Step 1: Setup

- Load **`Card_data.csv`** into Power BI.
- Disable **Auto DateTime**:
  File → Options → Current File → Data Load → Time Intelligence → Uncheck Auto Date/Time.
- Create a proper **Date Table**:

```
DateTable =
ADDCOLUMNS(
    CALENDARAUTO(),
    "Year", YEAR([Date]),
    "Month", FORMAT([Date], "MMM"),
    "MonthNum", MONTH([Date])
)
```

Relate it to `account_opened_date` and `expire_date`.

Step 2: Total Card Limit by Card Brand & Type

- Visual: **Stacked Column Chart**
  - X-axis: `card_brand`
  - Y-axis: `SUM(card_limit)`
  - Legend: `card_type`
  - Tooltip: `DistinctClientCount`

Create a measure for tooltip:

```
Client Count = DISTINCTCOUNT(Card_data[client_id])
```

Step 3: Drill Down into Monthly Trends

- Create **hierarchy** in Date table: `Year → Month`.
- Visual: **Stacked Column Chart**
  - Axis: Date Hierarchy (Year → Month)
  - Values: `COUNT(card_number)`
- Enable **drill down/up** in the chart (Power BI toolbar option).

Step 4: Top 10 Clients by Total Card Limit

1. Create measure:

```
Total Card Limit = SUM(Card_data[card_limit])
```

2. Visual: **Bar Chart**
    - Axis: `client_id`
    - Values: `Total Card Limit`
    - Filter: Top N → 10
    - Sort by: `Total Card Limit (Descending)`

Step 5: Client Drill-through Page

- Add a new **drill-through page**.
- Add `client_id` as drill-through field.
- Place a **table visual**: Columns → `card_type`, `card_brand`, `card_limit`, `expire_date`.
- Add **filters** (slicers): `card_type`, `expire_date (Year)`.

Step 6: Heatmap Matrix of Expiry Trends

- Visual: **Matrix**
    - Rows: `card_brand`
    - Columns: `Year(expire_date)`
    - Values: `COUNT(card_number)`
- Add **Conditional Formatting → Color Scale**
    - Red = higher expiries, Green/Light = lower expiries.

Step 7: Dynamic Top N by Card Limit

1. Create parameter table for **Top N**:
    - Modeling → New Parameter → Fields → Numeric Range (say 1–20).
    - Name it `TopNParameter[TopN]`.
2. Create measure:

```
Ranked Brands =
RANKX(
    ALL(Card_data[card_brand]),
    [Total Card Limit],
    ,
    DESC
)

Show TopN Brands =
IF([Ranked Brands] <= MAX(TopNParameter[TopN]), 1, 0)
```

3. Add **slicer** for `TopNParameter`.
4. Visual: **Column Chart**
    - X-axis: `card_brand`

- Y-axis: `Total Card Limit`
- Visual-level filter: `Show TopN Brands = 1`.

Step 8: Sales Data (sales.csv)

Load **`sales.csv`**, disable Auto DateTime, create **Sales Date Table** same as above.

Measure: Avg Days Between Sales

```
Avg Days Between Sales =
AVERAGEX(
    VALUES(Sales[customer_id]),
    VAR CurrentCustomer = Sales[customer_id]
    RETURN
        AVERAGEX(
            FILTER(
                ADDCOLUMNS(
                    Sales,
                    "PrevDate",
                        CALCULATE(
                            MAX(Sales[sales_date]),
                            FILTER(
                                Sales,
                                Sales[customer_id] = CurrentCustomer &&
                                Sales[sales_date] <
EARLIER(Sales[sales_date])
                            )
                        )
                ),
                NOT(ISBLANK([PrevDate]))
            ),
            DATEDIFF([PrevDate], Sales[sales_date], DAY)
        )
)
```

This computes differences between consecutive sales dates per customer, then averages them.

Example given:

- Sales dates: 04.21 → 05.01 → 05.05
- Differences: 10 days + 4 days = 14
- Average = `14/2 = 7 days`.