Assignment 1

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PROG8850 – Database Automation

Assignment 1: Database Automation and Scripting

Question 1: Understanding Database Automation

1.1 What is database automation and its significance?

Database automation refers to software applications or scripts which self-execute repetitive or complex database management tasks or processes without needing a manual interface. It is important in the automation of an organization's data including management of databases because it increases efficiency, decreases human errors, and ensures that tasks such as backups, updates, and deployment of schema changes are executed on time and consistently. When dealing with high-data volume, automation is critical because of the scalability, security, and reliability it offers during data operations.

1.2 Benefits of automating database tasks

Automating database tasks brings the following benefits::

- **Reduced errors:** Automating processes safeguards against manual error-based data operations, which enhances data governance accuracy and reduces operational mishaps..

- **Increased reliability:** The availability of data is improved with automated processes which are executed on predetermined optimal schedules. Automated systems ensure that critical data tasks are completed when they need to be done.

- **Faster deployments:** Automated systems enable fast execution of process defined schema alterations and repetitive data snapshots, which helps in minimizing suspended time during updates.

- **Cost efficiency:** Automated systems enable fast execution of process defined schema alterations and repetitive data snapshots, which helps in minimizing suspended time during updates.

Eliminating operational delays further enhances user engagement with minimal request bearing latency. As an instance, database snapshot is succeeded upon for applications hosted on multiple servers as header databases while operational databases are throttled.

Question 2: Scripting for Database Automation

2.1 Python Script for Database Backup Automation

The `backup_script.py` connects to a MySQL database and creates a backup using the `mysqldump` command-line utility. It generates a unique filename for each backup by including a timestamp in the file name. This ensures backups do not overwrite each other and allows easy identification of backup times. The script executes the backup command through the operating system shell and verifies success by checking the command's exit status.

2.2 Python Script for Database Change Deployment

The `deploy_changes_script.py` connects to the MySQL database using the `mysql-connector-python` library and executes SQL commands to deploy schema changes, such as creating new tables. It handles connection setup, executes the given SQL, commits the changes, and includes error handling to report any issues during deployment. This automation allows consistent and repeatable deployment of database changes without manual SQL execution.