```
-- 1.

CREATE TYPE AddressType AS OBJECT (
   street_number NUMBER,
   street_name VARCHAR2(50),
   suburb VARCHAR2(50),
   state VARCHAR2(10),
   pin NUMBER
);
/

CREATE TYPE InvestmentType AS OBJECT (
   company VARCHAR2(50),
   purchase_price NUMBER,
   purchase_date DATE,
   qty NUMBER
);
/

CREATE TYPE InvestmentTable AS TABLE OF InvestmentType;
/

CREATE TYPE ExchangeList AS VARRAY(5) OF VARCHAR2(50);
/

-- 2. Creating Tables

CREATE TABLE Clients (
   client_id NUMBER PRIMARY KEY,
```

```
    first_name VARCHAR2(50),
    last_name VARCHAR2(50),
    address AddressType,
    investments InvestmentTable
) NESTED TABLE investments STORE AS Investment_Storage;
/

CREATE TABLE Stocks (
    company VARCHAR2(50) PRIMARY KEY,
    current_price NUMBER,
    exchanges ExchangeList,
    last_dividend NUMBER,
    earnings_per_share NUMBER
);
/

-- 3. Inserting Sample Data

INSERT INTO Clients VALUES (
    1, 'John', 'Smith',
    AddressType(3, 'East Av', 'Bentley', 'WA', 6102),
    InvestmentTable(
        InvestmentType('BHP', 12.00, TO_DATE('02-10-2001', 'DD-MM-YYYY'), 1000),
        InvestmentType('BHP', 10.50, TO_DATE('08-06-2002', 'DD-MM-YYYY'), 2000),
        InvestmentType('IBM', 58.00, TO_DATE('12-02-2000', 'DD-MM-YYYY'), 500)
    )
);
/
```

```
INSERT INTO Clients VALUES (
   2, 'Jill', 'Brody',
   AddressType(42, 'Bent St', 'Perth', 'WA', 6001),
   InvestmentTable(
      InvestmentType('INTEL', 35.00, TO_DATE('30-01-2000', 'DD-MM-YYYY'), 300),
      InvestmentType('FORD', 40.00, TO_DATE('05-10-1999', 'DD-MM-YYYY'), 300),
      InvestmentType('GM', 55.50, TO_DATE('12-12-2000', 'DD-MM-YYYY'), 500)
   )
);
/

INSERT INTO Stocks VALUES (
   'BHP', 10.50, ExchangeList('Sydney', 'New York'), 1.50, 3.20
);
/

INSERT INTO Stocks VALUES (
   'IBM', 70.00, ExchangeList('New York', 'London', 'Tokyo'), 4.25, 10.00
);
/

INSERT INTO Stocks VALUES (
   'INTEL', 76.50, ExchangeList('New York', 'London'), 5.00, 12.40
);
/

INSERT INTO Stocks VALUES (
   'FORD', 40.00, ExchangeList('New York'), 2.00, 8.50
);
```

```
/

INSERT INTO Stocks VALUES (
   'GM', 60.00, ExchangeList('New York'), 2.50, 9.20
);
/

-- 3

-- (a) Get client name, stock name, current price, last dividend, EPS
SELECT c.first_name, c.last_name, i.company,
     (SELECT s.current_price FROM Stocks s WHERE s.company = i.company) AS current_price,
     (SELECT s.last_dividend FROM Stocks s WHERE s.company = i.company) AS last_dividend,
     (SELECT s.earnings_per_share FROM Stocks s WHERE s.company = i.company) AS
earnings_per_share
FROM Clients c, TABLE(c.investments) i;
/

-- (b) List clients, stock name, total shares held, and average purchase price
SELECT c.first_name, c.last_name, i.company,
     SUM(i.qty) AS total_shares,
     SUM(i.qty * i.purchase_price) / SUM(i.qty) AS avg_price
FROM Clients c, TABLE(c.investments) i
GROUP BY c.first_name, c.last_name, i.company;
/

-- (c) Stocks traded in New York, quantity held by clients, current value
SELECT i.company, c.first_name, c.last_name,
     i.qty AS shares_held,
```

```
    i.qty * s.current_price AS current_value
FROM Clients c
JOIN TABLE(c.investments) i ON 1=1
JOIN Stocks s ON i.company = s.company
WHERE EXISTS (
  SELECT 1 FROM TABLE(s.exchanges) e WHERE e.COLUMN_VALUE = 'New York'
);
-- (d) Total purchase value for each client
SELECT c.first_name, c.last_name,
    SUM(i.qty * i.purchase_price) AS total_purchase_value
FROM Clients c, TABLE(c.investments) i
GROUP BY c.first_name, c.last_name;
/

-- (e) Book profit or loss for each client
SELECT c.first_name, c.last_name,
    SUM(i.qty * (SELECT s.current_price FROM Stocks s WHERE s.company = i.company))
    - SUM(i.qty * i.purchase_price) AS book_profit_loss
FROM Clients c, TABLE(c.investments) i
GROUP BY c.first_name, c.last_name;
/

-- 4. Updating Transactions (John sells INFOSYS to Jill & Jill sells GM to John)

-- Remove INFOSYS from John's Investments
UPDATE Clients c
SET c.investments = (
  SELECT CAST(MULTISET (
    SELECT * FROM TABLE(c.investments) WHERE company <> 'INFOSYS'
```

```
   ) AS InvestmentTable) FROM DUAL
)
WHERE c.first_name = 'John' AND c.last_name = 'Smith';
/

-- Add INFOSYS to Jill's Investments
UPDATE Clients c
SET c.investments = c.investments MULTISET UNION InvestmentTable(
   InvestmentType('INFOSYS', (SELECT current_price FROM Stocks WHERE company = 'INFOSYS'),
   SYSDATE, (SELECT qty FROM TABLE(c.investments) WHERE company = 'INFOSYS'))
)
WHERE c.first_name = 'Jill' AND c.last_name = 'Brody';
/

-- Remove GM from Jill's Investments
UPDATE Clients c
SET c.investments = (
   SELECT CAST(MULTISET (
      SELECT * FROM TABLE(c.investments) WHERE company <> 'GM'
   ) AS InvestmentTable) FROM DUAL
)
WHERE c.first_name = 'Jill' AND c.last_name = 'Brody';
/

-- Add GM to John's Investments
UPDATE Clients c
SET c.investments = c.investments MULTISET UNION InvestmentTable(
   InvestmentType('GM', (SELECT current_price FROM Stocks WHERE company = 'GM'),
   SYSDATE, (SELECT qty FROM TABLE(c.investments) WHERE company = 'GM'))
```

```
)
WHERE c.first_name = 'John' AND c.last_name = 'Smith';
/

-- 6. Verification Query (Checking Update Works)
SELECT c.first_name, c.last_name, i.company
FROM Clients c, TABLE(c.investments) i;
/
```