PROG8850 – Database Automation-Assignment 1

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# Question 1: Understanding Database Automation

## 1.1 Explanation of Database Automation and Its Significance

* Database automation is basically a process of using scripts or tools to handle repetitive database tasks like backups, schema updates, monitoring, and more without manual intervention.
* It plays a crucial role in modern day data management, especially as systems grow larger and more n more complex. For e.g. in an organization that deals with customer data or online transactions, automating daily backups helps ensure that data isn’t lost. Similarly, automating schema updates when rolling out a new feature can help reduce downtime and avoid manual errors.
* I realized during this assignment how valuable automation is even for a student assignment. Instead of manually exporting the database each time, a script does it in seconds, with consistent results. That’s the same principle used in real companies running banking apps or large websites where reliability and speed matter.

## 1.2 Benefits of Automating Database Tasks

Here are a few key benefits I experienced (and researched):

* **Fewer Mistakes**: Manual changes often lead to typos or missed steps, but automation ensures the process is consistently accurate.
* **More Consistency**: Every time the script runs, it performs the task the same way. That consistency is great for team projects or production environments.
* **Speed**: Changes that might take minutes to do manually can be done instantly with a script.
* **Saves Time and Resources**: Once a script is ready, you don’t need someone to repeat the same task again. This frees up time for more important work.

In my case, I created a backup script using Python that stores the MySQL database with a timestamp. I also made another script that checks if a column exists in a table and adds it if needed. This experience gave me a basic but clear understanding of how DevOps teams use automation in the real world.

# Question 2: Scripting for Database Automation

## 2.1 Database Backup Automation: *backup\_script.py*

For the backup, I have created a Python script that runs the **mysqldump** command via the subprocess module. The credentials (username, password, host, and database name) are specified at the top. A timestamp was added to the filename in order to guarantee that every backup file was unique.

Here’s what the script does in simple steps:

* Generates a timestamp.
* Runs the mysqldump command with the proper credentials.
* Stores the .sql backup in the current directory.
* If anything fails (like wrong credentials or connection issues), the script prints a helpful error.

This script can be easily scheduled using Task Scheduler on Windows or a cron job on Linux to run at regular intervals.

## 2.2 Database Change Deployment: *deploy\_changes\_script.py*

The second script uses the **mysql-connector-python** module to connect to the database and deploy schema changes. I focused on creating a new table named Employee if it doesn’t exist. Then, using a query on **INFORMATION\_SCHEMA**, it checks whether a column called email is already there. If not, the script adds the column.

**Why this matters**: In real-world deployment, we want scripts to be idempotent meaning they don’t break if run more than once. This script handles that using simple condition checks and structured error handling.

# Conclusion:

Overall, this assignment gave me practical hands-on experience with Python-based automation and a better understanding of how DevOps teams maintain database efficiency in real scenarios.

# References

* MySQL Documentation: <https://dev.mysql.com/doc/>
* Python Subprocess Module: <https://docs.python.org/3/library/subprocess.html>
* MySQL Connector for Python: <https://pypi.org/project/mysql-connector-python/>