

MANAGEMENT INFORMATION SYSTEM

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COURSE OUTLINES

- **Course Title**
 - Management Information Systems
- **Grading Policy**
 - Exam → 80%
 - Tutorial / Assignment → 20%
- **Textbook and Reference Materials**
 - Course Manual for Management Information Systems CIS302, University of Ibadan Distance Learning Centre
 - Management Information Systems (Managing The Digital Firm) by Kenneth C. Laudon(New York University), Jane P. Laudon(Azimuth Information Systems), Twelfth Edition
 - Management Information Systems, Sixth Edition, by Effy Oz
- **Course Duration**
 - 12 Weeks

Managing Data Resources

LEARNING OUTCOMES

When you have studied this session, you should be able to:

- discuss organization and data management
- define database management systems
- explain database trends
- highlight management requirement
- describe database environment

CONTENTS

- Organizations and Data Management
- Database Management Systems
- Database Trends
- Management Requirements
- The Database Environment and Applications

ORGANIZATIONS AND DATA MANAGEMENT

- **Difficult to manage** data effectively- two very big challenges:
- Implementing a database
- A database management system (DBMS)
- In a traditional file environment, each department constructed files and programs to fulfil its specific needs.
- With a database, files and programs must be built that take into account the full organization's interest in data.
- Moving to database environment - a costly long-term process.

ORGANIZING DATA IN A TRADITIONAL FILE ENVIRONMENT

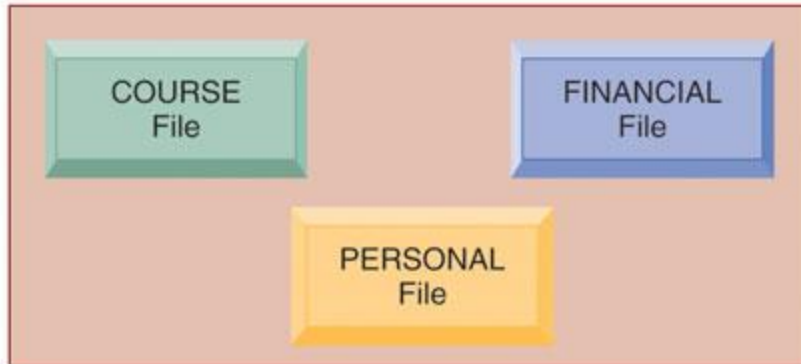
- Information is becoming important business resource
- Businesses are realizing the competitive advantage
- Understanding the whole concept of managing and maintaining information
- Turning data into useful information

FILE ORGANIZATION TERMS AND CONCEPTS

- Organizes data in a hierarchy
- **A bit** : the smallest unit of data a computer can handle
- **A byte** : a group of bits (represents a single character)
- **A field** : a grouping of characters into a word, a grouping of characters into a word, or a complete number
- **A record** : a group of related fields
- **A file** : a group of records of the same type
- **A database** : a group of related files

Student Database

Database



File

| COURSE | | | |
|------------|--------|------|-------|
| Student_ID | Course | Date | Grade |
| 39044 | IS 101 | F06 | B+ |
| 59432 | IS 101 | F06 | A |
| 64029 | IS 101 | F06 | C |

Record

| Student_ID | Course | Date | Grade |
|------------|--------|------|-------|
| 39044 | IS 101 | F06 | B+ |

Field

IS 101 (Course field)

Byte

0100 1001 (Letter I in ASCII)

Bit

0

Figure : Data hierarchy in traditional file management system

FILE ORGANIZATION TERMS AND CONCEPTS (CONT.)

- An entity : the person, place, thing, or event
- An attribute: characteristic or quality describing an entity
- Each record requires a key field, or unique identifier.
- example of a database:
 - For each customer, you create a record.
 - The fields: customer name, address, ID, date last paid
 - The records : Smith, Jones, and Brooks
 - The attributes : customer name, address, ID, and date last paid
 - The key field : the ID number

ACCESSING RECORDS

■ Sequential file organization

- magnetic tape
- processing the same information on all records at the same time
- called batch processing

■ Direct or random file organization

- magnetic disks
- disks don't physically deteriorate as fast as tapes do
- less danger of damaging the surface of the disks than there is of breaking a tape

ACCESSING RECORDS (CONT.)

■ Indexed Sequential Access Method

- use the key field: accurate idea of where a particular record is located
- important to have a unique ID as the key field
- maintained in the index

■ Direct file access method

- use key fields in combination with mathematical calculations to determine the location of a record
- the records are not stored sequentially but at random
- The transform algorithm uses the value in the key field to find the storage location and access the record.

PROBLEMS WITH THE TRADITIONAL FILE ENVIRONMENT

- Data redundancy, program-data dependence, inflexibility, poor data security, and inability
- Because they find the main system inflexible or it just doesn't fit their needs
- Resolve data conflicts between them, and
- Retrain people to understand the new database structures

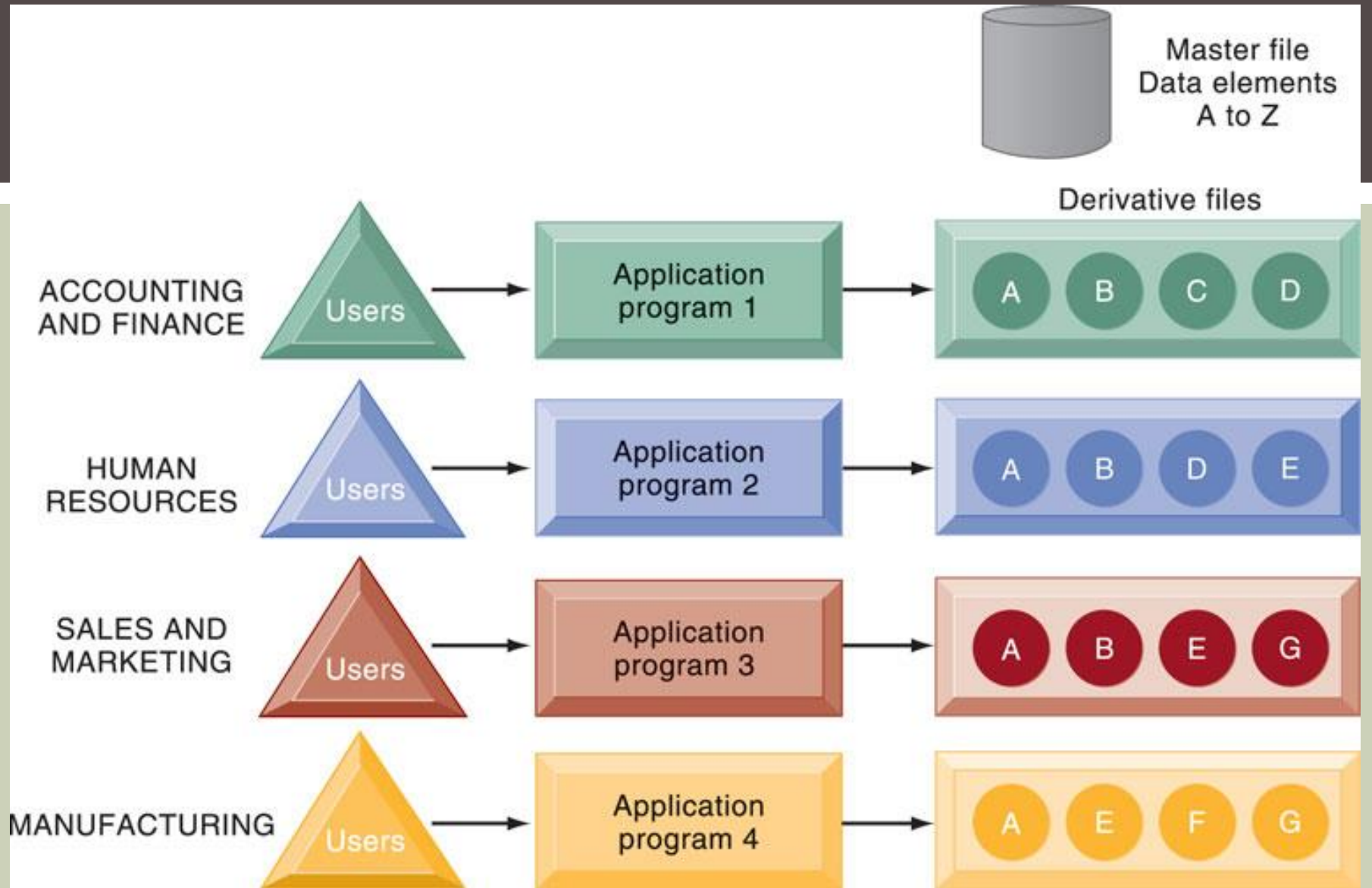


Figure : Traditional file processing

DATABASE MANAGEMENT SYSTEMS

- To involve the entire organization as much as possible
- Software program like Word or Excel or Email
- More complicated
- Permits an organization to centralize data,
- Manage them efficiently, and
- Provide access to the stored data by application programs
- A DBMS has 3 components - important for the long-term success of the system

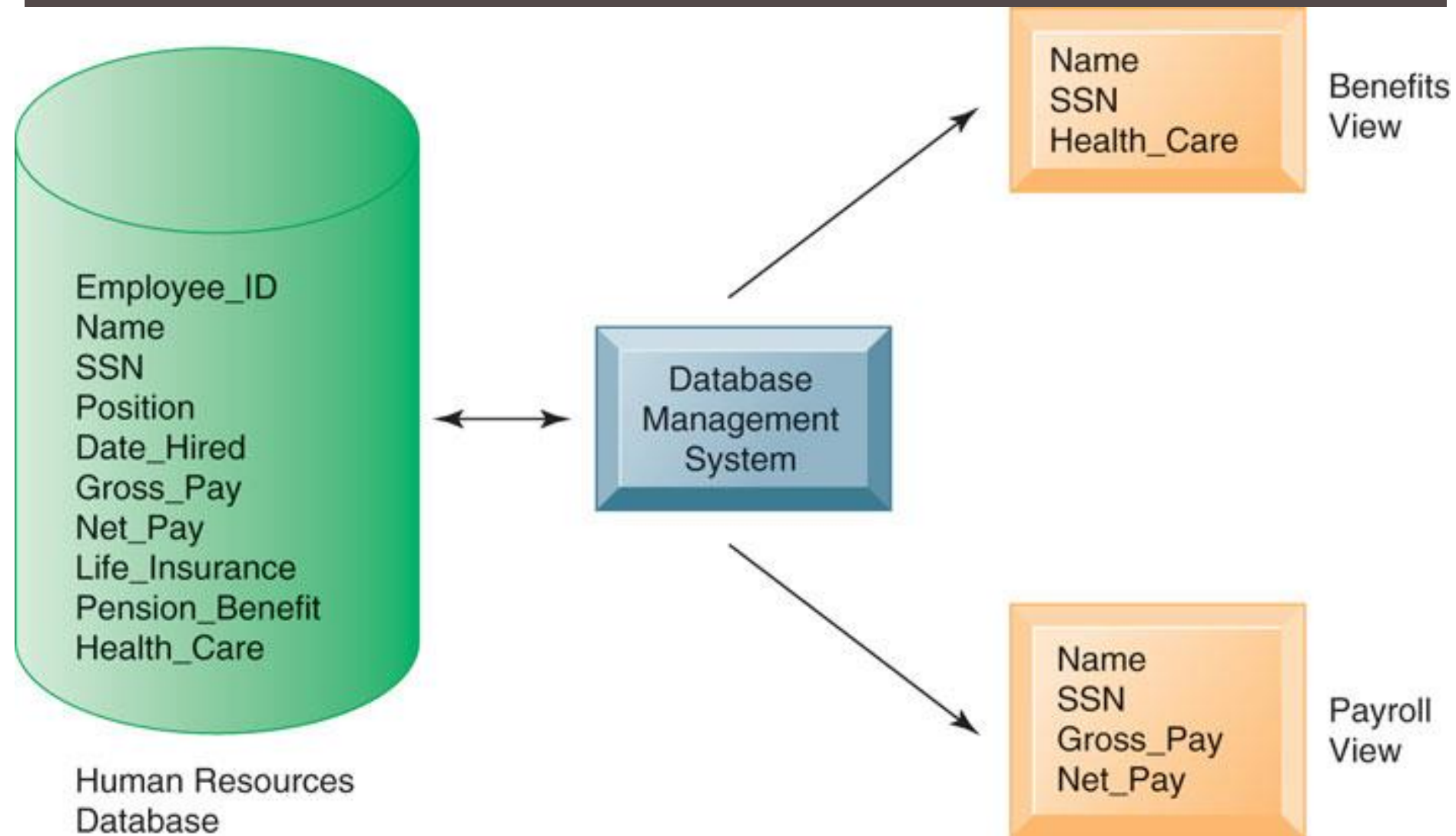


Figure : Human resources database with multiple views

DATA DEFINITION LANGUAGE (DDL)

- Make sure that all users of the database are speaking the same language
- If Marketing is speaking French, Production is speaking German, and Human Resources is speaking Japanese
- It's very difficult for them to understand each other
- Critical to involve users in the development of the Data Definition Language

DATA MANIPULATION LANGUAGE (DML)

- A formal language used by programmers
- To manipulate the data in the database
- Formulated into useful information
- Easy for users
- Establish a single data element that can serve multiple users in different departments

DATA DICTIONARY

- What it will be used for,
- Who will be the primary user, and
- How it fits into the overall scheme of things
- Write it all down and make it easily available to all users

LOGICAL AND PHYSICAL VIEWS OF DATA

- The physical view of data cares about **where the data** are actually stored in the record or in a file.
- The **physical view is important to programmers**
- bring the data **from their physical location** on the storage device **to a logical view** in the output device

DESIGNING DATABASES

Hierarchical Databases

- a treelike structure (a mother and her children)
- inherits some of the characteristics
- one or more children
- develop its own characteristics separate from the mother

DESIGNING DATABASES (CONT.)

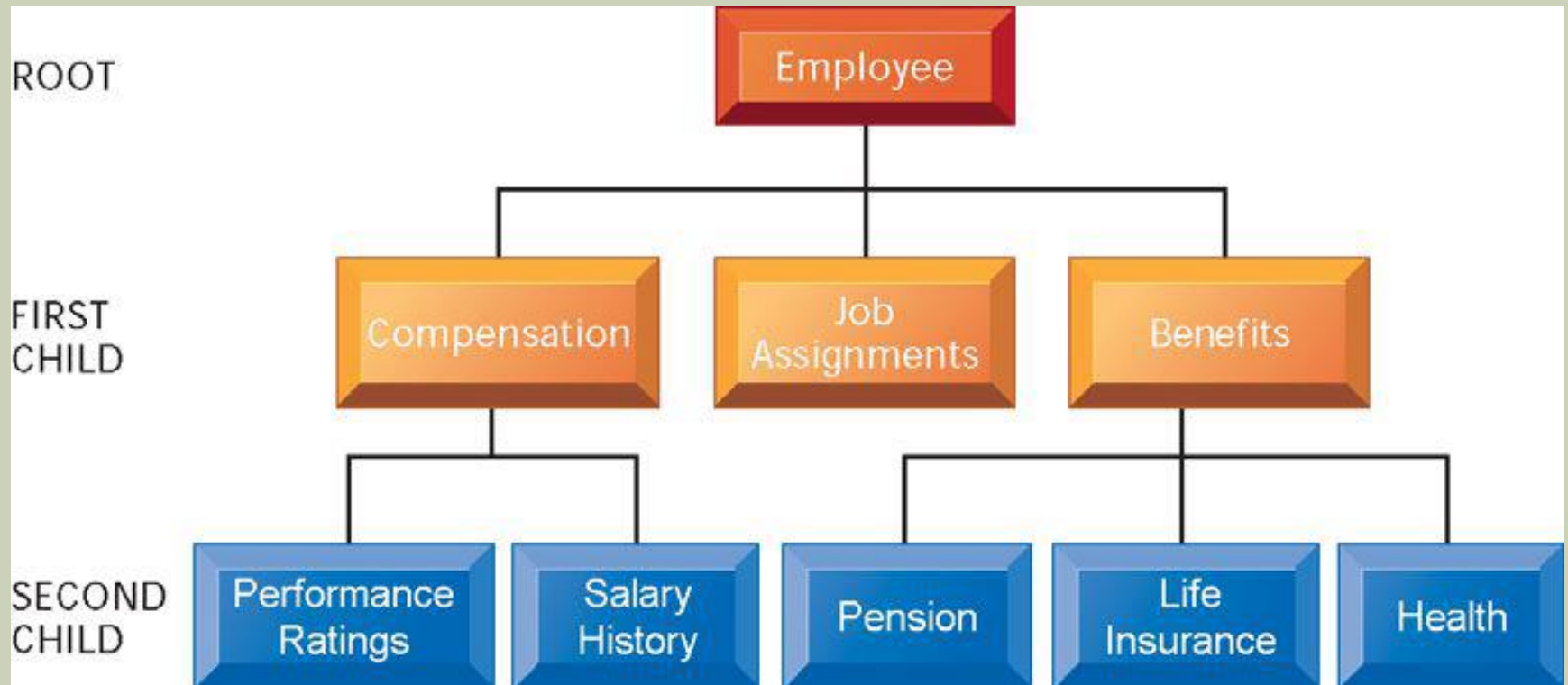


Figure : A hierarchical database for a human resources system.
(Source: <http://studynama.com>)

DESIGNING DATABASES (CONT.)

Network Database

- a variation of the hierarchical model
- one parent and many children
- the parents aren't restricted to only one (the mother) but to many parents
- a parent can have many children and a child can have many parents.
- the children also have their own distinct characteristic

DESIGNING DATABASES (CONT.)

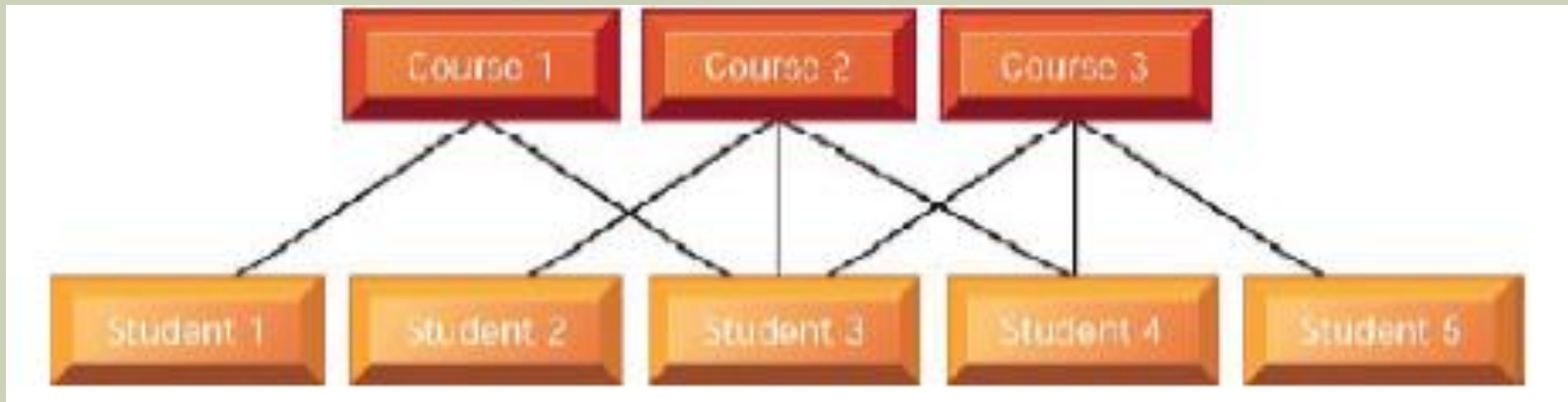


Figure : Network Data Model
(Source: <http://studynama.com>)

DESIGNING DATABASES (CONT.)

Relational Data Model

- uses tables (called files)
- each table contains a primary key, a unique identifier for each record.
- Use these three basic operations to develop relational databases:
 1. Select: create a subset of records meeting the stated criteria
 2. Join: combine related tables to provide more information than individual tables
 3. Project: create a new table from subsets of previous tables

CREATING A DATABASE

- The good and the bad of **how information is organized, stored, and used**
- Determine the **relationships** between each data element
- Determine which data elements **work best together**
- Break your groups of data into **as small a unit as possible**
- Avoid **redundancy**
- Decide what the **key identifier** will be for each record

DATABASE TRENDS

Distributed Databases

- very large corporations
- immediate, fast access to data

Object-Oriented

- data as objects
- bring the various objects from many different sources and get them all working together

Hypermedia Databases

- the various elements are networked
- allows the user to decide which path to follow from one node to another

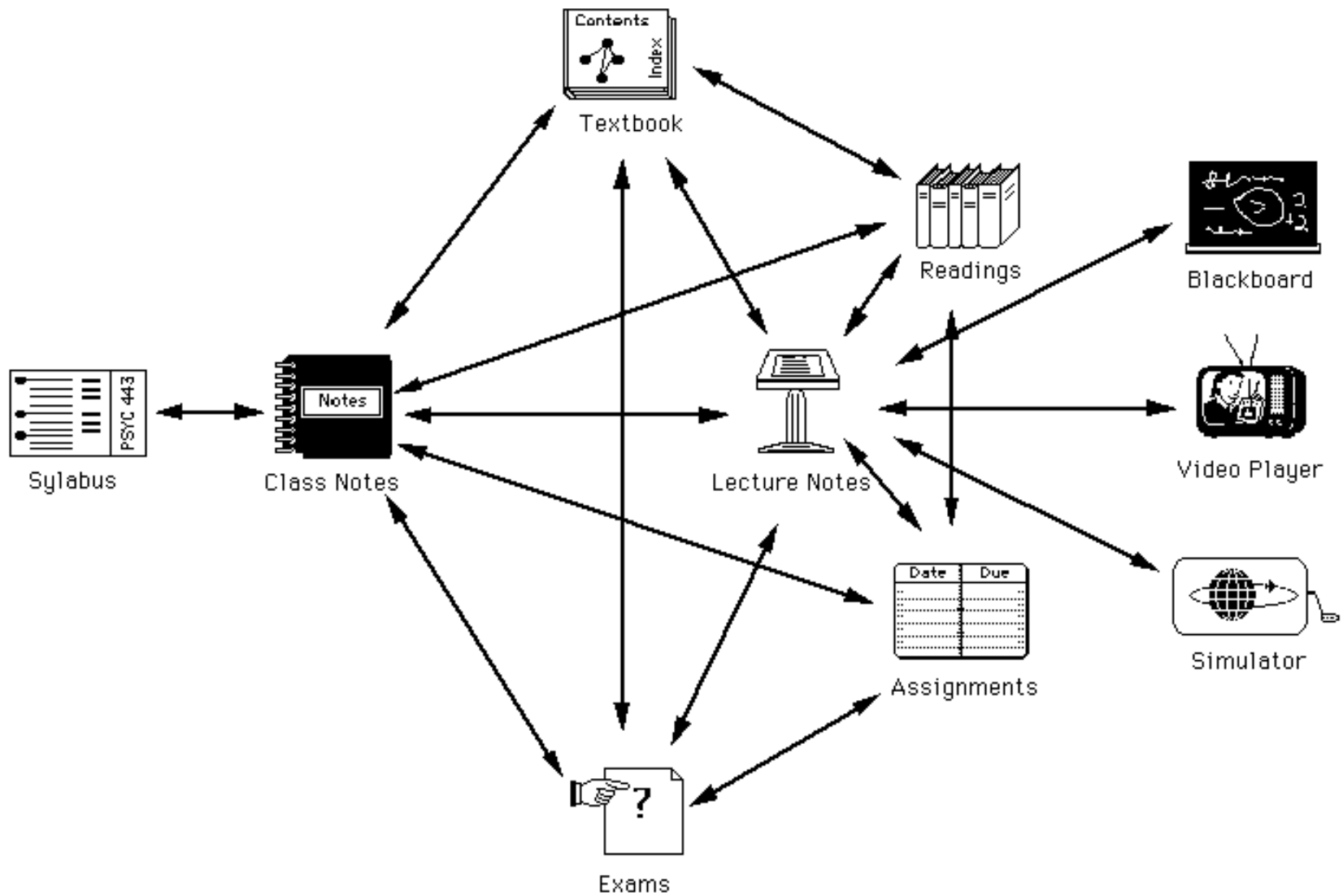


Figure : A hypermedia database for the electronic educational environment (Source: Norman, 1991)

MANAGEMENT REQUIREMENTS

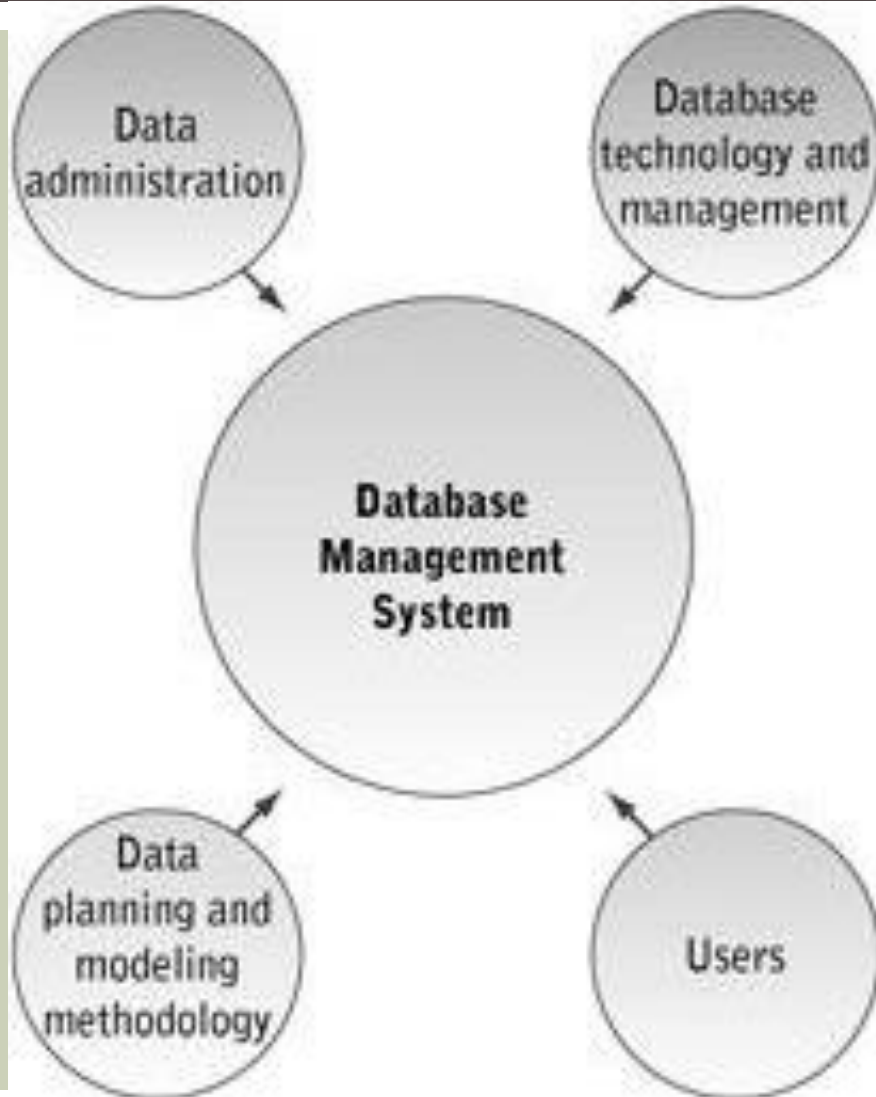


Figure : Database Structure (Source: <http://studynama.com>)

DATA ADMINISTRATION

- A data administration function
- Define and structure the information requirements
- Data Administration is responsible for:
 1. Developing information policies
 2. Planning for data
 3. Overseeing logical database design
 4. Data dictionary development
 5. Monitoring the usage of data by techies and non-techies

DATABASE TECHNOLOGY, MANAGEMENT AND USERS

- Users - more responsibility for accessing data
- Need to understand the role they play in treating information as an important corporate resource
- Database administration functions can:
 1. Define and organize database structure and content.
 2. Develop security procedures to safeguard the database.
 3. Develop database documentation.
 4. Maintain the database management software.

THE DATABASE ENVIRONMENT AND APPLICATIONS

- Database is an organized collection of logically related data
- To increase the knowledge of the person
- Example:
 - The bank that owns your ATM card
 - The monthly statement contains information about your account
 - The bank maintains a database of related data
 - The ATM transaction information

THE RANGE OF DATABASE APPLICATIONS

- Personal databases
- Workgroup Database
- Department Databases
- Enterprise Database

ASSESSMENT

1. Enumerate some of the challenges of data management in an organisation.
2. DBMS has component systems. List them.
3. List two areas where database have taken new trends

Next Week Lecture: End User Computing

THANK YOU.