Database System (MS Access) - PDF Note - computeroperatorexam.com

Part 1 — Data, Database, DBMS

Data = raw facts | **Information** = processed data | **Database** = organized data store | **DBMS** = software to manage it

RDBMS = stores data in linked tables using key fields. Examples: MS Access, Oracle, MySQL, SQL Server.

Advantages of DBMS (must memorize these 7):

1. Reduces data redundancy
2. Data consistency
3. Data integrity (validation rules)
4. High security (access control)
5. Supports multiple users concurrently
6. Data sharing among authorized users
7. Backup and recovery support

Disadvantages: Complex, high cost, maintenance overhead, data leakage risk, central DB failure affects all users.

Part 2 — Tables, Fields, Records, Keys

Table = primary building block. Stores data in rows (records) and columns (fields).

3 ways to create a table in MS Access: Design View | Datasheet View | Table Wizard

Elements:

Term	Also Called	Definition
Field	Column / Attribute	One category of data (smallest unit)
Record	Row / Tuple	Complete information about one entity
Table	Relation	Full collection of related records

Keys — must know all 6:

Key	Definition
Primary Key	Uniquely identifies each record; no NULL, no duplicates
Foreign Key	Links to another table's Primary Key
Unique Key	All values unique; can have NULL
Composite Key	Two+ columns together form a unique identifier
Candidate Key	Any column that could be Primary Key
Alternate Key	Candidate Key not chosen as Primary Key

3 Relationship Types:

- **1:1** — One Person ↔ One Passport
- **1:M** — One Customer → Many Orders *(most common)*
- **M:N** — Many Students ↔ Many Courses (needs junction table)

Referential Integrity = FK must always match an existing PK (or be NULL). Prevents orphan records.

Indexing = speeds up searches by creating a pointer structure. Trade-off: faster reads, slower writes.

Part 3 — Data Types (Quick Reference)

Data Type	Stores	Size
Text	Alphanumeric	255 chars
Memo	Long text	65,535 chars
Number	Numeric	Varies (Byte/Int/Long/Single/Double)
Date/Time	Dates and times	8 bytes
Currency	Money	8 bytes

Data Type	Stores	Size
AutoNumber	Auto-incrementing ID	4 bytes
Yes/No	Boolean (True/False)	1 bit
OLE Object	Images, audio, video	Up to 1 GB
Hyperlink	URLs, file links	2048 chars
Attachment	Any file attachment	Up to 2 GB
Lookup Wizard	Dropdown from another table	4 bytes
Calculated	Computed from other fields	—

Key Field Properties: Field Size · Format · Input Mask · Default Value · Validation Rule · Validation Text · Required · Indexed

Validation Rule examples: `>=0` · `<1000` · `Between 5000 And 10000` · `"M" Or "F"`

Part 4 — Creating Tables, Relationships, Validation

Table creation steps (Design View):
Create tab → Table Design → enter Field Name + Data Type → set Primary Key → Ctrl+S

Establishing Relationships:
Database Tools → Relationships → Add tables → Drag PK field to FK field → Enforce Referential Integrity → Create → Save

Cascade Options:

- Cascade Update = PK change updates all FK values automatically
- Cascade Delete = deleting parent record deletes all child records

Input Mask = controls HOW data is entered (format pattern)
Validation Rule = controls WHAT data is accepted
Required = Yes = field cannot be left blank

Part 5 — Queries, Forms, Reports, Macros

Queries

5 Types of Query in MS Access:

Type	Action
Select	Retrieves records (read-only) — most common
Crosstab	Summarizes data in grid/pivot format
Parameter	Prompts user for input when run
Action	Modifies data (Update/Append/Delete/Make-Table)
SQL	Written in SQL language

Action Query sub-types: Update · Append · Delete · Make-Table

Forms vs Reports

	Form	Report
Purpose	Data INPUT	Data OUTPUT
Used for	Entering/editing records	Printing/summarizing data
Layouts	Columnar, Tabular, Datasheet	Columnar, Tabular, Justified
Analogy	Data entry screen	Printed invoice/report

Form Sections (5): Form Header · Page Header · Detail · Page Footer · Form Footer

Report Sections (7): Report Header · Page Header · Group Header · Detail · Group Footer · Page Footer · Report Footer

Macros

Automated sequences of actions. Single Action or Compound. Attached to form events (On Click, On Open, etc.).

MS Access Objects — The 5 Main Objects

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MS ACCESS DATABASE
├── Tables    → Store raw data
├── Queries   → Retrieve/filter/modify data
├── Forms     → User interface (input)
├── Reports   → Formatted output (print)
```

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└── Macros    → Automation
(+ Modules for VBA programming)
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High-Priority Exam Topics for Unit 5

Based on question frequency across all 14 past paper sets:

Topic	Frequency	Priority
DBMS definition + advantages/disadvantages	3 sets	🔴 High
Queries — types and steps	3 sets	🔴 High
Table, Query, Form, Report — define + parts	2 sets	🔴 High
Data types in MS Access	2 sets	🟡 Medium
Relationships and referential integrity	2 sets	🟡 Medium
Keys (Primary, Foreign, etc.)	1 set	🟡 Medium