventory.product_ID
8     HAVING SUM(store_inventory.inventory) = 0);
```

name_of_product

Razer BLADE 18 (i9-13950HX/32GB/RTX 4090/1TB+1TB(2...

- **Find those packages that were not delivered within the promised time.**

```
SELECT *
FROM online_order
WHERE delivery_time > estimated_time
```

```
1 SELECT *
2 FROM online_order
3 WHERE delivery_time > estimated_time
```

ID	delivery_company	trace_num	account	sale_commodity_ID	shipping_time	estimated_time	delivery_time	created_at	pay_method
10	USPS	8	411077022@mail.nknu.edu.tw	11	2023-06-13 22:55:27	2023-06-16	2023-06-17	2023-06-10 01:44:02	簽帳金融卡
18	順豐速遞	10	411077006@mail.nknu.edu.tw	9	2023-06-12 00:43:49	2023-06-15	2023-06-17	2023-06-10 01:44:02	簽帳金融卡

- **Assume the package shipped by USPS with tracking number 123456 is reported to have been destroyed in an accident. Find the contact information for the customer. Also, find the contents of that shipment and create a new shipment of replacement items.**

```
FROM commodity, sale_commodity
WHERE    commodity.ID    =    sale_commodity.commodity_ID    AND
sale_commodity.ID = (
```

SELECT sale_commodity_ID
FROM online_order
WHERE delivery_company LIKE 'USPS' and trace_num = '123456');

```sql
1  SELECT commodity.name_of_commodity
2  FROM commodity, sale_commodity
3  WHERE commodity.ID = sale_commodity.commodity_ID AND sale_commodity.ID = (
4      SELECT sale_commodity_ID
5      FROM online_order
6      WHERE delivery_company LIKE 'USPS' and trace_num = '123456');
7
```

name_of_commodity

ASUS 27吋2K HDR電競螢幕(VG27AQL1A)