

Exercise walk-through

Database Management Systems (DBMS) ■ 8.2

eXercise

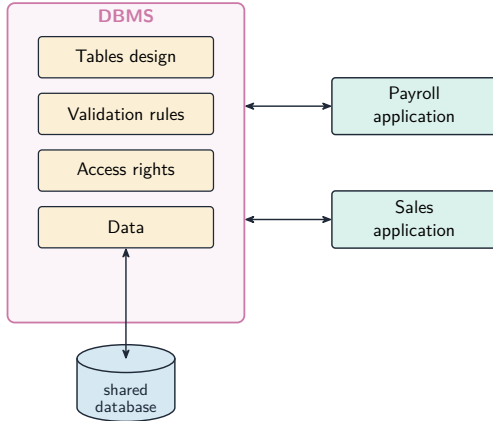
You must be able to

- describe the features of a DBMS that fix the problems of a file-based approach
- describe how the software tools in a DBMS are used in practice

Method — Why a DBMS

A **DBMS** is the software that manages the database centrally for all programs, so the structure, rules and security live in one place — not hard-coded into each program.

Method — Why a DBMS



A DBMS replaces the older file-based approach to data

Method — Features that fix file-based problems

Feature	What it does
data dictionary	describes every table, field, type and key
logical schema 逻辑模式	the overall logical design: the tables, fields, keys and relationships
redundancy control	each fact stored once (no inconsistency)
concurrent access control	locks/transactions let many users work safely
integrity rules	keys, unique and range constraints enforced centrally
transactions	a group of operations that all succeed or all fail
views	virtual tables showing each user only their slice
security & backup	per-user permissions; backup and recovery

Method — The DBMS tools

A query builder, a forms designer, a report generator, a data-dictionary editor, user management, and an **SQL** editor — so designers, programmers and end-users each work at the right level.

Practice 2.1 ■ 1 mark

State what a **data dictionary** holds.

Solution 2.1

Worked steps

A description of every table, field, data type and key in the database (its structure) **B1**.

Practice 2.2 ■ 1 mark

State what a **transaction** is.

Solution 2.2

Worked steps

A group of operations treated as one unit — they **all succeed or all fail** **B1**.

Practice 2.3 ■ 2 marks

State **two** features a DBMS provides that a file-based system does not.

Solution 2.3

Method: Features that fix file-based problems

Worked steps

Any two of: data dictionary; concurrency control; transactions; central integrity rules; views; per-user security; backup/recovery **B1** **B1**.

Practice 2.4 ■ 1 mark

State what a **view** is.

Solution 2.4

Worked steps

A **virtual table** that shows a user a chosen slice of the data (selected rows/columns) **B1**.

Exam-style 3.1 ■ 4 marks

Describe **two** features of a DBMS that solve problems of the file-based approach.

Solution 3.1

Worked steps

Any two, described, e.g.: **central integrity rules** — keys and constraints enforced for all programs, so data stays valid **B1 B1**; **concurrency control** — locks/transactions let many users edit without corrupting data **B1 B1**.

Exam-style 3.2 ■ 2 marks

Explain how a DBMS allows many users to work on the data at the same time **safely**.

Solution 3.2

Method: Features that fix file-based problems

Worked steps

The DBMS uses **locks** and **transactions** **B1** so two users cannot change the same data at once and each transaction completes fully or not at all **B1**.

Exam-style 3.3 ■ 2 marks

State **two** software tools found in a DBMS and what each is used for.

Solution 3.3

Worked steps

Any two with a use, e.g.: query builder (build queries without writing SQL); forms designer (build data-entry screens); report generator (produce formatted output)

B1 **B1**.

Exam-style 3.4 ■ 2 marks

Describe what is meant by the DBMS feature **data dictionary** and the DBMS feature **logical schema**.

Solution 3.4

Method: Features that fix file-based problems

Worked steps

Data dictionary: data about the data — a description of every table, field, data type and key [B1](#). **Logical schema:** the overall logical design of the database — its tables, fields, keys and relationships [B1](#).