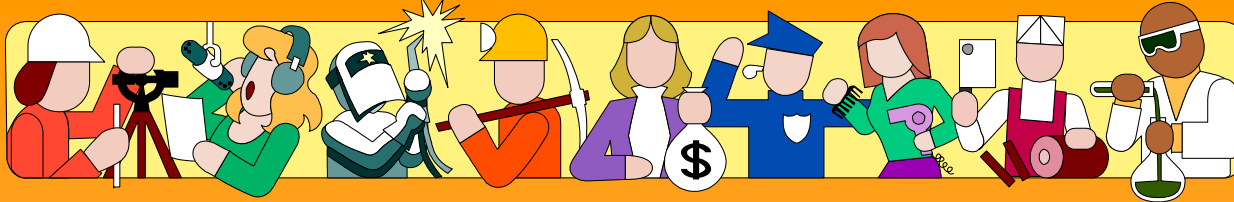


**MANAGING
DATA
RESOURCES**

**VERİ
KAYNAKLARININ
YÖNETİMİ**

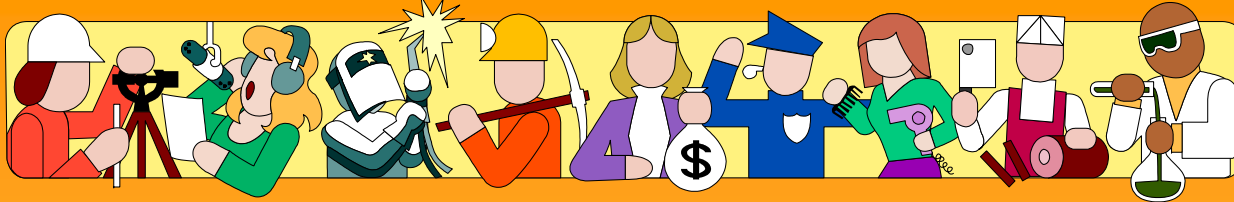
Dr. Vahap TECİM



FILE ORGANIZATION

- **BIT: Binary Digit (0,1; Y,N; On,Off)**
- **BYTE: Combination of BITS which represent a CHARACTER**
- **FIELD: Collection of BYTES which represent a DATUM or Fact**
- **RECORD: Collection of FIELDS which reflect a TRANSACTION**

*

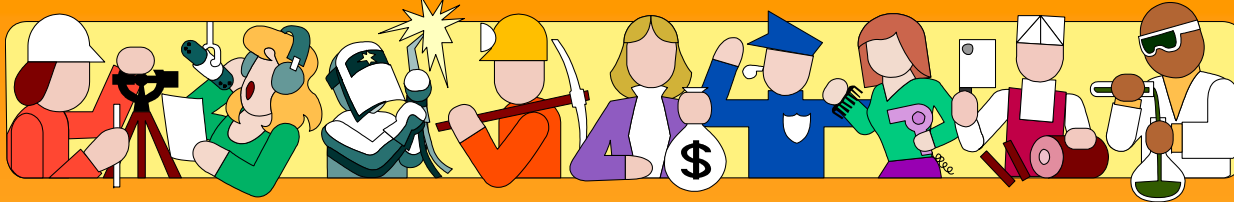


FILE ORGANIZATION

- **FILE: A Collection of similar RECORDS**
- **DATABASE: An Organization's Electronic Library of FILES organized to serve business applications**

*

BIT ➤ BYTE ➤ FIELD ➤ RECORD ➤ FILE ➤ DATABASE



FILE ORGANIZATION

- **ENTITY: Person, place, thing, event about which data must be kept**
- **ATTRIBUTE: Description of a particular ENTITY**
- **KEY FIELD: Field used to retrieve, update, sort RECORD**

*

KEY FIELD

Field in Each Record

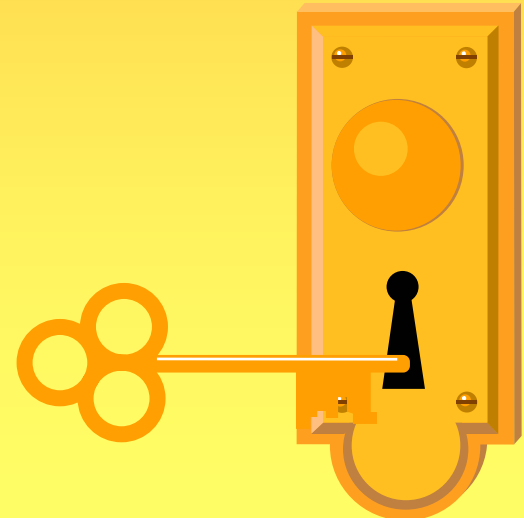
Uniquely Identifies THIS Record

For RETRIEVAL

UPDATING

SORTING

*



PROBLEMS WITH TRADITIONAL FILE ENVIRONMENT

- **DATA REDUNDANCY**
- **PROGRAM / DATA DEPENDENCY**
- **LACK OF FLEXIBILITY**
- **POOR SECURITY**
- **LACK OF DATA SHARING & AVAILABILITY**

*



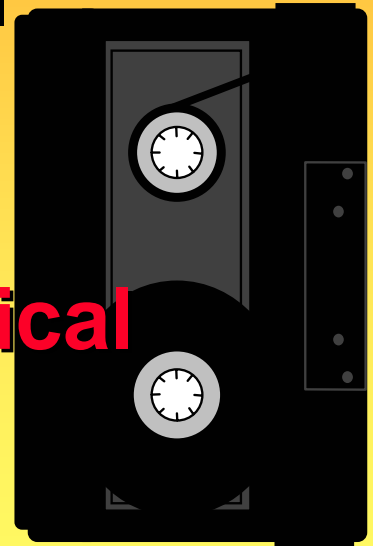
Flat File



SEQUENTIAL VS. DIRECT FILE ORGANIZATION

- **SEQUENTIAL:** Tape oriented; one file follows another; follows physical sequence
- **DIRECT:** Disk oriented; can be accessed without regard to physical sequence

*

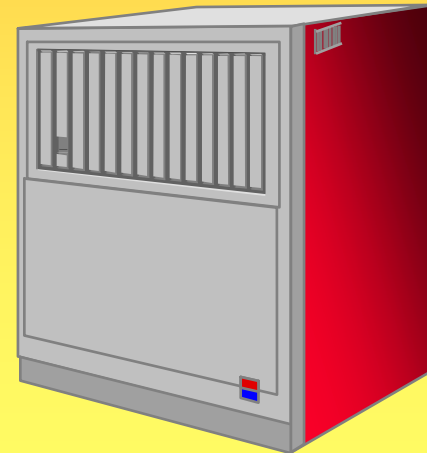


FILING METHODS

- **INDEXED SEQUENTIAL ACCESS METHOD (ISAM) :**
 - EACH RECORD IDENTIFIED BY KEY
 - GROUPED IN BLOCKS AND CYLINDERS
 - KEYS IN INDEX
- **VIRTUAL STORAGE ACCESS METHOD (VSAM) :**
 - MEMORY DIVIDED INTO AREAS & INTERVALS
 - DYNAMIC FILE SPACE

VSAM WIDELY USED FOR RELATIONAL DATABASES
- **DIRECT FILE ACCESS METHOD**

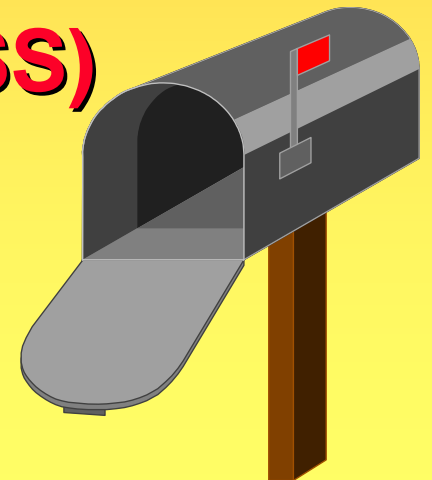
*



DIRECT FILE ACCESS METHOD

- **EACH RECORD HAS KEY FIELD**
- **KEY FIELD FED INTO TRANSFORM ALGORITHM**
- **ALGORITHM GENERATES PHYSICAL STORAGE LOCATION OF RECORD (RECORD ADDRESS)**

*



DATABASE MANAGEMENT SYSTEM (DBMS)

**SOFTWARE TO CREATE & MAINTAIN
DATA**

**ENABLES BUSINESS APPLICATIONS
TO EXTRACT DATA**

**INDEPENDENT OF SPECIFIC
COMPUTER PROGRAMS**

*

GEP V

COMPONENTS OF DBMS:

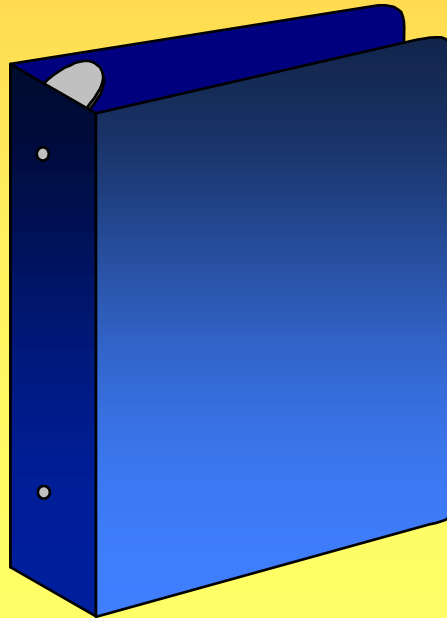
- **DATA DEFINITION LANGUAGE:**
 - Defines data elements in database
- **DATA MANIPULATION LANGUAGE:**
 - Manipulates data for applications
- **DATA DICTIONARY:**
 - Formal definitions of all variables in database, controls variety of database contents, data elements



GEP V

STRUCTURED QUERY LANGUAGE (SQL)

**EMERGING STANDARD
DATA MANIPULATION LANGUAGE
FOR RELATIONAL DATABASES**



GEP V

ELEMENTS OF SQL

- **SELECT:** List of columns from tables desired
- **FROM:** Identifies tables from which columns will be selected
- **WHERE:** Includes conditions for selecting specific rows, conditions for joining multiple tables

*

GEP V

TWO VIEWS OF DATA

- **PHYSICAL VIEW: Where is data physically?**
 - DRIVE, DISK, SURFACE, TRACK, SECTOR (BLOCK), RECORD
 - TAPE, BLOCK, RECORD NUMBER (KEY)
- **LOGICAL VIEW: What data is needed by application?**
 - SUCCESSION OF FACTS NEEDED BY APPLICATION
 - NAME, TYPE, LENGTH OF FIELD

*

GEP V

RELATIONAL DATA MODEL

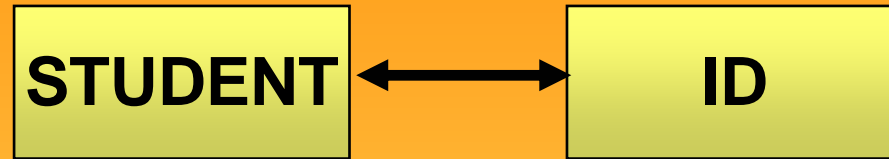
- **DATA IN TABLE FORMAT**
- **RELATION: TABLE**
- **TUPLE: ROW (RECORD) IN TABLE**
- **FIELD: COLUMN (ATTRIBUTE) IN TABLE**

*

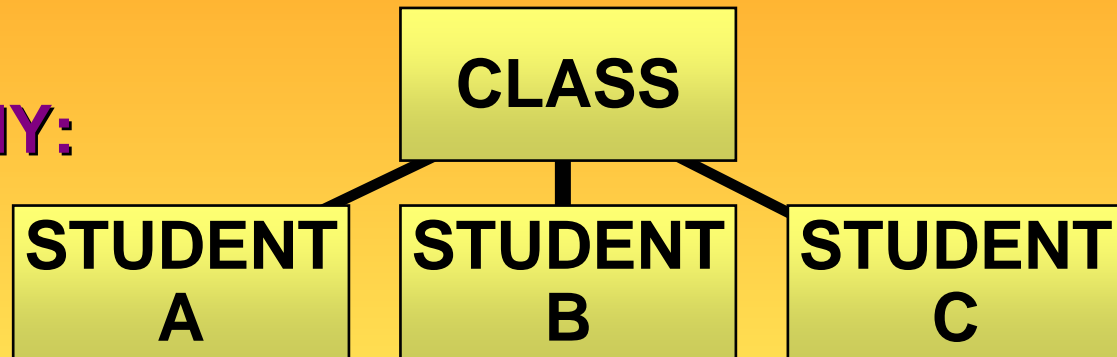
	HOURS	RATE	TOTAL
ABLE	\$ 40.50	\$ 10.35	\$ 419.18
BAXTER	\$ 38.00	\$ 8.75	\$ 332.50
CHEN	\$ 42.70	\$ 9.25	\$ 394.98
DENVER	\$ 35.90	\$ 9.50	\$ 341.05

TYPES OR RELATIONS

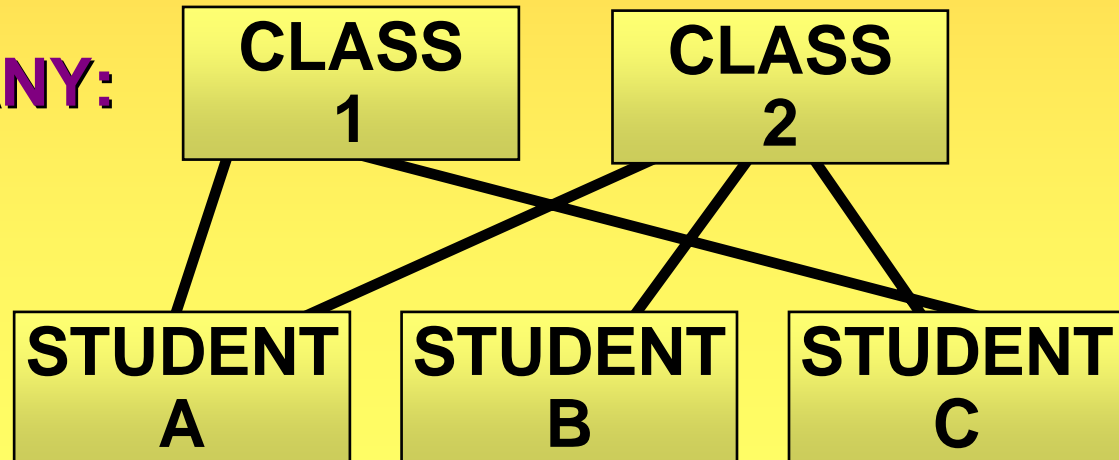
ONE-TO-ONE:



ONE-TO-MANY:



MANY-TO-MANY:



HIERARCHICAL DATA MODEL

ROOT

Employer

**FIRST
CHILD**

Compensation

**Job
Assignments**

Benefits

**2nd
CHILD**

Ratings

Salary

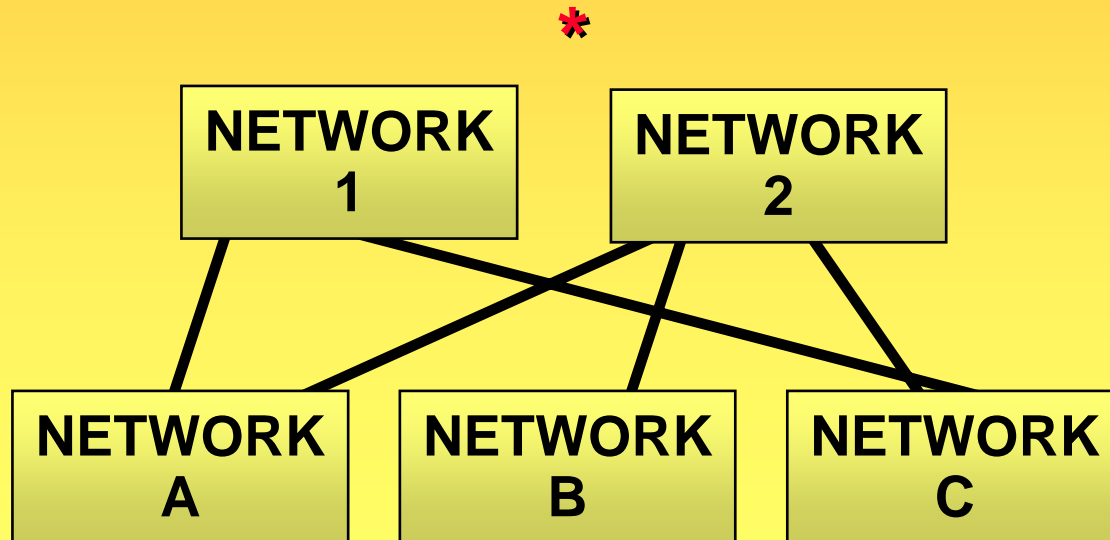
Pension

Insurance

Health

NETWORK DATA MODEL

- **VARIATION OF HIERARCHICAL MODEL**
- **USEFUL FOR MANY-TO-MANY RELATIONSHIPS**



OTHER SYSTEMS

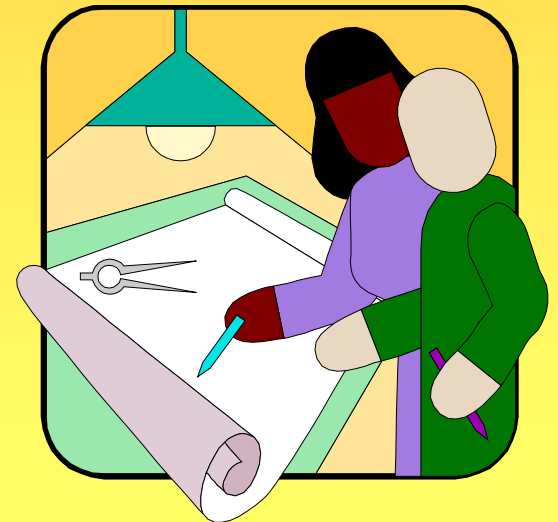
- **LEGACY SYSTEM: older system**
- **OBJECT - ORIENTED DBMS: stores data & procedures as objects**
- **OBJECT - RELATIONAL DBMS: hybrid**



CREATING A DATABASE

- **CONCEPTUAL DESIGN**
- **PHYSICAL DESIGN**

*

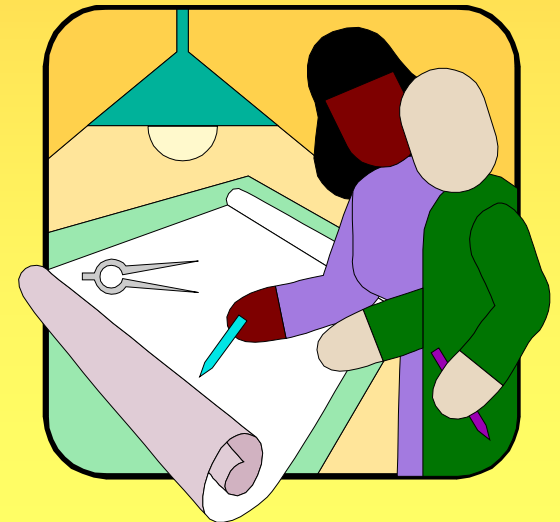


CREATING A DATABASE

CONCEPTUAL DESIGN:

- **ABSTRACT MODEL, BUSINESS PERSPECTIVE**
- **HOW WILL DATA BE GROUPED?**
- **RELATIONSHIPS AMONG ELEMENTS**
- **ESTABLISH END-USER NEEDS**

*

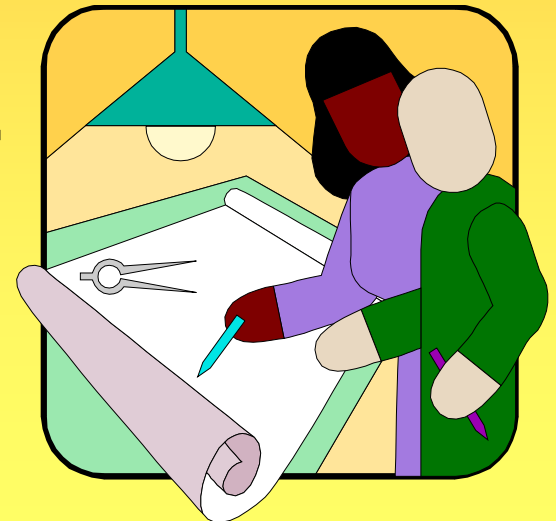


CREATING A DATABASE

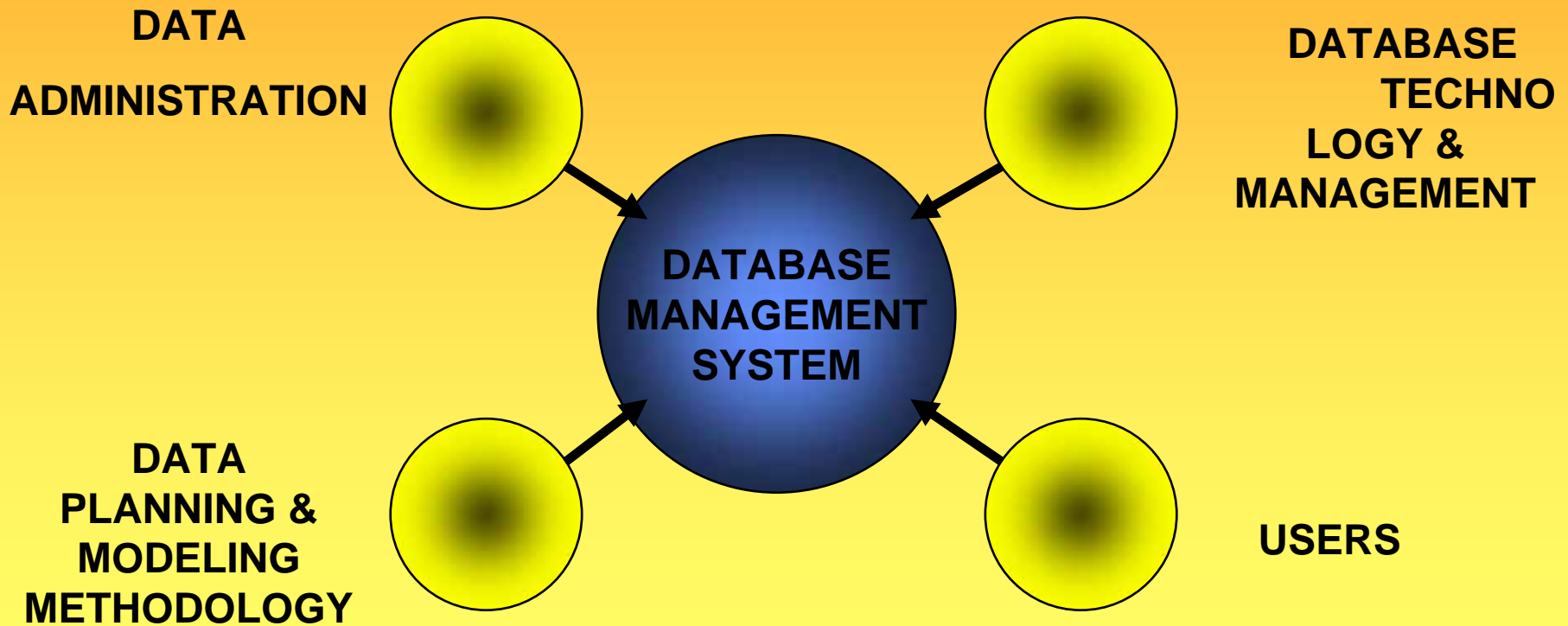
PHYSICAL DESIGN:

- **DETAILED MODEL BY DATABASE SPECIALISTS**
- **ENTITY-RELATIONSHIP DIAGRAM**
- **NORMALIZATION**
- **HARDWARE / SOFTWARE SPECIFIC**

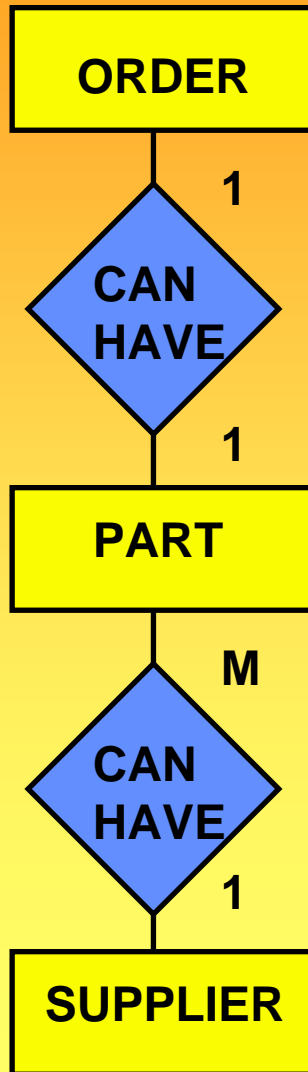
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ELEMENTS OF DATABASE ENVIRONMENT



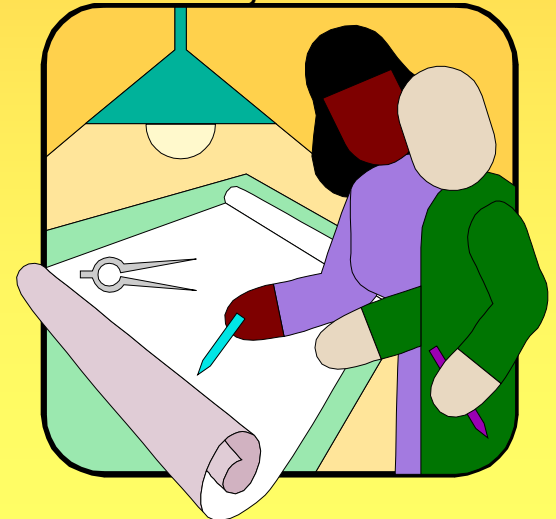
ENTITY- RELATIONSHIP DIAGRAM



ORDER: #, DATE, PART #, QUANTITY

PART: #, DESCRIPTION, UNIT PRICE, SUPPLIER #

SUPPLIER: #, NAME, ADDRESS



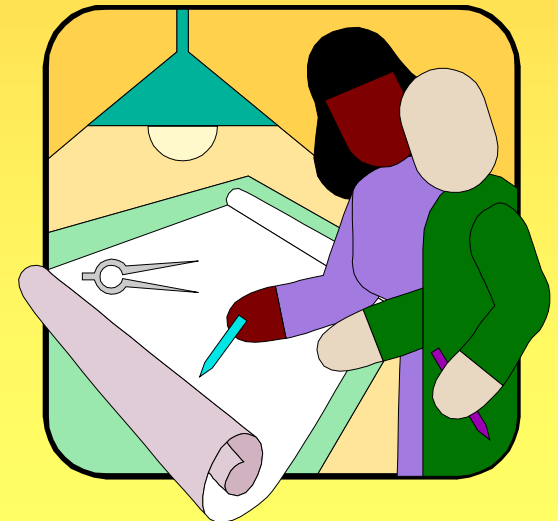
NORMALIZATION

**PROCESS OF CREATING SMALL
DATA STRUCTURES FROM
COMPLEX GROUPS OF DATA**

EXAMPLES:

- **ACCOUNTS RECEIVABLE**
- **PERSONNEL RECORDS**
- **PAYROLL**

*



DISTRIBUTED DATABASES

- **PARTITIONED: remote CPUs** (connected to host) have files unique to that site, e.g., records on local customers
- **DUPLICATE: each remote CPU has copies of common files,** e.g., layouts for standard reports and forms



DATABASE ADMINISTRATION

- **DEFINES & ORGANIZES DATABASE STRUCTURE AND CONTENT**
- **DEVELOPS SECURITY PROCEDURES**
- **DEVELOPS DATABASE DOCUMENTATION**
- **MAINTAINS DBMS**

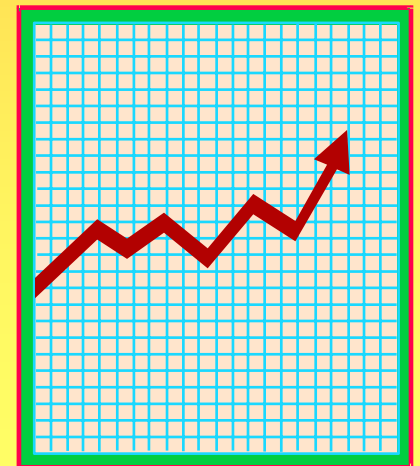
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DATABASE TRENDS

- **MULTIDIMENSIONAL DATA ANALYSIS:** 3D (or higher) groupings to store complex data
- **HYPERMEDIA:** Nodes contain text, graphics, sound, video, programs. organizes data as nodes.

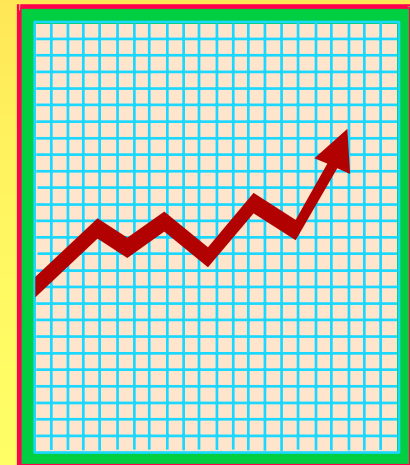
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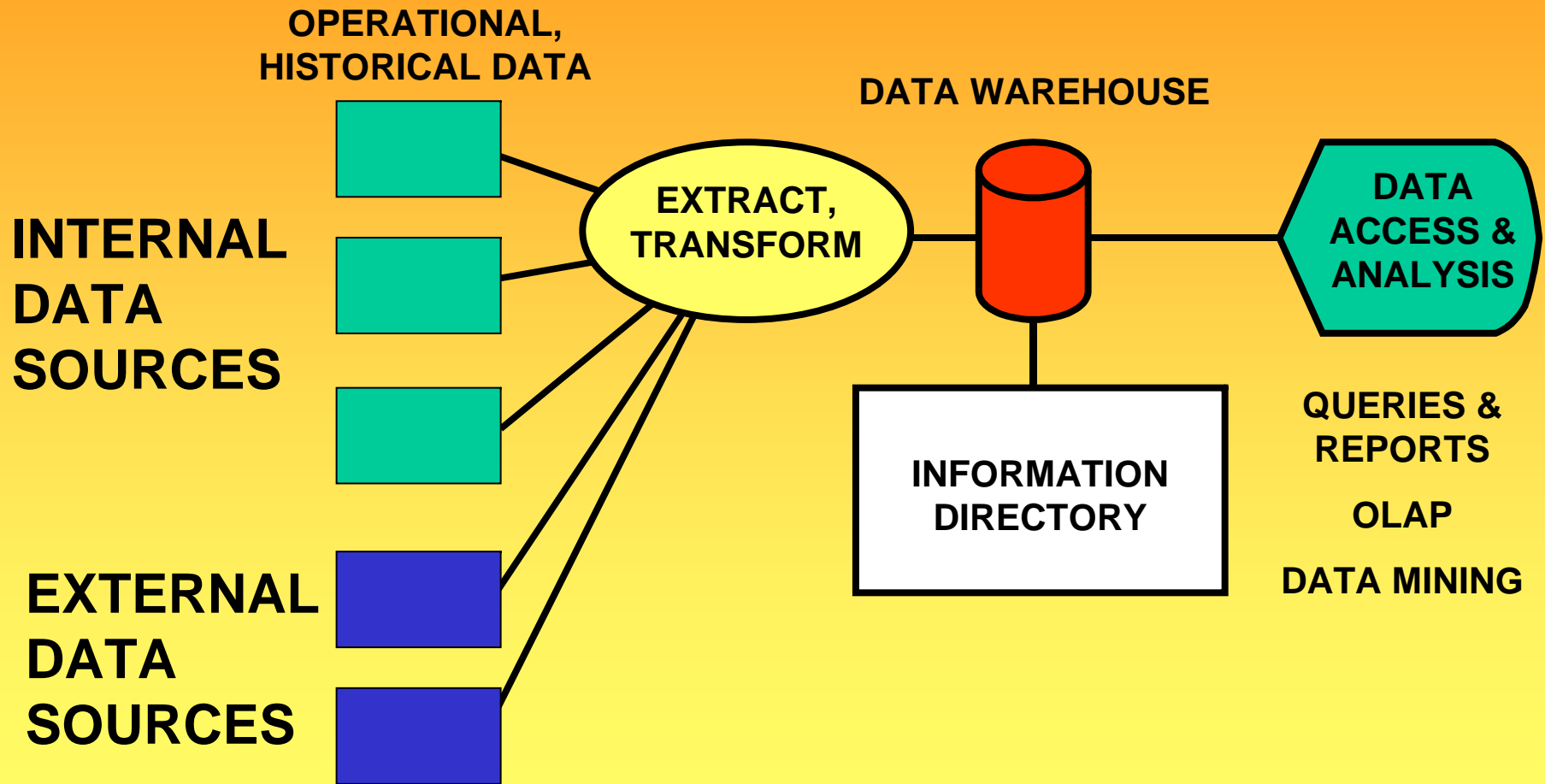
DATABASE TRENDS

- **DATA WAREHOUSE:** Organization's electronic library stores consolidated current & historic data for management reporting & analysis
- **ON-LINE ANALYTICAL PROCESSING (OLAP):** Tools for multi-dimensional data analysis

*



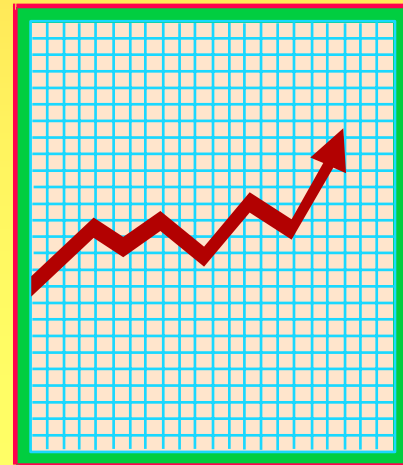
COMPONENTS OF DATA WAREHOUSE



DATABASE TRENDS

- **DATA MART: Small data warehouse for special function, e.g., Focused marketing based on customer info**
- **DATAMINING: Tools for finding hidden patterns, relationships, for predicting trends**

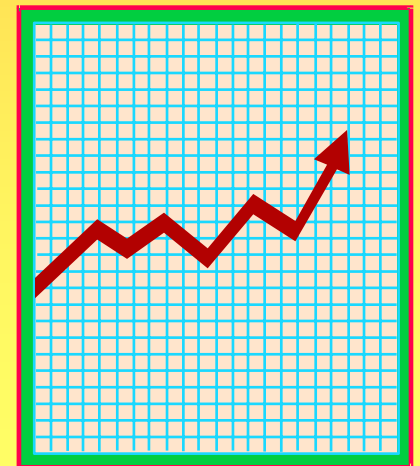
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DATABASE TRENDS

LINKING DATABASES TO THE WEB:

- **WEB USER CONNECTS TO VENDOR DATABASE**
- **SPECIAL SOFTWARE CONVERTS HTML TO SQL**
- **SQL FINDS DATA, SERVER CONVERTS RESULT TO HTML**



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