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# Information Systems


## ISM 3011

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Unit 5A

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# Organizing Data and Information

## Chapter 5

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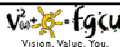
## The Traditional Approach

**FIGURE 5.3**  
The Traditional Approach to Data Management

With the traditional approach, one or more data files is created and used for every application. For example, the inventory control program would have one or more files containing inventory data, such as the inventory item, number on hand, and item description. Likewise, the invoicing program can have files on customers, inventory items being shipped, and so on. With the traditional approach to data management, it is possible to have the same data, such as inventory items, in several different files used by different applications.

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## Traditional Approach

- Data redundancy
- Program-data dependence
- Data integrity

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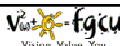
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## Database Approach

**FIGURE 5.4**  
The Database Approach to Data Management

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## Advantages and Disadvantages of the Database Approach

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FIGURE 5.1

The Hierarchy of Data

The Hierarchy of Data

Database

Files

Records

Fields

Characters (Bytes)

Example

(Project database)

(Personnel file)

(Record containing SSN, last and first name, hire date)

(Last name field)

(Letter F in ASCII)

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FIGURE 5.2

Data Entities, Attributes, and Keys

Keys and Attributes

The key field is the employee number. The attributes include last name, first name, hire date, and department number.

Employee #	Last name	First name	Hire date	Dept. number
005-10-6321	Johns	Francine	10-07-1997	257
549-77-1001	Buckley	Bill	02-17-1979	632
098-40-1370	Fiske	Steven	01-05-1965	598

Key field

Attributes (fields)

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FIGURE 5.5

Entity-Relationship (ER) Diagrams

An Entity-Relationship (ER) Diagram for a Customer Order Database

Development of this type of diagram helps ensure the logical structuring of application programs that are able to serve users' needs and are consistent with the data relationships in the database.

Salesperson

Customer

Orders

Invoice

Line Items

Product

services

places

includes

generates

specifies

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Elements of the ERM

Entity

Attribute

Relationship

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Blackboard Picture

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Blackboard Picture

1) Identify Entities

Student → "Student"

Schools → "Schools"

2) Student @ SSN

Name

YOB

Schools: School Name

City

3) Relation: "is enrolled to"

Student

School

SSN

Name

YOB

School Name

City

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Relational Models

Data table 1: Project table

Project number	Description	Dept. number
155	Payroll	257
498	Widgets	632
226	Sales Manual	598

Data table 2: Department table

Dept. number	Dept. name	Manager SSN
257	Accounting	005-10-6321
632	Manufacturing	549-77-1001
598	Marketing	098-40-1370

Data table 3: Manager table

SSN	Last name	First name	Hire date	Dept. number
005-10-6321	Johns	Francine	10-07-1997	257
549-77-1001	Buckley	Bill	02-17-1979	632
098-40-1370	Fiske	Steven	01-05-1985	598

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FIGURE 5 8

A Relational Database Model

In the relational model, all data elements are placed in two-dimensional tables, or relations. As long as they share at least one common element, these relations can be linked to output useful information.

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Relational Models

FIGURE 5 9

Linking Data Tables to Answer an Inquiry

In finding the name and hire date of the manager working on the sales manual project, the president needs three tables: project, department, and manager. The project description (Sales Manual) leads to the department number (598) in the project table, which leads to the manager's SSN (098-40-1370) in the department table, which leads to the manager's name (Fiske) and hire date (01-05-1985) in the manager table.

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Database Management Systems (DBMSs)

- Provide a user view
- Create and modify the database
- Store and retrieve data
- Manipulate data
- Produce reports

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Open Database Connectivity (ODBC)

FileMaker Pro

ACCESS database

Lotus 1-2-3 spreadsheet

ODBC "myDatabase"

Application Software

FIGURE 5 20

Advantages of ODBC

ODBC can be used to export, import, or link tables between different applications.

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Storing and Retrieving Data

Data on storage

Physical access path (PAF)

DBMS

Logical access path (LAP)

Management inquiries

Other software

Application programs

FIGURE 5 14

Logical and Physical Access Paths

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Structured Query Language

FIGURE 5 15

Structured Query Language

SQL has become an integral part of most relational database packages, as shown by this screen from Microsoft Access.

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## Database Output

**FIGURE 5-18**  
Database Output  
A database application offers sophisticated formatting and organization options to produce the right information in the right format.

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## Confused?

DBMS

Database

SQL

ODBC

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## Database

### DBMS

### ODBC

### SQL

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## Summary

- **Data** - one of the most valuable resources a firm possesses
- **Entity** - a generalized class of objects for which data is collected, stored, and maintained
- **DBMS** - a group of programs used as an interface between a database and application programs
- **Traditional on-line transaction processing (OLTP)** - do not support the types of data analysis needed today

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## Thank you!

The slides will be available on the internet at  
<http://ruby.fgcu.edu/courses/mhepp/>  
 (-> CRN10033)

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