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Physical Modelling Objectives

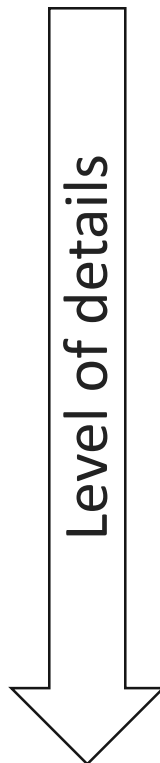
Relational Databases Basics



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Levels of Database Modelling



Level		It describes...	It operates...
Logical	Conceptual (infological)	Subject matter regardless database type	Entities, attributes, some relationships
	Logical (datalogical)	Subject matter regarding database type or DBMS	Entities, attributes, relationships, keys, some indexes and views
Physical		Technical aspects regarding DBMS	Entities, attributes, relationships, keys, indexes, views, triggers, stored routines, storage engines, encodings, permissions, etc.

Physical Level – a level of consideration at which all aspects deal with the physical representation of data structures and with mapping them on corresponding storage organizations and their access operations in a data processing system.

The main objective

We have to carefully think over and write down any specific detail about database.

Points to consider

DBMS specifics

Top-down & bottom-up

Representation form

Points to consider

DBMS specifics

Top-down & bottom-up

Representation form

Read manuals, analyze, experiment. Here we can not ignore any technical detail.

Points to consider

DBMS specifics

Top-down & bottom-up

Representation form

We have to take both ways to make our database both subject matter adequate and **application level usable.**

Points to consider

DBMS specifics

Top-down & bottom-up

Representation form

Unlike with two previous levels, here we have no traditional approaches, so think carefully about the best representation form.

Main ideas to start with

Access permissions

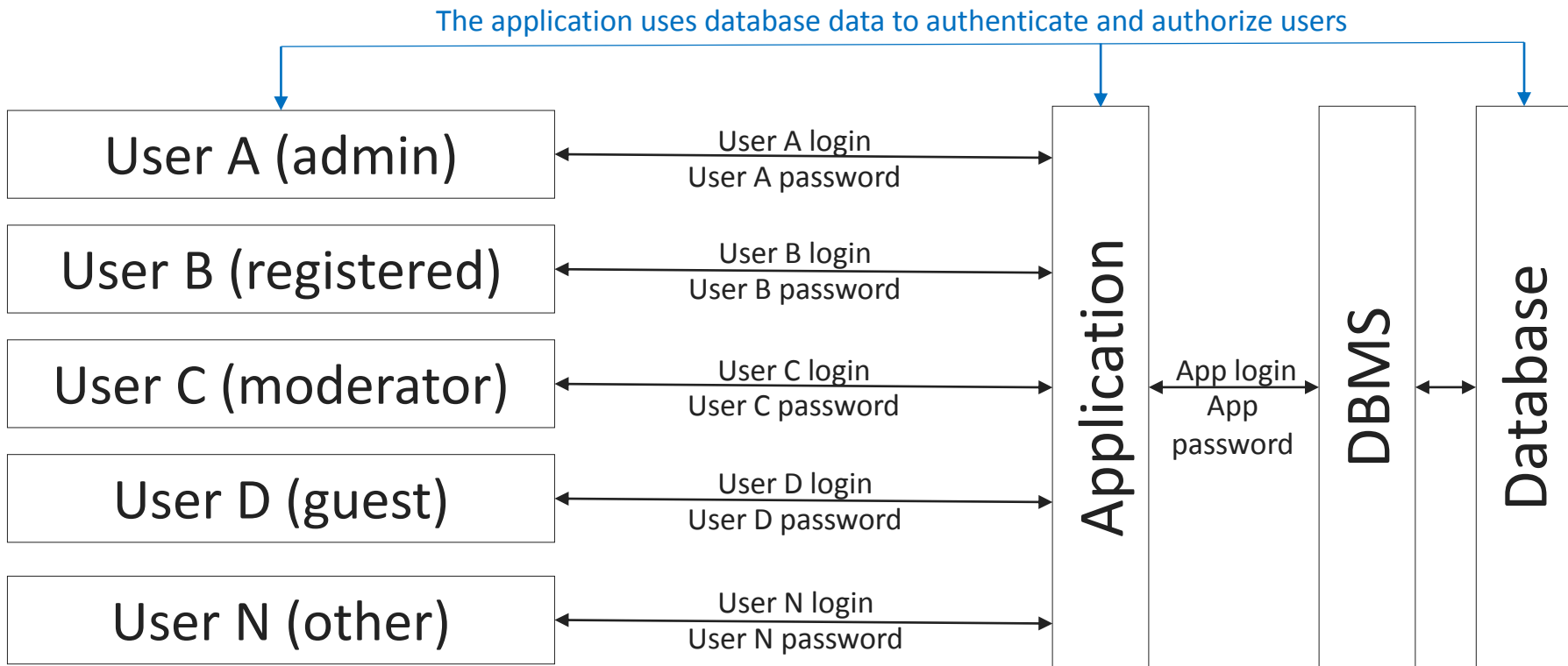
Encodings

Storage engines

Indexes

DB/DBMS settings

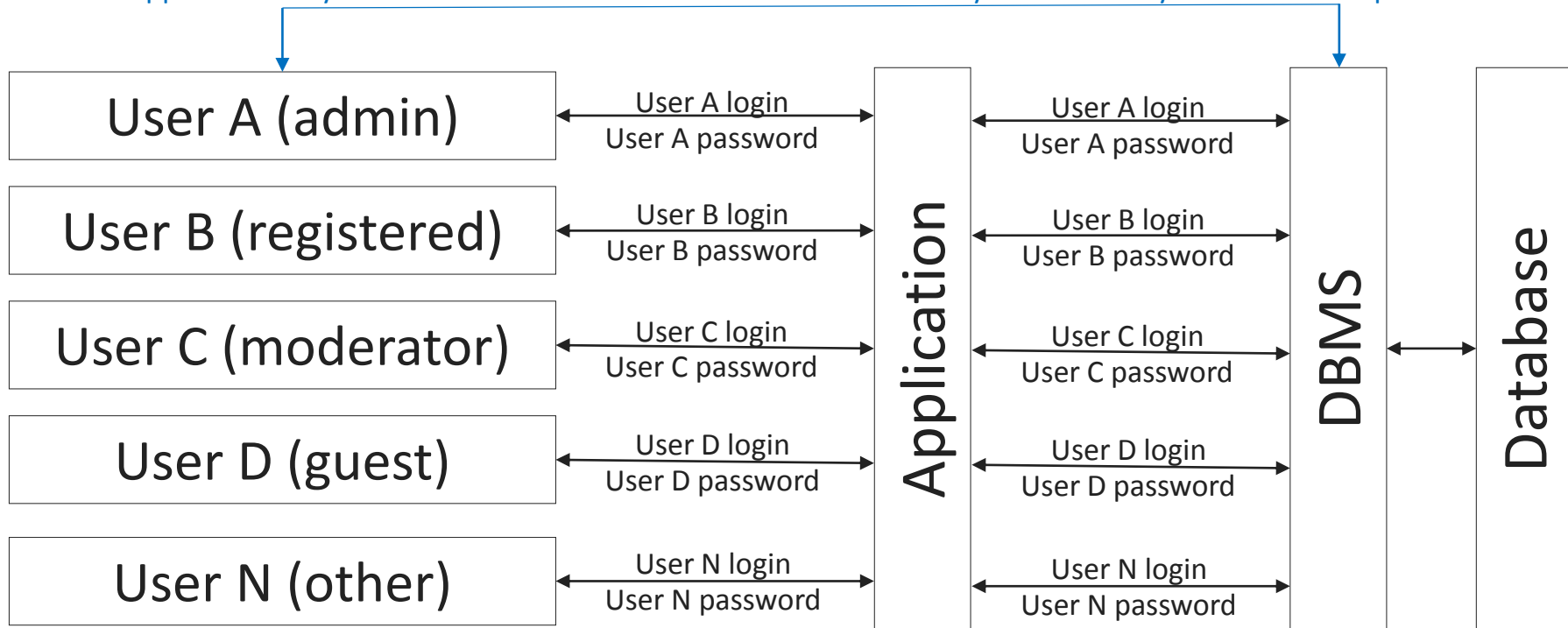
Main ideas to start with: access permissions, type 1



Main ideas to start with: access permissions, type 2

SQL code for this depend on dozens of nuances.

The application only uses user credentials to connect to the DBMS. Any other security measures are up to DBMS.



Main ideas to start with: encodings

Error Code: 1366. Incorrect string value:
'\xD0\x93\xD1\x80\xD1\x83...' for column 'word' at row 1

Tired of struggling with such errors?

```
CREATE TABLE `words`  
(  
  `word` VARCHAR(255) NULL  
)  
DEFAULT CHARACTER SET = utf8  
COLLATE = utf8_general_ci
```

Use proper encodings settings!

Main ideas to start with: storage engines

```
CREATE TABLE `words`  
(  
  `word` VARCHAR(255) NULL  
)  
ENGINE = InnoDB  
DEFAULT CHARACTER SET = utf8  
COLLATE = utf8_general_ci
```

Use proper storage engine
settings!

Main ideas to start with: indexes

```
CREATE TABLE `books`  
(  
  `b_id` INTEGER UNSIGNED NOT NULL AUTO_INCREMENT,  
  `b_name` VARCHAR(150) NOT NULL,  
  `b_year` SMALLINT UNSIGNED NOT NULL,  
  `b_quantity` SMALLINT UNSIGNED NOT NULL,  
  CONSTRAINT `PK_books` PRIMARY KEY (`b_id`)  
);
```

```
CREATE INDEX `idx_b_year_b_name`  
ON `books` (`b_year`, `b_name`);
```

```
CREATE INDEX `idx_b_quantity`  
ON `books` (`b_quantity`);
```

```
CREATE INDEX `idx_b_name`  
ON `books` (`b_name`);
```

Use your tools capabilities or
create indexes with SQL code!

Main ideas to start with: DB/DBMS settings

In `my.ini` under `[mysqld]` section add the following options:
`character_set_server` with `utf8mb4` value,
`collation_server` with `utf8mb4_general_ci` value.

NEVER give a piece of ready-to-use config to
avoid “copy-paste without thinking”!

P.S.

Some parts of this level's results may be encapsulated into Datalogical model, but some require unique approaches and techniques.

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