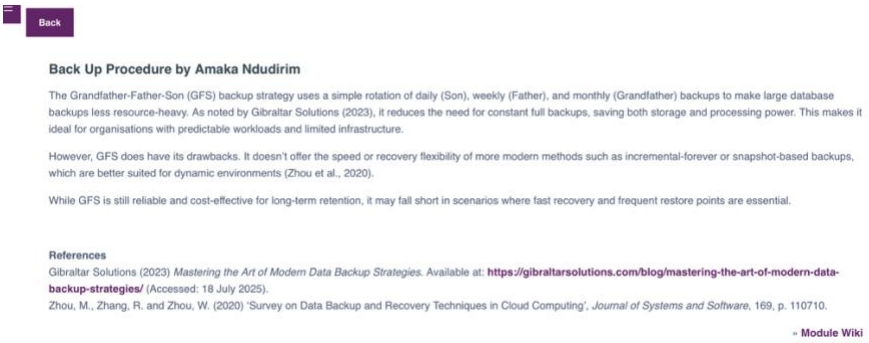
Unit 11: DBMS Transaction and Recovery

This unit introduced me to the concept of **transaction processing** in database systems and how it ensures data stays consistent, even if something goes wrong. We focused on the **ACID properties**—Atomicity, Consistency, Isolation, and Durability—and how they shape the full transaction cycle from start to finish.

We also looked at scheduled transactions, how system failures can interrupt them, and the importance of **checkpoints** in keeping things recoverable.

Back Up Procedure Activity

As part of this unit, I reviewed the **Grandfather-Father-Son (GFS)** backup strategy—a tiered backup rotation system often used in large-scale environments. Using the *Gibraltar Solutions (2023)* reading as a starting point, I explored how this method balances storage use and backup frequency.


Back

Back Up Procedure by Amaka Ndudirim

The Grandfather-Father-Son (GFS) backup strategy uses a simple rotation of daily (Son), weekly (Father), and monthly (Grandfather) backups to make large database backups less resource-heavy. As noted by Gibraltar Solutions (2023), it reduces the need for constant full backups, saving both storage and processing power. This makes it ideal for organisations with predictable workloads and limited infrastructure.

However, GFS does have its drawbacks. It doesn't offer the speed or recovery flexibility of more modern methods such as incremental-forever or snapshot-based backups, which are better suited for dynamic environments (Zhou et al., 2020).

While GFS is still reliable and cost-effective for long-term retention, it may fall short in scenarios where fast recovery and frequent restore points are essential.

References

Gibraltar Solutions (2023) *Mastering the Art of Modern Data Backup Strategies*. Available at: **https://gibraltarsolutions.com/blog/mastering-the-art-of-modern-data-backup-strategies/** (Accessed: 18 July 2025).
Zhou, M., Zhang, R. and Zhou, W. (2020) 'Survey on Data Backup and Recovery Techniques in Cloud Computing', *Journal of Systems and Software*, 169, p. 110710.

« Module Wiki

Module Project

Building on the group project from Unit 6, we were asked to submit an **executive summary** of our database design. The final deliverable pulled together everything we worked on—from initial planning and database modelling to technology selection and legal compliance.

Key parts of the summary included:

- A simple, non-technical breakdown of the work we did, including visual elements like charts and diagrams.
- A review of database modelling concepts and a critical look at the data models we used—what worked well and what could've been better.
- An analysis of our DBMS options, weighing up both **SQL** and **NoSQL** tools to choose the best fit for the project.
- A section on **GDPR compliance** and other legal obligations the system had to meet.
- Our final recommendations, laid out based on what mattered most to the business.

GitHub link to the full project can be found here: GitHub-Project Executive Summary (PDF)

Core Readings

- Cove, V. (2024) Visualize COVID-19 trends in ArcGIS Insights.
- McKinney, W. (2022) Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Jupyter. 3rd edn. Sebastopol, California: O'Reilly.
    - Chapter 5.7.

Recommended Reading

Gibraltar Solutions. (2023) Mastering the Art of Modern Data Backup Strategies.