



IBM Information Management software

Introduction

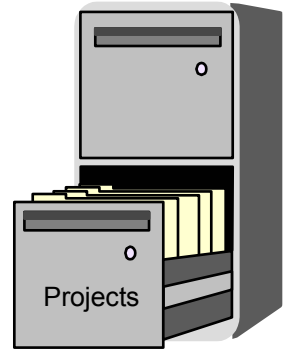
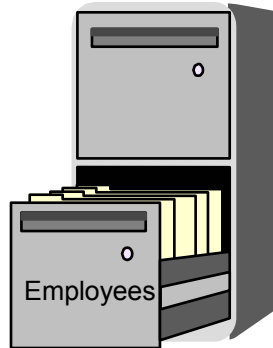
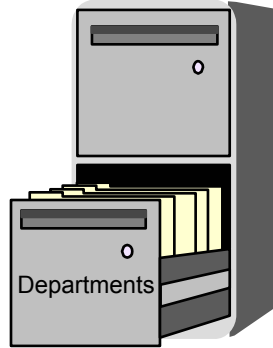


Unit Objectives

After completing this unit, you should be able to:

- Define the terms
 - Database, table, row, column, view
- State the more common DB2 data types
- List the most commonly used SQL statements in the
 - Data definition language (DDL)
 - Data manipulation language (DML)
 - Data control language (DCL)
- State three null characteristics and their meaning

Computerless Data Storage



Relational Database Management System

EMPLOYEE

EMPNO	FIRSTNAME	MID INIT	LASTNAME	WORK DEPT	...
000010	CHRISTINE	I	HAAS	A00	
000020	MICHAEL	L	THOMPSON	B01	
000030	SALLY	A	KWAN	C01	
000050	JOHN	B	GEYER	E01	
000060	IRVING	F	STERN	D11	
000070	EVA	D	PULASKI	D21	

DEPARTMENT

DEPT NO	DEPTNAME	...
A00	SPIFFY COMPUTER SERVICE DIV	
B01	PLANNING	
C01	INFORMATION CENTER	
D01	DEVELOPMENT CENTER	
D11	MANUFACTURING SYSTEMS	
D21	ADMINISTRATION SYSTEMS	

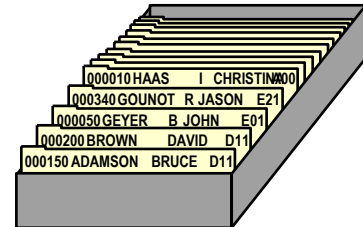


Database
A collection of
tables

PROJECT

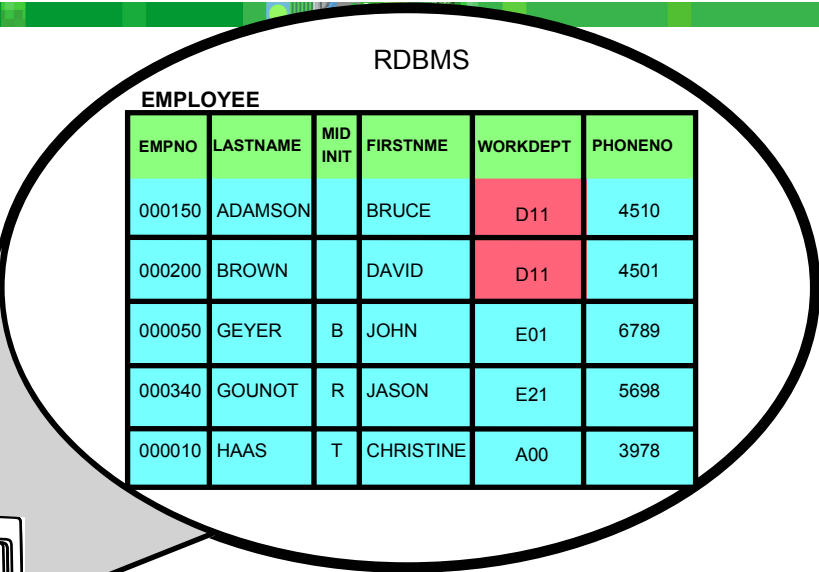
PROJNO	PROJNAME	DEPT NO	...
AD3100	ADMIN SERVICES	D01	
AD3110	GENERAL ADMIN SYSTEMS	D21	
AD3111	PAYROLL PROGRAMMING	D21	
AD3112	PERSONNEL PROGRAMMING	D21	
AD3113	ACCOUNT PROGRAMMING	D21	
IF1000	QUERY SERVICES	C01	

Computerless Data Retrieval



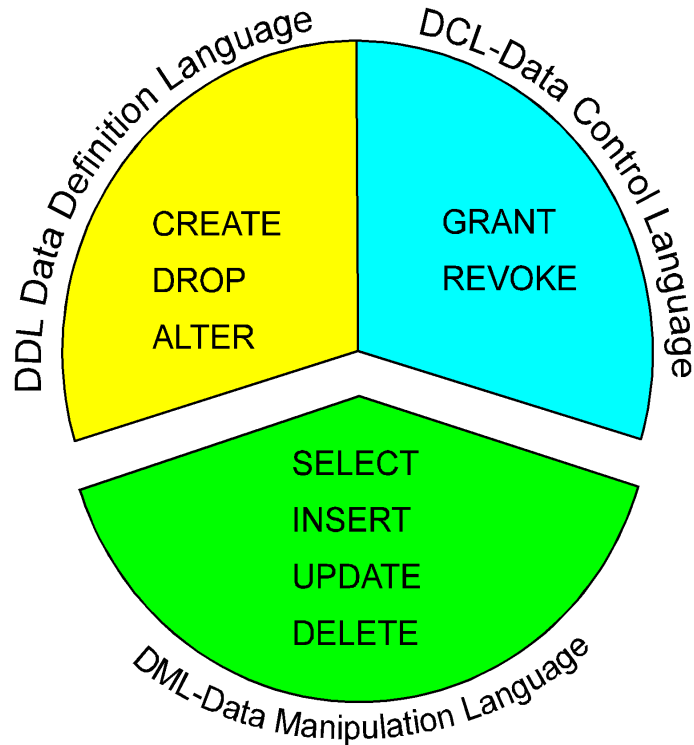
Asking for Information - RDBMS

Return a list of employees in department D11 sorted by last name



SELECT Statement

SQL Structured Query Language



Table

USERA.EMPLOYEE

	EMPNO	FIRSTNME	MIDINIT	LASTNAME	...	BIRTHDATE	COMM
	000010	CHRISTINE	I	HAAS	...	1933-08-24	9220
	000020	MICHAEL	L	THOMSON	...	1948-02-02	0
row →	000030	SALLY	A	KWAN	...	1941-05-11	-----
	000050	JOHN	B	GEYER	...	1925-09-15	3214

	000330	WING		LEE	...	1941-07-18	2030

↑
column

↑
text column

↑
date column

↑
numeric
column

Table Name Construction

Qualified Table Name
USERA.EMPLOYEE

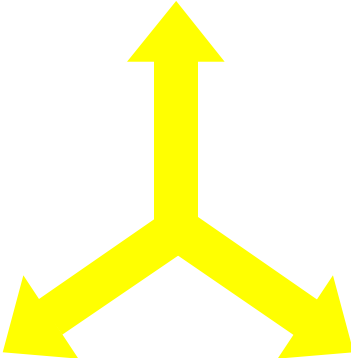
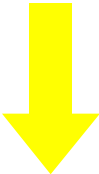


Table owner / Schema

Simple Name



USERA



EMPLOYEE

Sample Numeric Data Types

Data Type	Comment
SMALLINT	Whole numbers from -32768 to +32767
INTEGER	Whole numbers from -2,147,483,648 to +2,147,483,647
DECIMAL(m,n)	Decimal numbers with max. 31 digits m = total number of digits n = number of decimal digits

Sample Alphanumeric Data Types



Data Type	Comment
CHAR(n) or CHARACTER(n)	STRING (fixed length)
VARCHAR(n)	STRING (variable length)

Date Data Type

Data Type	Comment
DATE	Display / Input Format
YYYYMMDD	USA mm/dd/yyyy
	EUR dd.mm.yyyy
	ISO yyyy-mm-dd
	JIS yyyy-mm-dd

**DATE / TIME / TIMESTAMP data type - input verification
allows arithmetic
sorting
component extraction**

Time Data Type



Data Type	Comment	
TIME	Display / Input Formats	
HHMMSS	USA	hh:mm AM or PM
	EUR	hh.mm.ss
	ISO	hh.mm.ss
	JIS	hh:mm:ss

Create Table

```
CREATE TABLE EMPLOYEE
( EMPNO          CHAR(6)          NOT NULL,
  FIRSTNME       VARCHAR(12)       NOT NULL,
  MIDINIT        CHAR(1)          NOT NULL,
  LASTNAME       VARCHAR(15)       NOT NULL,
  WORKDEPT       CHAR(3)          ,
  .              .              .
  .              .              .
  BIRTHDATE      DATE             ,
  SALARY         DECIMAL(9,2)     ,
  BONUS         DECIMAL(9,2)     ,
  COMM          DECIMAL(9,2)     )
```

NULL Characteristic



"nullable"

Column can be marked as having an 'unknown value'

NOT NULL

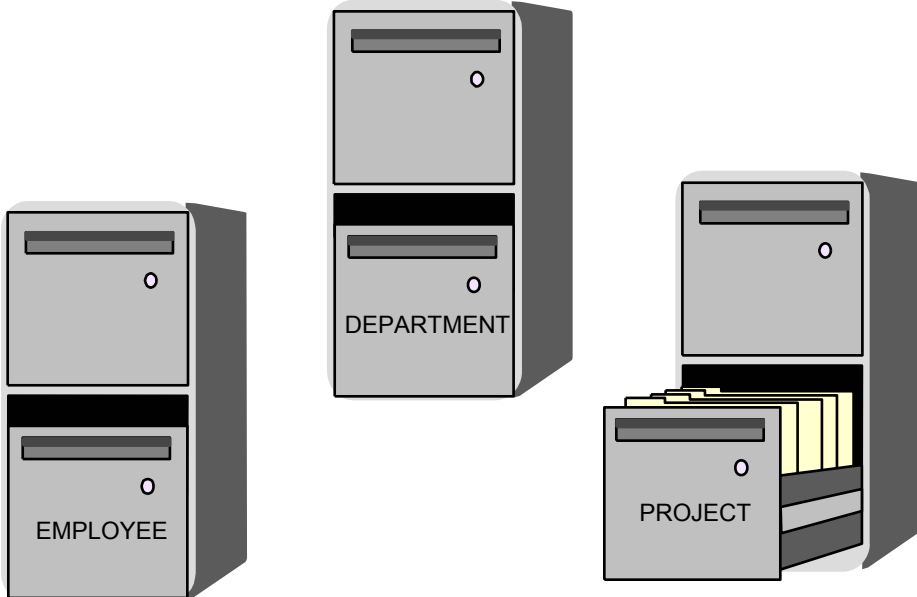
Column must always have a value

**NOT NULL WITH
DEFAULT
[(value)]
supplied**

Column must always have a value if we do not supply one, a system or user defined default value will be

Authorization

GRANT SELECT ON PROJECT TO SALLY



REVOKE SELECT ON PROJECT FROM SALLY

VIEW

You only see what you should

EMPNO	FIRSTNME	MIDINIT	LASTNAME	WORKDEPT	PHONENO
000150	BRUCE		ADAMSON	D11	4510
000200	DAVID		BROWN	D11	4501
000050	JOHN	B	GEYER	E01	6789
000340	JASON	R	GOUNOT	E21	5698
000010	CHRISTINE	T	S	A00	3978

● Data security

● Simplification

Checkpoint



1. True or False? A database is a collection of tables.
2. What are some of the advantages of using date data types?
3. Name the alphanumeric and numeric data types covered in this unit.
4. Name the types of SQL statements in the Data Manipulation Language (DML).

Checkpoint Solutions



1. True
2. Automatic verification of correctness
 - Date arithmetic
 - Date, time, timestamp sorting
 - Extraction of components
3. CHAR/CHARACTER (fixed length)
 - VARCHAR (variable length)
 - SMALLINT
 - INTEGER, INT
 - DECIMAL(x,y), DEC(x,y)
4. SELECT
 - INSERT
 - UPDATE
 - DELETE

Unit Summary

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