

Entity-Relationship Diagram (ERD)

- Documents firm's data by identifying types of data entities and their interrelationships
- Summary level data structure modeling method
- Very flexible

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Entity Types

- Environmental
- Resource
- Important transaction
- Descriptor uses a Noun

Entity symbol

Employee Time card

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Relationship

- An association between two entity types
- Descriptor uses a Verb

Relationship symbol

Employee — Fills out — Time card

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Connectivity

Number of times an entity occurs in relation to another entity

Time card — 1 — Produces — 1 — Payroll check

A. One to one

Invoice — 1 — Contains — M — Inventory item

B. One to many

Customer — M — Purchases — M — Product

C. Many to many

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Attributes

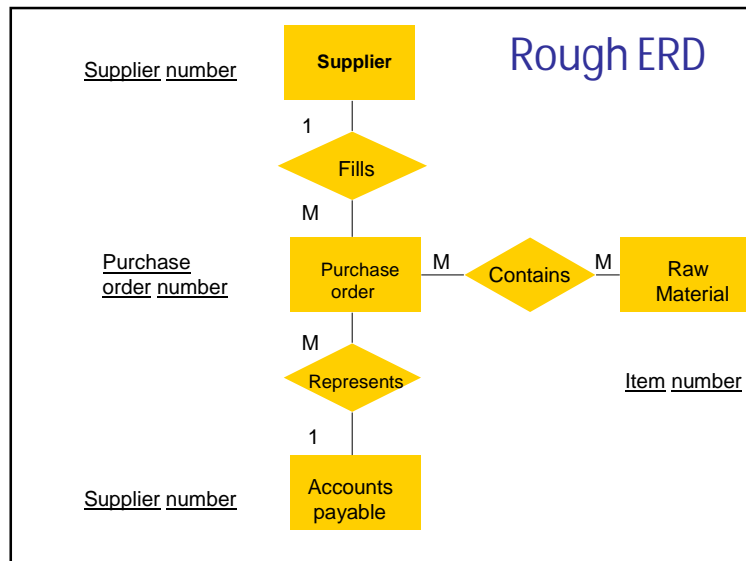
- **Attributes = Characteristics of an entity (Fields)**
- **Attribute Value = Data stored in attribute (Data Value)**
- **Identifiers = unique attributes of the entity (Key Fields)**
- **Descriptors describe the entity (Field Names)**

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Preparation of an Entity-Relationship Diagram

1. Identify the entities
2. Identify the relationships
3. Prepare a rough ERD
4. Map data elements to the entities
5. Perform a data analysis
6. Prepare a modified ERD
7. Review the ERD with users and refine

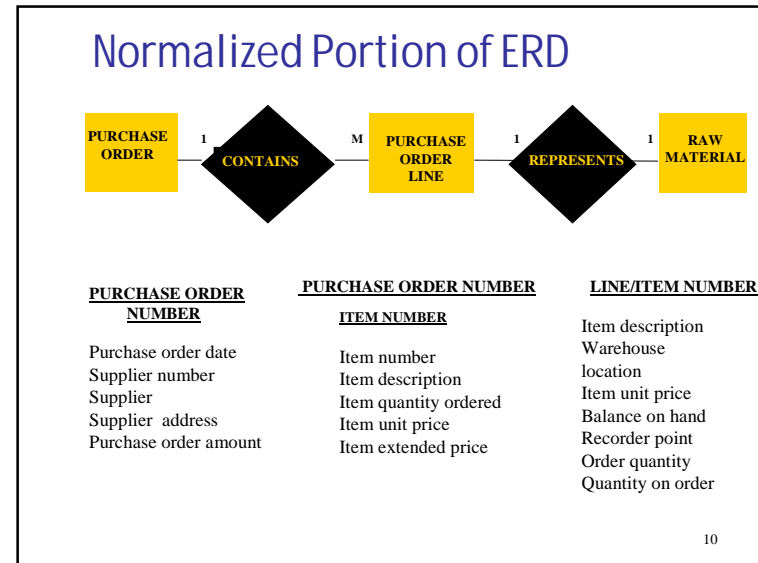
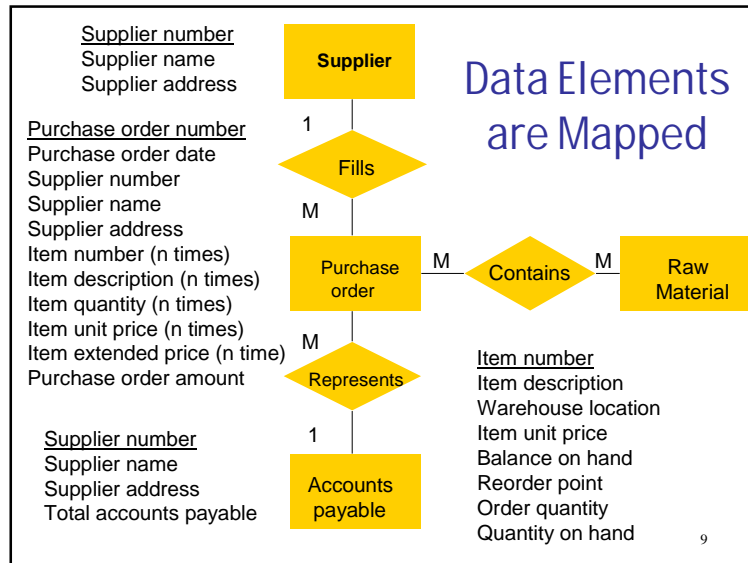
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Normalization

- **First normal form (1NF)**
 - Eliminate repeating elements in an entity
- **Second normal form (2NF)**
 - Ensure that descriptor attributes rely on the entire composite key for the assignment of values
- **Third normal form (3NF)**
 - Ensure that an attribute value cannot be determined by values of other attributes

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Data Dictionary

- **Written description of the data contained in the database**
- **First ones maintained in hardcopy form**
- **Most are now maintained on a computer using CASE tools**

Data Flow Dictionary Entry

Data flow name: Sales Order

Description: The documents that are filled out by customers to identify the products, and the quantities of each, that they will wish to purchase.

From: 1. Open mail

To: 2. Enter sales order
 information

Data structures: Sales order record

Comments:

Data Store Dictionary Entry

Data store name: Sales order form

Description: The history file of sales order forms, after the data has been entered into the sales commission system.

Data structures: Sales order record

Volume: Approximately 140 per day

Activity:

Access: Order department personnel

Comments:

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Data Structure Dictionary Entry

Structure name: Sales order record

Description: The sales order form that the customer uses to order merchandise.

Date elements: Customer.Number
Customer.Order.Number
Salesperson.Number
Customer.Order.Date
*Item.Number
*Item.Description
*Item.Quantity
*Item.Unit.Price
*Item.Extended.Price

Comments: Elements marked with asterisks occur for each item record

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Data Element Dictionary Entry

Data element name: Salesperson.Number

Description: The number that identifies the salesperson

Type: Numeric

Length: 4

No. decimal pos.

Aliases: Salesman number, Sales rep number

Range of values: 0001-9999

Typical value:

Specific values:

Other editing details:

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Summary

- During early years of computing, emphasis was on the processes performed.
- Currently, emphasis is on data
- ERDs are a primary tool in data analysis
- Data dictionaries provide a means of documenting data

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