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Assignment
Robotic Process Automation TO00BS68-3007

23.03.2025

Project work – individual or Group with selected technology

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Assignment
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23.03.2025

Robot Name: Concert Tickets Sales Weekly Reporting
Tools Used: Power Automate (Web), SQL Server Management Studio, Encodian, Outlook

The video presentation link: PAD3 video presentation

The flow code link: Code

1. Project Status: Schedule and Plan Adherence

Our project mostly followed the original plan. The primary goal was to automate the weekly reporting of concert ticket sales from an SQL database and send them via email in both **excel and formatted PDF** formats.

- **Compared to the original idea:**
  - We successfully implemented SQL data extraction, automated scheduling, CSV & HTML & PDF generation, and email delivery.
  - We achieved PDF generation using Encodian. However, since CSV files can still be edited in Excel, and the summary from the PDF can be directly displayed in the email body using HTML, we ultimately decided to attach only the CSV file and exclude the PDF version.
  - However, we did not implement the Excel report with pivot table, as originally planned due to the extra longer running time.
- **Changes from the Plan**:
  - We replaced the Excel pivot table with an HTML summary for faster and simpler implementation and attach CSV file with the detailed sales information.

2. Execution Timeline and Performance

The final executed version of the flow includes the following steps and timing (from attached run log):

Compared to manual steps (30–45 minutes), automation reduced the time to **just 13 seconds**, representing a **time saving of over 90%** and removing the risk of human error.

3. SQL Integration – Setup and Challenges

Setting up the SQL connection was the most technically complex part of the project. We followed these steps to enable Power Automate to connect securely to the local SQL Server:

- **Install SQL Server Management Studio (SSMS)**

  Used to manage the database, create tables and stored procedures.

  Sample DB was created using this SQL:

```
CREATE DATABASE concert_tickets;

GO

USE concert_tickets;

GO

CREATE TABLE tickets (

   ticket_id INT IDENTITY(1,1) PRIMARY KEY,

   ticket_code VARCHAR(50) UNIQUE NOT NULL,

   ticket_price DECIMAL(10,2) NOT NULL,

   concert_name VARCHAR(255) NOT NULL,

   concert_date DATETIME NOT NULL,

   artist VARCHAR(255) NOT NULL,

   venue VARCHAR(255) NOT NULL,

   city VARCHAR(100) NOT NULL,

   seat_number VARCHAR(50) NULL, -- Optional, useful for reserved seating

   purchase_date DATETIME DEFAULT GETDATE()

);

GO


INSERT INTO tickets (ticket_code, ticket_price, concert_name, concert_date, artist, venue, city, seat_number)

VALUES

('TCKT001', 75.00, 'Rock Night', '2025-06-15 20:00:00', 'The Rockers', 'Stadium Arena', 'New York', 'A12'),

('TCKT002', 85.50, 'Jazz Evening', '2025-07-20 19:30:00', 'Smooth Jazz Band', 'Grand Theater', 'Los Angeles', 'B05'),

('TCKT003', 99.99, 'Pop Extravaganza', '2025-08-10 21:00:00', 'StarPop', 'Downtown Pavilion', 'Chicago', 'C22'),
```

('TCKT004', 60.00, 'Indie Vibes', '2025-09-05 18:00:00', 'IndieSound', 'Riverside Park', 'San Francisco', NULL),

('TCKT005', 120.00, 'EDM Festival', '2025-06-25 23:00:00', 'DJ Beats', 'City Hall Square', 'Miami', NULL),

('TCKT006', 55.75, 'Country Night', '2025-07-15 20:00:00', 'The Cowboys', 'Texas Arena', 'Dallas', 'D14'),

('TCKT007', 200.00, 'Rock Legends', '2025-08-22 20:00:00', 'Guitar Masters', 'Madison Square Garden', 'New York', 'E33'),

('TCKT008', 45.00, 'Classical Symphony', '2025-09-12 19:00:00', 'City Orchestra', 'Royal Hall', 'Boston', 'F10'),

('TCKT009', 90.00, 'Reggae Summer', '2025-07-28 18:30:00', 'The Reggae Roots', 'Sunset Beach', 'San Diego', NULL),

('TCKT010', 130.00, 'Hip-Hop Arena', '2025-08-05 22:00:00', 'MC Flow', 'Underground Club', 'Atlanta', 'G08'),

('TCKT011', 75.00, 'Folk Music Fest', '2025-06-10 17:00:00', 'Folk & Friends', 'Open Air Park', 'Denver', NULL),

('TCKT012', 65.00, 'Latin Fiesta', '2025-07-18 20:00:00', 'Salsa Kings', 'Havana Club', 'Orlando', 'H21'),

('TCKT013', 110.00, 'Alternative Rock Live', '2025-08-30 21:30:00', 'Rebel Sound', 'East Coast Hall', 'Philadelphia', 'I06'),

('TCKT014', 95.00, 'Metal Madness', '2025-09-15 22:00:00', 'Iron Fists', 'Heavy Metal Arena', 'Detroit', 'J11'),

('TCKT015', 150.00, 'R&B Night', '2025-07-07 20:00:00', 'Smooth Vibes', 'The Lounge', 'Las Vegas', 'K03'),

('TCKT016', 80.00, 'Techno Beats', '2025-08-20 23:30:00', 'DJ Light', 'The Warehouse', 'Seattle', NULL),

('TCKT017', 70.00, 'Acoustic Sessions', '2025-06-29 18:30:00', 'Guitar Tales', 'Cozy Café', 'Portland', 'L15'),

('TCKT018', 200.00, 'Pop Superstars Live', '2025-09-05 21:00:00', 'MegaPop', 'Hollywood Stadium', 'Los Angeles', 'M20'),

('TCKT019', 85.00, 'Punk Revival', '2025-07-12 19:30:00', 'The Rebels', 'Underground Bar', 'Chicago', 'N08'),

('TCKT020', 95.00, 'Blues Night', '2025-08-02 20:00:00', 'Deep Blue', 'Jazz & Blues Hall', 'Memphis', 'O13'),

('TCKT021', 175.00, 'Symphony Orchestra Live', '2025-09-25 19:00:00', 'National Orchestra', 'Royal Concert Hall', 'San Francisco', 'P07'),

('TCKT022', 140.00, 'Bollywood Beats', '2025-06-18 21:30:00', 'Desi Rhythms', 'Festival Grounds', 'Houston', NULL),

('TCKT023', 105.00, 'K-Pop Sensation', '2025-08-14 20:00:00', 'Super Idols', 'Asia Dome', 'Los Angeles', 'Q25'),

('TCKT024', 90.00, 'Funk Revival', '2025-07-22 19:45:00', 'Groove Machine', 'Downtown Hall', 'Chicago', 'R02'),

('TCKT025', 135.00, 'Soulful Evenings', '2025-09-08 20:15:00', 'Soul Express', 'The Opera House', 'New York', 'S14'),

('TCKT026', 160.00, 'Dance Pop Tour', '2025-08-19 22:00:00', 'Electric Pulse', 'The Arena', 'Las Vegas', 'T05'),

('TCKT027', 99.50, 'Alternative Indie Live', '2025-07-25 20:00:00', 'Indie Waves', 'Rooftop Club', 'San Diego', 'U12'),

```
('TCKT028', 185.00, 'Hard Rock Frenzy', '2025-06-30 21:30:00', 'Thunderstorm', 'Rock Stadium', 'Boston', 'V18'),

('TCKT029', 88.00, 'Electronic Grooves', '2025-07-09 23:45:00', 'Synth World', 'Neon Club', 'Miami', NULL),

('TCKT030', 50.00, 'Acoustic Café Sessions', '2025-09-02 17:30:00', 'Soft Strings', 'Garden Café', 'Portland',
'W09');

SELECT * FROM tickets;
```

- **Connect to SQL Server with SQL Server Authentication**

  Chose SQL authentication using the default **sa (superadmin)** login.

  Reference Video: How to Enable SQL Server Authentication

- **Install and Configure an On-Premises Data Gateway**

  Power Automate required a gateway to connect to the local SQL Server.

  Downloaded the gateway installer from Microsoft:

  https://www.microsoft.com/en-us/download/details.aspx?id=53127

  Installed and signed in using the same Microsoft account linked to Power Automate.

  Connected the gateway to the SQL server instance.

- **Tested the Connection and Executed the Stored Procedure**

  Used the “Execute stored procedure (V2)“action to run the GetAllMusic procedure.

  Successfully retrieved and parsed the results into JSON format for further use.

This was the **most time-consuming and error-prone part**, especially in configuring authentication and the gateway. But once it worked, it allowed us to build and test the rest of the automation quickly.

The following flow was based on the tutorial video:

Automate SQL Report Generation with Power Automate

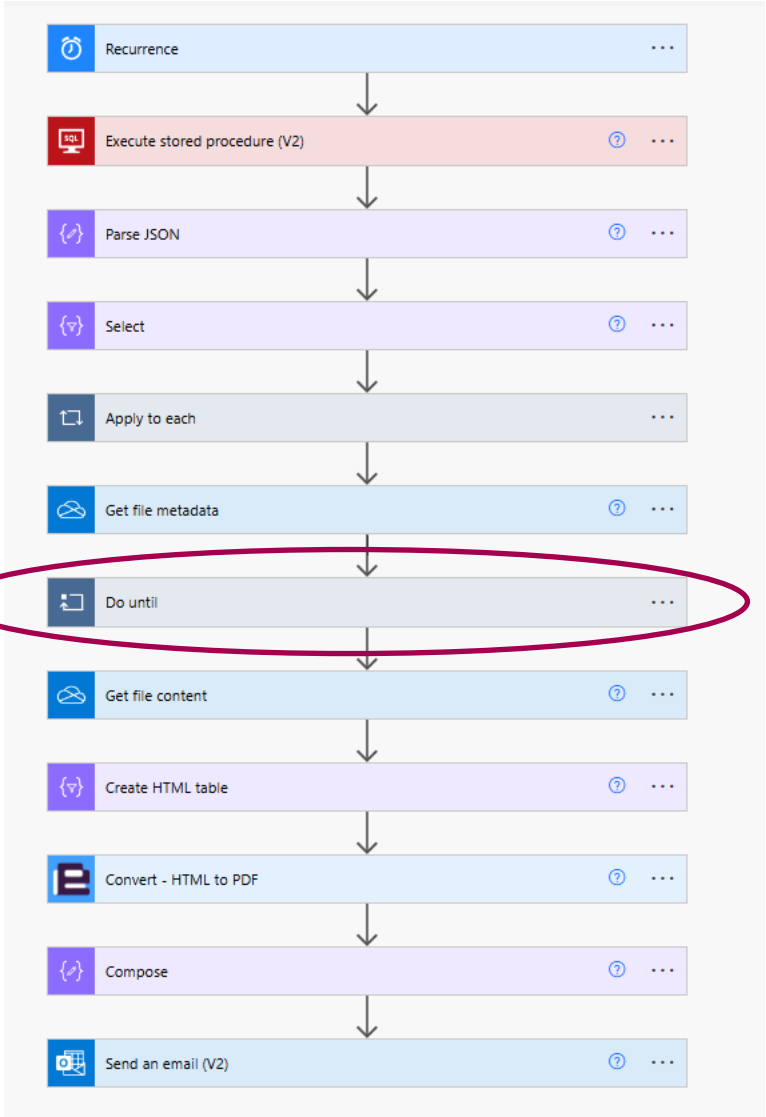
4. Decision to Remove the Original Excel Design

Although the Excel report technically worked during testing, we ultimately decided to remove it from the final flow. The main reason was efficiency—the flow became very long and slow, especially due to the “Do until” action, which alone took nearly 10 minutes to complete.

In addition, the results in the Excel file did not appear in the expected order, and we were unable to identify the cause within the project timeframe.

Another important factor in this decision was that, according to our original plan, the PDF report was meant to summarize the Excel report by calculating Total Sales and Total Revenue. However, the sample database we used does not contain numerical data suitable for such calculations—only a code ID field with numbers. This would have added unnecessary complexity to the flow at this stage.

Considering both the performance issues and data limitations, we concluded that removing the Excel and pivot table generation was the most practical choice. Instead, we focused on producing well-structured HTML and PDF reports, which delivered the necessary functionality with a faster and more reliable execution time.



5. Flow iteration

Although we initially created a project plan, the implementation process turned out to be more challenging than expected. So Charlotte began by working with a simple database containing information such as song titles, artists, and release years. She first built a flow that extracted data from SQL, exported it into a CSV table, then converted it into an HTML table, and finally sent it via email with the HTML content included in the message body.

We planned to submit this version if we were unable to fully implement our original plan.

Later, Charlotte updated the flow to include PDF generation from the HTML content.

After that, she upgraded the flow to use a more complex SQL database that included the price of each song. She then modified the flow to send an email with a summary of the total sales and revenue for the week, along with a CSV file attachment containing the detailed sales data.

6. Learning Reflections and Lessons

- **Time Estimation Insights**:
    - The actual development took longer than we initially estimated.
    - PDF generation (especially using third-party connectors) required extra testing time.
    - Understanding the functional differences between the desktop and web versions of Power Automate is crucial when deciding which one to use as the foundation for building a flow. Some features areonly available with the premium version of Power Automate.
    - Although we have a Premium license, we decided to exclude the use of Excel and pivot tables from the final flow. The Excel-based approach was found to be inefficient and time-consuming, and the current sample database does not contain numerical data necessary for meaningful summary calculations. Instead, we chose to present the report in HTML and PDF formats, which ensured a faster and more stable process.

- **Key Lessons:**
    - **Plan for flexibility**: Having a Plan B (HTML + CSV) helped us avoid getting blocked by technical limits.
    - **Real-world automation isn't just about speed** – it's also about stability, compatibility, and clarity of output.

- **Personal/Team Challenges:**
    - Troubleshooting SQL + gateway authentication
    - Learning to use third-party connectors like Encodian under free/trial constraints
    - Although flows can be shared with team members in Power Automate, involving additional connections—such as to an SQL database—can make the authorization process more complex.
        - The SQL scripts and Power Automate flow were developed by Charlotte, while Chien Chuan was responsible for writing the final report. The presentation was prepared and delivered by both team members together.
        - Initially, the flow was created on Power Automate Web, connected to the SQL database on Charlotte's computer, and then shared with Chien Chuan. However, Chien Chuan was unable to establish a working connection to the SQL database on his side.
        - As a result, the main flow was completed by Charlotte, while Chien Chuan actively participated in the discussions and decision-making throughout the development process.

7. Report Quality

Our automated flow meets the key quality standards outlined for robotic process automation reporting:

- Neat Overall Look

The email sent by the robot includes both an attached **CSV file** (for raw data) and included a **PDF version** of the report to simulate a professional summary report. This creates a neat and accessible presentation for different types of stakeholders.

- Data from Multiple Systems

The robot retrieves data from our SQL Server database, processes it using Power Automate, and then exports it into multiple formats (CSV and HTML). The flow demonstrates how Power Automate can integrate external systems with cloud-based automation.

- Data Processing and Value-Added Transformation

The raw data retrieved from the SQL database is **refined** into both a structured CSV and a visually clear HTML sales summary including total sales and revenue. The HTML content providing a summarized report suitable for executives or non-technical stakeholders. This transformation adds significant value by turning raw, technical data into user-friendly formats.

- Data Forwarding and Delivery

Once processed, the reports are automatically sent by email to stakeholders using Outlook integration. The email includes clear subject lines and attachments, and can be scheduled to send weekly at a specific time (Monday at 12:00 AM), ensuring timely delivery without human intervention.

- Supervisor Notification and Monitoring

The robot's final step is to send an email, which serves as both the report delivery and a confirmation that the task has been completed. In case of errors—such as connection issues or data retrieval failures—Power Automate can be configured to send an alert or error notification (this feature is part of the platform and can be expanded in the future for more robust monitoring).

8. Conclusion

We achieved the key goals of the project: automating weekly SQL data extraction, generating human-readable reports, and delivering them via email. Although we adjusted the report formats due to technical constraints, the final solution is fast, robust, and adaptable for future needs.

The project clearly demonstrated **the power of automation in saving time (from ~45 minutes to 13 seconds)** and reducing errors. It also taught us how important setup and integration can be — and that creative workarounds can lead to just as effective outcomes.