

Information engineering

NORMALISATION & DETERMINACY
DIAGRAMS

Enterprise Rules

- ❑ These are the underlying rules which govern the organisation's data. They provide a reliable means of eliminating redundant data.
- ❑ An enterprise rule is assumed to be obeyed by a single snapshot of data, but not necessarily by a series of time interval snapshots, e.g.
- ❑ At any given time, a part# value has exactly one associated part-desc value, but the part-desc value could be changed between snapshots.

Examples of Enterprise Rules

1. A given part# value has exactly one associated part-desc.
2. A given part-desc value may be associated with many part# values.
3. A given supplier# value may be associated with many part# values.
4. A given part# value may be associated with many supplier# values.

Repeating Groups

Consider the following table:

Table: Supplier-Part

<u>Supplier#</u>	<u>Supplier-name</u>	<u>Part#</u>
S5	Wells	P1
S2	Heath	P1, P4
S7	Barron	P6
S9	Edwards	P8,P2, P6

Here Row 2: supplier# S2 and row 4: supplier# S9 contain repeating groups. A repeating group is in fact one table type embedded within another.

Disadvantages of Repeating Groups

1. Table is asymmetrical (within a given row, a given supplier# can be associated with a list of part#'s, but a given part# cannot be associated with a list of supplier#'s).
2. Rows may be sorted on supplier# or supplier-name, but not part#.
3. Variable length rows.
4. Fixed length attribute types would require padding.
5. Definition of upper limit on part# value?

Normalisation

NORMALISATION - The elimination of repeating groups.

Possible methods:

1. Creating a row for each occurrence of the repeating group.
2. Splitting the table, the repeating group into a new table.

The latter method is more useful for further normalisation.

Normalisation

Elimination of repeating group by creating new rows:

Table: Supplier-Part

<u>Supplier#</u>	<u>Supplier-name</u>	<u>Part#</u>
S5	Wells	P1
S2	Heath	P1
S2	Heath	P4
S7	Barron	P6
S9	Edwards	P8
S9	Edwards	P2
S9	Edwards	P6

Normalisation

Elimination of repeating group by table splitting:

Table: Supplier

<u>Supplier#</u>	<u>Supplier-Name</u>
S5	Wells
S2	Heath
S7	Barron
S9	Edwards

Normalisation

Table: Supp-Part

<u>Supplier#</u>	<u>Part#</u>
S5	P1 Note: Supplier# provides the link
S2	P1
S2	P4
S7	P6
S9	P8
S9	P2
S9	P6

Determinants

Consider the table occurrence Stock:

Table: Stock	<u>Stock</u>	<u>Description</u>
	P4	Nut
	P2	Pin
	P7	Nut
	P1	Bolt
	P5	Bolt

Enterprise Rule: A given Stock# has exactly one associated description (a given description as one or more Stock No's associated with it).

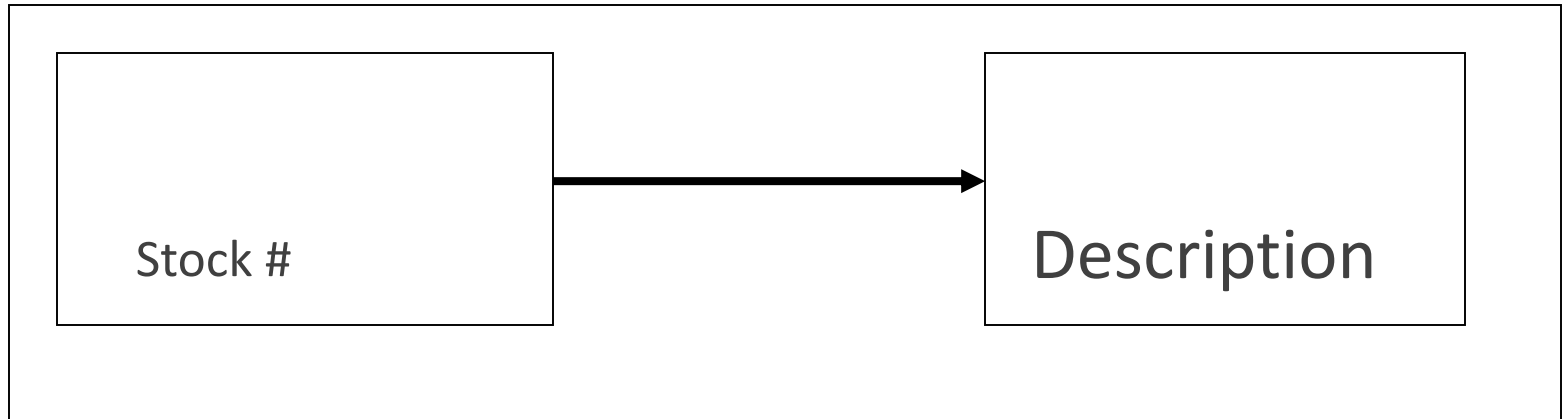
Stock# is a determinant of Description, i.e.

Stock# determines description, and

Description is determined by/dependent on Stock#

determinacy Diagrams

These can be used to show determinants and the attributes they determine. Thus, for the previous example the determinacy diagram is:



The arrow shows the dependency. The direction of the arrow head shows which attribute is the determinant.

Determinacy Diagrams

Consider the following Enterprise Rules:

1. A given Consultant# has exactly one associated Project#.
2. A given Project# has exactly one associated Consultant#.
3. The resultant determinacy diagram is:



Examples of Determinacy Diagrams



Part# is the determinant of Part_Description and Qty_in_Stock.

Each Part# is associated with only one Part_Description and one Qty_in_Stock.

A given Qty_in_Stock may be associated with many Part# values.

Examples of determinacy Diagrams

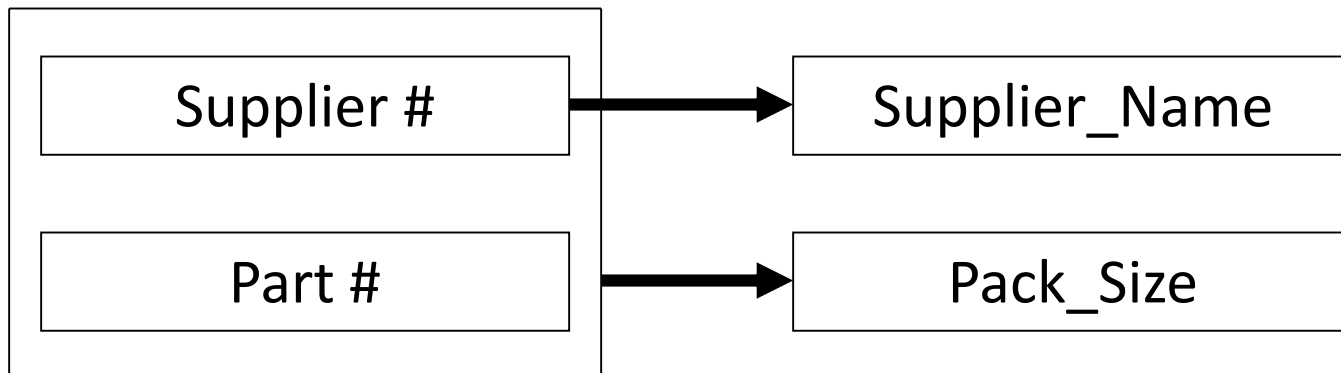
A given Part_Description value may be associated with many Part# values.

Table: Supplier_Part

<u>Supplier#</u>	<u>Supplier Name</u>	<u>Part#</u>	<u>Pack Size</u>
S2	Jones	P1	10
S7	Smith	P6	25
S2	Jones	P4	40
S5	Jones	P1	20

Rules

1. Supplier identified by supplier#.
2. Part identified by Part#.
3. A Supplier has one Supplier_Name.
4. A Supplier may supply many parts in many Pack_Sizes.
5. A Part may be supplied by different suppliers in different Pack_Sizes.
6. A Supplier supplies a given part in just one Pack_Size.



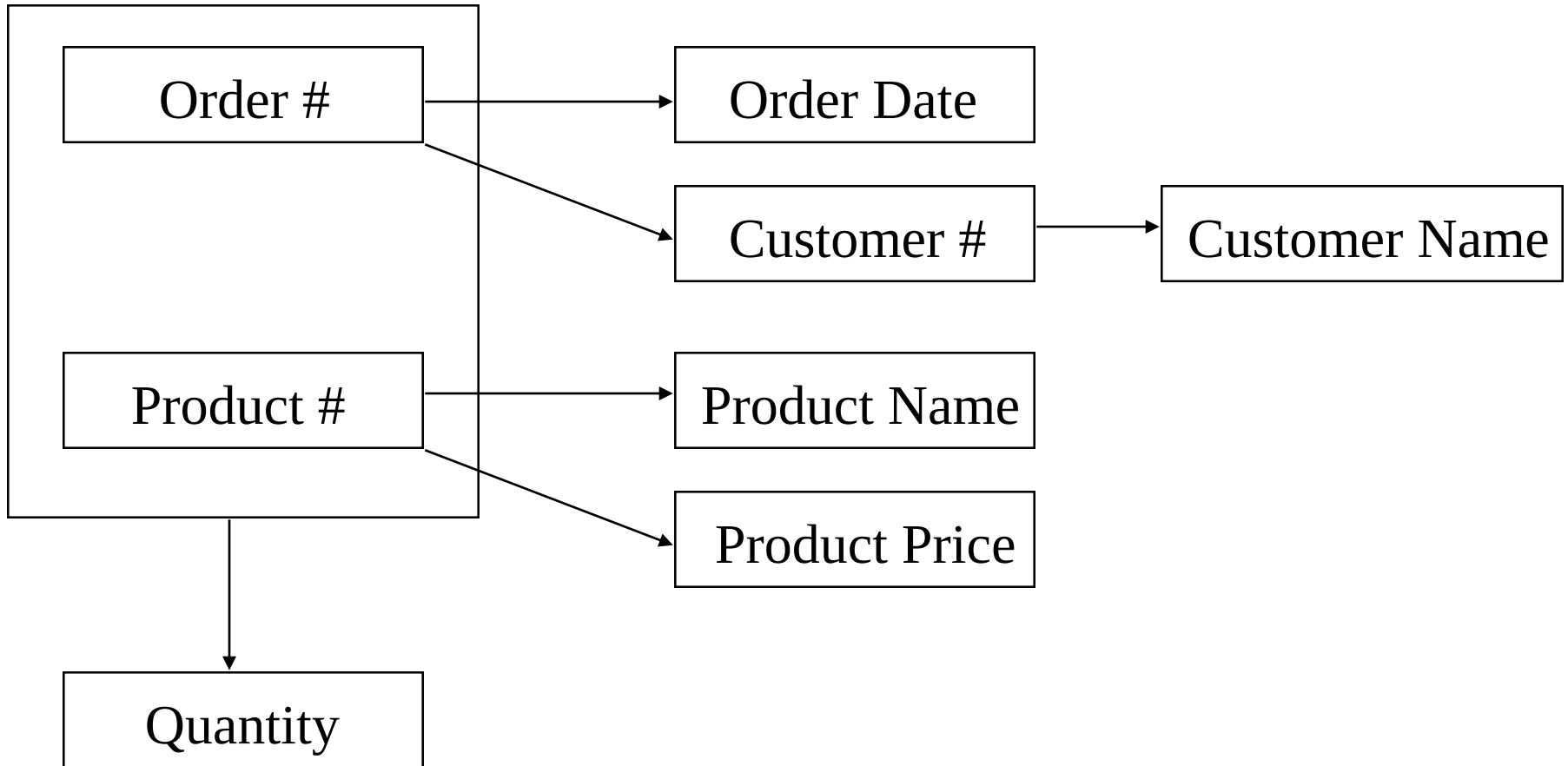
Exercise 1

Table: Order Processing

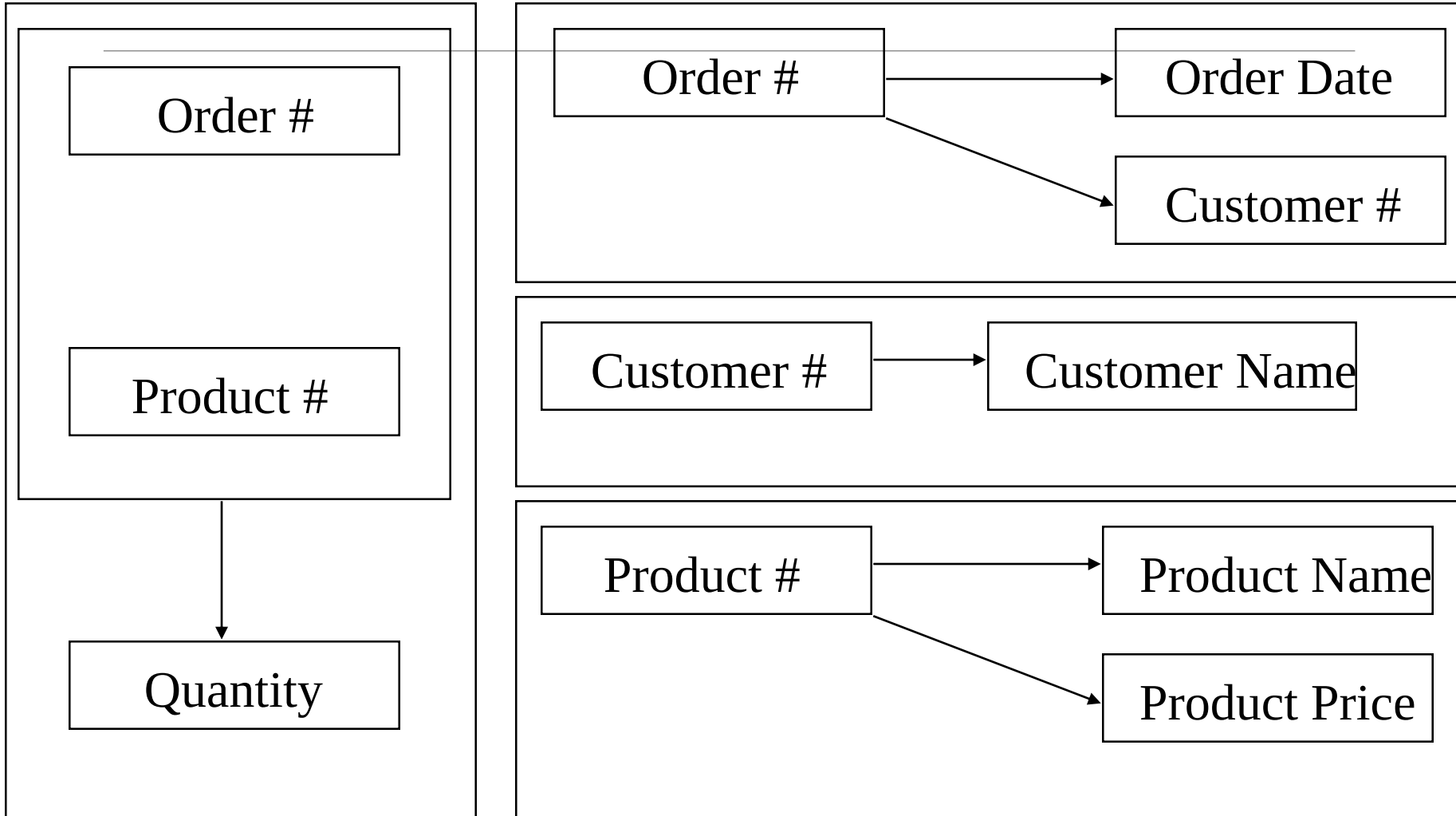
Order#	Order Date	Cust #	Cust Name	Prod#	Prod Name	Qty	Prod Price
1234	01/02/96	2235	Jenkins	4875	Widget	200	1.00
1385	08/02/96	3444	Jones	2890	Woggle	300	2.00
1567	15/03/96	3444	Jones	4875	Widget	1000	1.00
1789	21/04/96	2890	Jones	3332	Wangle	150	0.50
2045	23/04/96	2235	Jenkins	3332	Wangle	40	0.50
2344	02/03/96	2235	Jenkins	4875	Widget	400	1.00
1385	08/02/96	34444	Jones	4875	Widget	300	1.00

1. Produce a determinacy diagram for the above data.
2. From your diagram construct the resultant tables.

Initial Diagram



Individual Diagrams



Construct Tables

Table: Order

- Order (Order #, Order Date, Customer #)

Table: Customer

- Customer (Customer #, Customer Name)

Table: Product

- Product (Product #, Product Name, Product Price)

Table Order Line

- Order Line (Order #, Product #, Quantity)