AIE303 Labsheet 7

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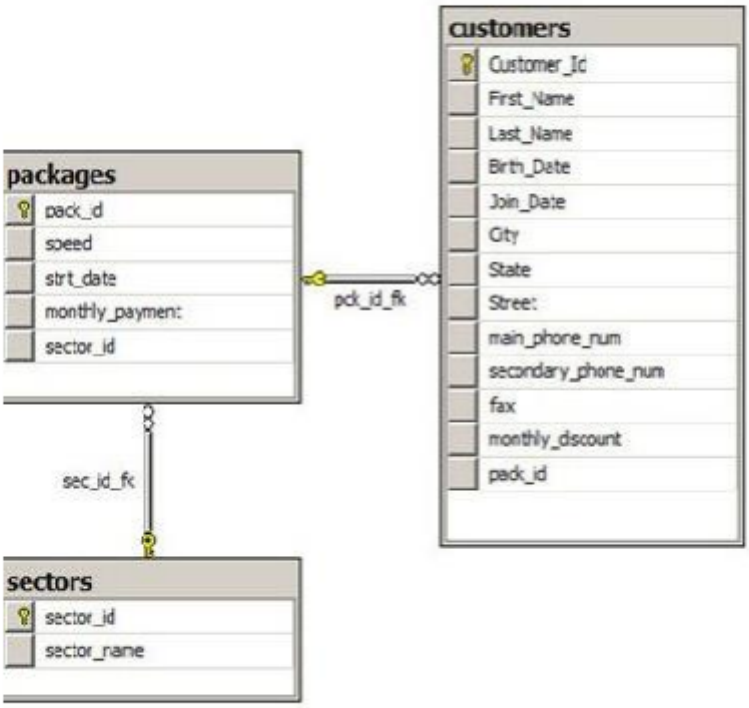
Creating and inserting data into tables

```
postgres=# CREATE TABLE Sectors (
    sector_id INT PRIMARY KEY,
    sector_name VARCHAR(50)
);
CREATE TABLE
postgres=# CREATE TABLE Packages (
    pack_id INT PRIMARY KEY,
    speed INT, -- Internet speed in Mbps
    monthly_payment DECIMAL(10, 2),
    sector_id INT,
    FOREIGN KEY (sector_id) REFERENCES Sectors(sector_id)
);
CREATE TABLE
postgres=# CREATE TABLE Customers (
    customer_id INT PRIMARY KEY,
    First_Name VARCHAR(50),
    Last_Name VARCHAR(50),
    Join_Date DATE,
    pack_id INT,
    monthly_discount DECIMAL(10, 2),
    FOREIGN KEY (pack_id) REFERENCES Packages(pack_id)
);
CREATE TABLE
postgres=# INSERT INTO Sectors (sector_id, sector_name)
VALUES
    (1, 'Private'),
    (2, 'Business'),
    (3, 'Education');
INSERT 0 3
postgres=# INSERT INTO Packages (pack_id, speed, monthly_payment, sector_id)
VALUES
    (10, 50, 25.99, 1),
    (22, 100, 45.99, 2),
    (27, 200, 85.99, 2),
    (30, 300, 120.50, 3);
INSERT 0 4
postgres=# INSERT INTO Customers (customer_id, First_Name, Last_Name, Join_Date, pack_id, monthly_discount)
VALUES
    (101, 'John', 'Doe', '2023-01-15', 10, 5.00),
    (102, 'Jane', 'Smith', '2023-05-10', 22, 10.00),
    (103, 'Amado', 'Taylor', '2023-03-08', 27, 15.00),
    (104, 'Alice', 'Brown', '2023-07-20', 30, 7.50),
    (105, 'Bob', 'White', '2023-06-25', NULL, 0.00);
INSERT 0 5
postgres=#
```

Schema of the database



Queries

Inner Join

1. Customers and internet packages (*Customers* & *Packages* tables) –
   a. Write a query to display first name, last name, package number and internet speed for all customers.
   b. Write a query to display first name, last name, package number and internet speed for all customers whose package number equals 22 or 27. Order the query in ascending order by last name.
2. Internet packages and sectors –
   a. Display the package number, internet speed, monthly payment and sector name for all packages (*Packages* and *Sectors* tables).
   b. Display the customer name, package number, internet speed, monthly payment and sector name for all customers (*Customers*, *Packages* and *Sectors* tables).
   c. Display the customer name, package number, internet speed, monthly payment and sector name for all customers in the business sector (*Customers*, *Packages* and *Sectors* tables).
3. Display the last name, first name, join date, package number, internet speed and sector name for all customers in the private sector.

1.a

```
SELECT
    c.First_Name,
    c.Last_Name,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed
FROM
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id;
```

```
postgres=# SELECT
    c.First_Name,
    c.Last_Name,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed
FROM
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id;
 first_name | last_name | package_number | internet_speed
------------+-----------+----------------+----------------
 John       | Doe       |             10 |             50
 Jane       | Smith     |             22 |            100
 Amado      | Taylor    |             27 |            200
 Alice      | Brown     |             30 |            300
(4 rows)
```

1.b

```sql
SELECT
    c.First_Name,
    c.Last_Name,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed
FROM
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id
WHERE
    p.pack_id IN (22, 27)
ORDER BY
    c.Last_Name ASC;
```

```
postgres=# SELECT
    c.First_Name,
    c.Last_Name,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed
FROM
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id
WHERE
    p.pack_id IN (22, 27)
ORDER BY
    c.Last_Name ASC;
 first_name | last_name | package_number | internet_speed
------------+-----------+----------------+----------------
 Jane       | Smith     |             22 |            100
 Amado      | Taylor    |             27 |            200
(2 rows)
```

2.a

```sql
SELECT
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment,
    s.sector_name AS Sector_Name
FROM
    packages p
INNER JOIN
    sectors s
ON
    p.sector_id = s.sector_id;
```

```
postgres=# SELECT
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment,
    s.sector_name AS Sector_Name
FROM
    packages p
INNER JOIN
    sectors s
ON
    p.sector_id = s.sector_id;
 package_number | internet_speed | monthly_payment | sector_name
----------------+----------------+-----------------+-------------
             10 |             50 |           25.99 | Private
             22 |            100 |           45.99 | Business
             27 |            200 |           85.99 | Business
             30 |            300 |          120.50 | Education
(4 rows)
```

2.b

```sql
SELECT
    c.First_Name || ' ' || c.Last_Name AS Customer_Name,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment,
    s.sector_name AS Sector_Name
FROM
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id
INNER JOIN
    sectors s
ON
    p.sector_id = s.sector_id;
```

```
postgres=# SELECT
    c.First_Name || ' ' || c.Last_Name AS Customer_Name,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment,
    s.sector_name AS Sector_Name
FROM
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id
INNER JOIN
    sectors s
ON
    p.sector_id = s.sector_id;
 customer_name | package_number | internet_speed | monthly_payment | sector_name
---------------+----------------+----------------+-----------------+-------------
 John Doe      |             10 |             50 |           25.99 | Private
 Jane Smith    |             22 |            100 |           45.99 | Business
 Amado Taylor  |             27 |            200 |           85.99 | Business
 Alice Brown   |             30 |            300 |          120.50 | Education
(4 rows)
```

2.c

```sql
SELECT
    c.First_Name || ' ' || c.Last_Name AS Customer_Name,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment,
    s.sector_name AS Sector_Name
FROM
```

```
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id
INNER JOIN
    sectors s
ON
    p.sector_id = s.sector_id
WHERE
    s.sector_name = 'Business';
```

```
postgres=# SELECT
    c.First_Name || ' ' || c.Last_Name AS Customer_Name,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment,
    s.sector_name AS Sector_Name
FROM
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id
INNER JOIN
    sectors s
ON
    p.sector_id = s.sector_id
WHERE
    s.sector_name = 'Business';
 customer_name | package_number | internet_speed | monthly_payment | sector_name
---------------+----------------+----------------+-----------------+-------------
 Jane Smith    |             22 |            100 |           45.99 | Business
 Amado Taylor  |             27 |            200 |           85.99 | Business
(2 rows)
```

3

```
SELECT
    c.Last_Name,
    c.First_Name,
    c.Join_Date,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    s.sector_name AS Sector_Name
FROM
    customers c
INNER JOIN
    packages p
ON
```

```
    c.pack_id = p.pack_id
INNER JOIN
    sectors s
ON
    p.sector_id = s.sector_id
WHERE
    s.sector_name = 'Private';
```

```
postgres=# SELECT
    c.Last_Name,
    c.First_Name,
    c.Join_Date,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    s.sector_name AS Sector_Name
FROM
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id
INNER JOIN
    sectors s
ON
    p.sector_id = s.sector_id
WHERE
    s.sector_name = 'Private';
 last_name | first_name | join_date  | package_number | internet_speed | sector_name
-----------+------------+------------+----------------+----------------+-------------
 Doe       | John       | 2023-01-15 |             10 |             50 | Private
(1 row)
```

Outer Joins

Outer Join

4. Customers and internet packages (*Customers* and *Packages* tables)
   a. Display the first name, last name, internet speed and monthly payment for all customers. Use INNER JOIN to solve this exercise.
   b. Modify last query to display all customers, including those without any internet package.(outer join)
   c. Modify last query to display all packages, including those without any customers.(outer join)
   d. Modify last query to display all packages and all customers.

4.a

```sql
SELECT
    c.First_Name,
    c.Last_Name,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment
FROM
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id;
```

```
postgres=# SELECT
    c.First_Name,
    c.Last_Name,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment
FROM
    customers c
INNER JOIN
    packages p
ON
    c.pack_id = p.pack_id;
 first_name | last_name | internet_speed | monthly_payment
------------+-----------+----------------+-----------------
 John       | Doe       |             50 |           25.99
 Jane       | Smith     |            100 |           45.99
 Amado      | Taylor    |            200 |           85.99
 Alice      | Brown     |            300 |          120.50
(4 rows)
```

4.b

```sql
SELECT
    c.First_Name,
    c.Last_Name,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment
FROM
    customers c
LEFT OUTER JOIN
    packages p
ON
    c.pack_id = p.pack_id;
```

```
postgres=# SELECT
    c.First_Name,
    c.Last_Name,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment
FROM
    customers c
LEFT OUTER JOIN
    packages p
ON
    c.pack_id = p.pack_id;
 first_name | last_name | internet_speed | monthly_payment
------------+-----------+----------------+-----------------
 John       | Doe       |             50 |           25.99
 Jane       | Smith     |            100 |           45.99
 Amado      | Taylor    |            200 |           85.99
 Alice      | Brown     |            300 |          120.50
 Bob        | White     |                |
(5 rows)
```

4.c

```sql
SELECT
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment,
    c.First_Name,
    c.Last_Name
FROM
    packages p
LEFT OUTER JOIN
    customers c
ON
    p.pack_id = c.pack_id;
```

```
postgres=# SELECT
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment,
    c.First_Name,
    c.Last_Name
FROM
    packages p
LEFT OUTER JOIN
    customers c
ON
    p.pack_id = c.pack_id;
 package_number | internet_speed | monthly_payment | first_name | last_name
----------------+----------------+-----------------+------------+-----------
             10 |             50 |           25.99 | John       | Doe
             22 |            100 |           45.99 | Jane       | Smith
             27 |            200 |           85.99 | Amado      | Taylor
             30 |            300 |          120.50 | Alice      | Brown
(4 rows)
```

4.d

```sql
SELECT
    c.First_Name,
    c.Last_Name,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment
FROM
    customers c
FULL OUTER JOIN
    packages p
ON
    c.pack_id = p.pack_id;
```

```
postgres=# SELECT
    c.First_Name,
    c.Last_Name,
    p.pack_id AS Package_Number,
    p.speed AS Internet_Speed,
    p.monthly_payment AS Monthly_Payment
FROM
    customers c
FULL OUTER JOIN
    packages p
ON
    c.pack_id = p.pack_id;
 first_name | last_name | package_number | internet_speed | monthly_payment
------------+-----------+----------------+----------------+-----------------
 John       | Doe       |             10 |             50 |           25.99
 Jane       | Smith     |             22 |            100 |           45.99
 Amado      | Taylor    |             27 |            200 |           85.99
 Alice      | Brown     |             30 |            300 |          120.50
 Bob        | White     |                |                |
```

Self Joins

5. Self Join

a. Display the last name, first name and package number for all customers who have the same package number as customer named 'Amado Taylor' (*Customers* table).
b. Display the last name, first name and monthly discount for all customers whose monthly discount is lower than the monthly discount of employee number 103 (*Customers* table).
c. Display the package number and internet speed for all packages whose internet speed is equal to the internet speed of package number 10 (*Packages* table).

5.a

```
SELECT
    c1.Last_Name,
    c1.First_Name,
    c1.pack_id AS Package_Number
FROM
    customers c1
INNER JOIN
    customers c2
ON
    c1.pack_id = c2.pack_id
WHERE
    c2.First_Name = 'Amado' AND c2.Last_Name = 'Taylor';
```

```
postgres=# SELECT
    c1.Last_Name,
    c1.First_Name,
    c1.pack_id AS Package_Number
FROM
    customers c1
INNER JOIN
    customers c2
ON
    c1.pack_id = c2.pack_id
WHERE
    c2.First_Name = 'Amado' AND c2.Last_Name = 'Taylor';
 last_name | first_name | package_number
-----------+------------+----------------
 Taylor    | Amado      |             27
(1 row)
```

5.b

```sql
SELECT
    c1.Last_Name,
    c1.First_Name,
    c1.monthly_discount
FROM
    customers c1
INNER JOIN
    customers c2
ON
    c1.Customer_Id != c2.Customer_Id
WHERE
    c2.Customer_Id = 103
    AND c1.monthly_discount < c2.monthly_discount;
```

```
postgres=# SELECT
    c1.Last_Name,
    c1.First_Name,
    c1.monthly_discount
FROM
    customers c1
INNER JOIN
    customers c2
ON
    c1.Customer_Id != c2.Customer_Id
WHERE
    c2.Customer_Id = 103
    AND c1.monthly_discount < c2.monthly_discount;
 last_name | first_name | monthly_discount
-----------+------------+------------------
 Doe       | John       |             5.00
 Smith     | Jane       |            10.00
 Brown     | Alice      |             7.50
 White     | Bob        |             0.00
(4 rows)
```

5.c

```
SELECT
    p1.pack_id AS Package_Number,
    p1.speed AS Internet_Speed
FROM
    packages p1
INNER JOIN
    packages p2
ON
    p1.speed = p2.speed
WHERE
    p2.pack_id = 10;
```

```
postgres=# SELECT
    p1.pack_id AS Package_Number,
    p1.speed AS Internet_Speed
FROM
    packages p1
INNER JOIN
    packages p2
ON
    p1.speed = p2.speed
WHERE
    p2.pack_id = 10;
 package_number | internet_speed
----------------+----------------
             10 |             50
(1 row)
```