Introduction

Database? What is it ?

Your textbook:
A database is a collection of data, typically describing the activities of one or more related organizations

Database administrator:
A database is a logically coherent collection of data with some inherent meaning

Your lecturer:
A database is a representation of a selected part of the reality

Philosopher:
Database is a simulation of a selected part of the reality

Examples

Business database

University database

Library database

Police, military database

Engineering database

Multimedia database

Database Management System (DBMS)

Your textbook:
DBMS is a software designed an implemented to assist in maintaining and utilizing large collections of data

Database administrator:
DBMS is a common set of algorithms to perform the most routine data storage tasks

Your lecturer:
DBMS is a collection of computer programs that facilitate the processes of defining, constructing, manipulating, administering and protecting databases

Philosopher:
???

Software tools of DBMS

Database definition tools

Database construction tools

Database manipulation tools

Database administration tools

Database protection tools

A domain of a sample database

A company would like to store and to maintain information about its suppliers and the parts shipped by the suppliers
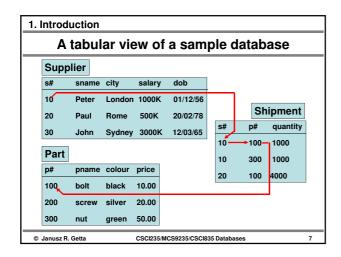
It essential to store a supplier number, name, date of birth, salary, and city he/she lives in.
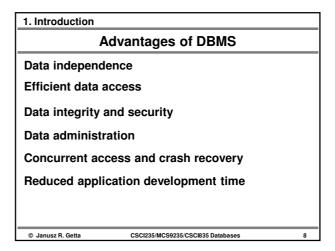
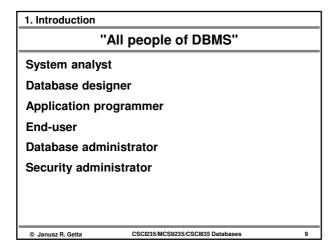*Parts are described by part number, part name, colour and price*

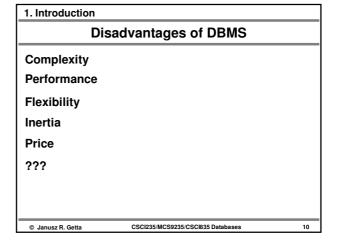*Shipments are represented by a supplier number, part name and quantity*

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A tabular view of a sample database

Supplier

s#	sname	city	salary	dob
10	Peter	London	1000K	01/12/56
20	Paul	Rome	500K	20/02/78
30	John	Sydney	3000K	12/03/65

Shipment

s#	p#	quantity
10	100	1000
10	300	1000
20	100	4000

Part

p#	pname	colour	price
100	bolt	black	10.00
200	screw	silver	20.00
300	nut	green	50.00

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Advantages of DBMS

Data independence

Efficient data access

Data integrity and security

Data administration

Concurrent access and crash recovery

Reduced application development time

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"All people of DBMS"

System analyst

Database designer

Application programmer

End-user

Database administrator

Security administrator

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Disadvantages of DBMS

Complexity

Performance

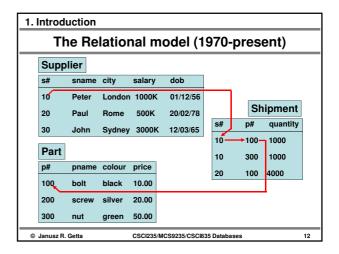**Flexibility**

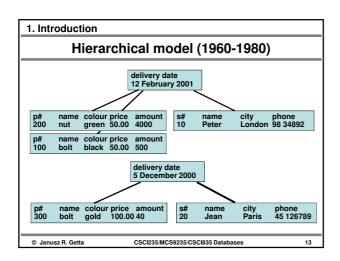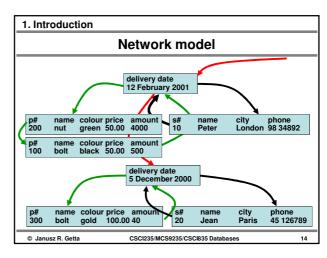**Inertia**

Price

???

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Data model ? What is it ?

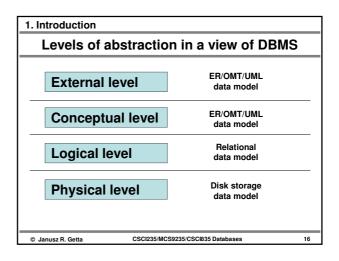**Data model is a collection of high-level data description constructs that hide many low-level storage details**

Data model is an abstraction that provides a conceptual representation of data

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The Relational model (1970-present)

Supplier

s#	sname	city	salary	dob
10	Peter	London	1000K	01/12/56
20	Paul	Rome	500K	20/02/78
30	John	Sydney	3000K	12/03/65

Shipment

s#	p#	quantity
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20	100	4000

Part

p#	pname	colour	price
100	bolt	black	10.00
200	screw	silver	20.00
300	nut	green	50.00

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Hierarchical model (1960-1980)

1. Introduction

Network model

1. Introduction

Other data models

Object-oriented model (1990-2000) (network model re-born)

Object-relational model (1992-present)

XML data model (1998-present) (hierarchical and network models re-born)

Conceptual data models (1976-present)Entity-Relationship model, Object Role model, Object Modeling Technique, UML class diagrams, etc

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Levels of abstraction in a view of DBMS

External level	ER/OMT/UML data model
Conceptual level	ER/OMT/UML data model
Logical level	Relational data model
Physical level	Disk storage data model

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Database schema ? What is it ?

A schema is a description of stored data in the terms of a data model

Conceptual schema (ER/OMT/UML)
Entities, relationships, objects, attributes

Logical schema (Relational schema)
Tables, rows, columns, attributes

Physical schema
Records, fields, tracks, sectors, cylinders, bytes

1. Introduction

References

Elmasri R., Navathe S. B., *Database Systems*, chapters 1, 2

Ramakrishnan R., Gehrke J., *Database Management Systems*, chapters 1.1, 1.3, 1.4, 1.5, 1.9,