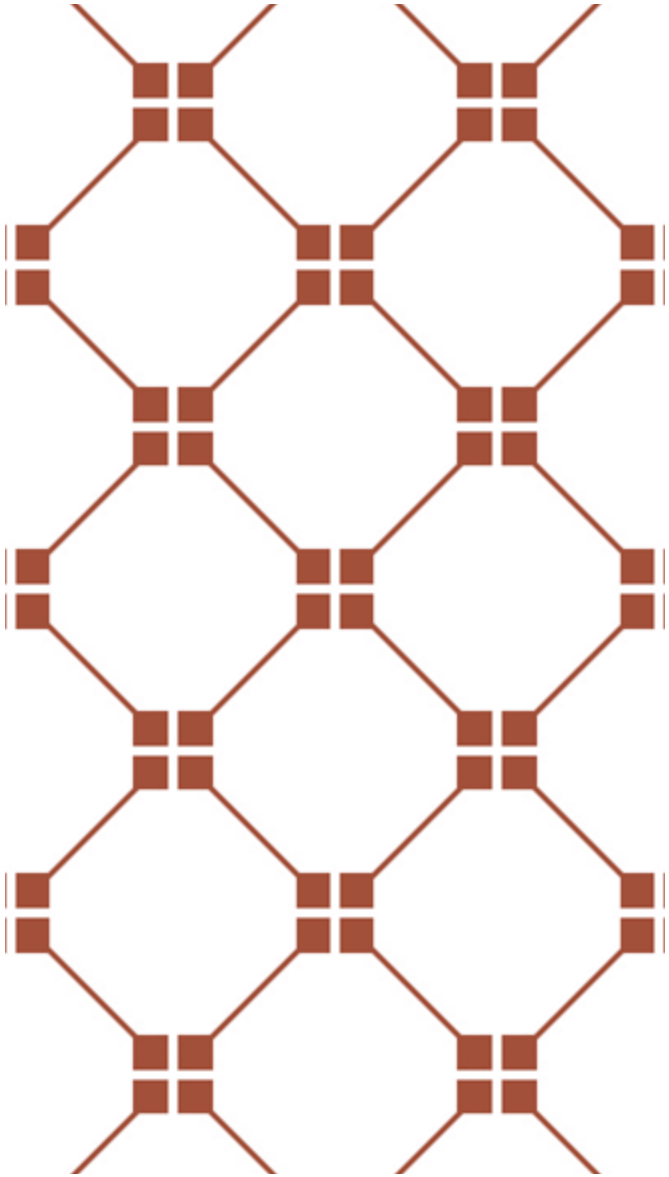


MANCHESTER 1824
The University of Manchester

RELATIONAL MODEL (PART 2)

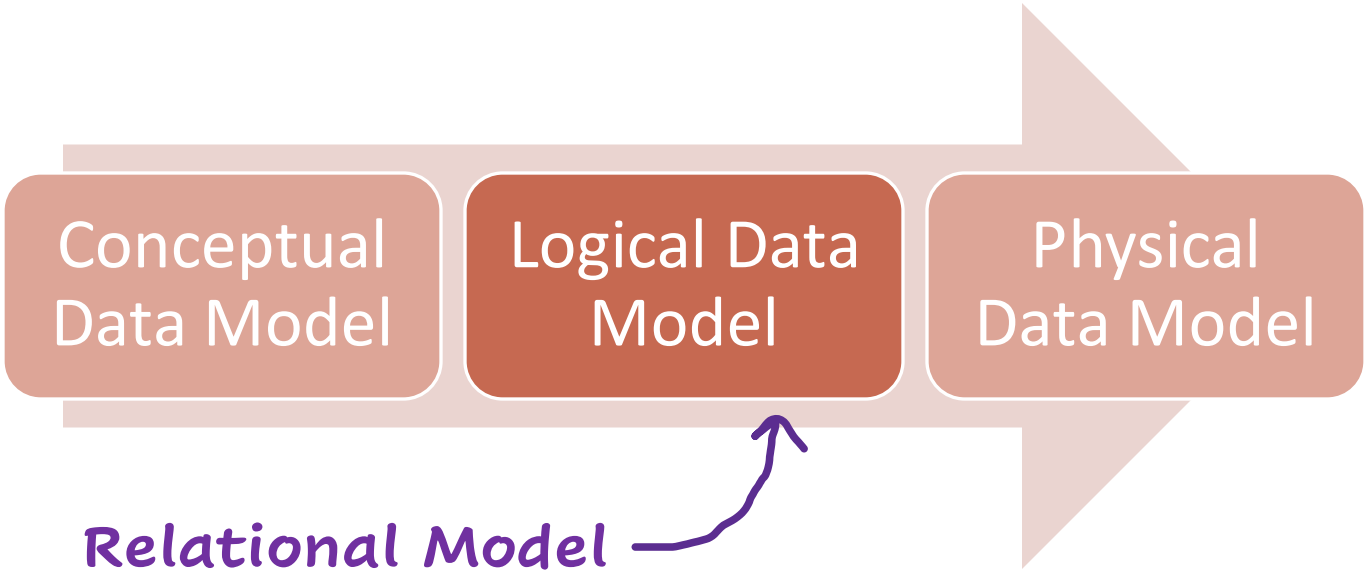
COMP23111 – Database Systems

OUTLINE

Relational Model

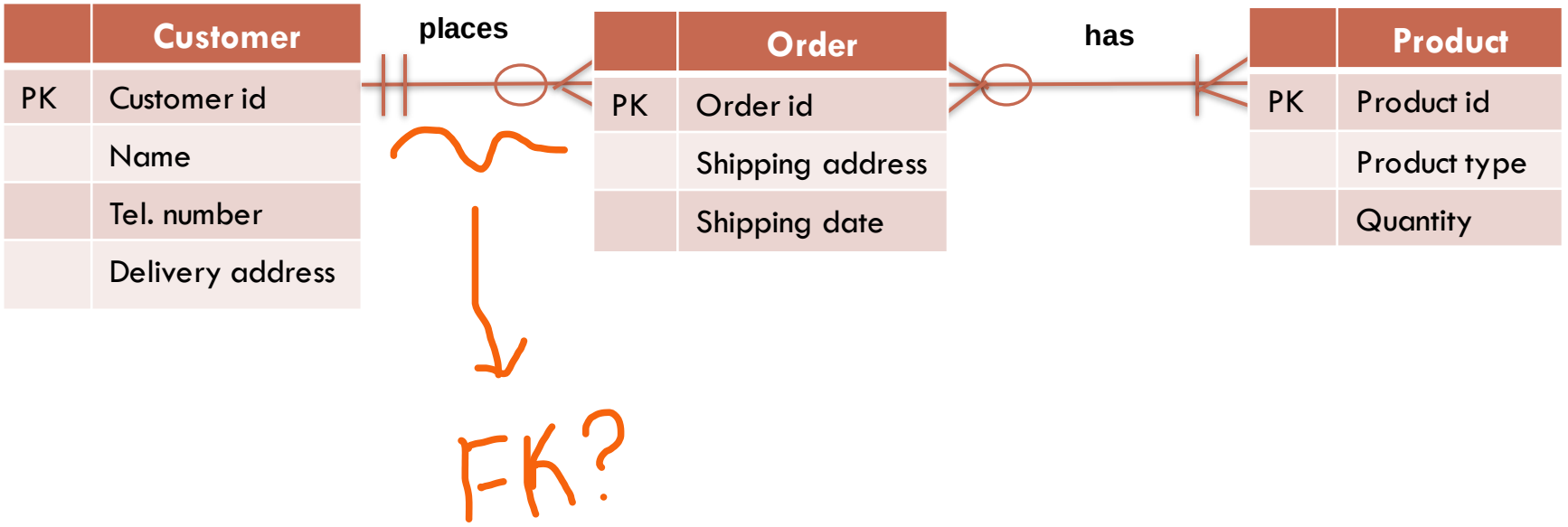
Logical Data Model (via ER Diagram)

DATABASE APPLICATION DESIGN PHASES - *DATA MODELLING*



- Entity-Relationship Diagram (ERD)

LOGICAL DATA MODEL
– *FK ADDITION?*



RELATIONAL MODEL – FOREIGN KEY

1. For each row of the FK in parent, value must be the same in child.
2. Careful when deleting or updating tables.

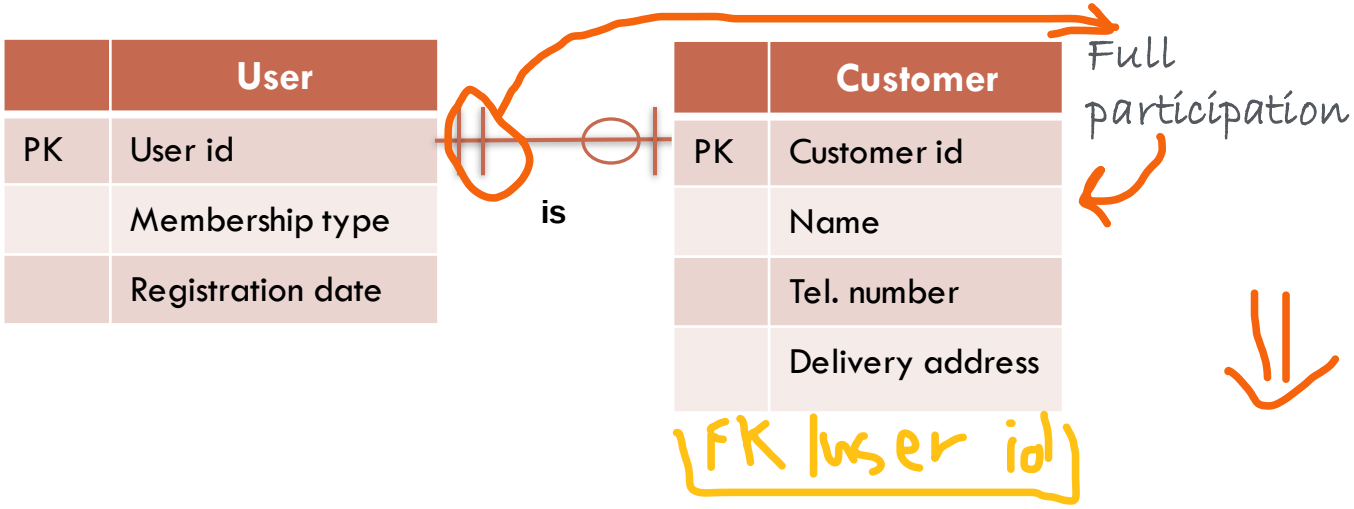
Customer Table

Customer_ID	Name	Tel. number	Delivery address
2812	Mary Smiths	7786554389	21 Lever St., M1 3PL
9322	John Caroll	7877346312	21 Lever St., M1 3PL
2324	Anna		
7890	Pablo		
1122	Mary		
3167	Maria		

Order Table

Order_ID	Customer_ID	Shipping address	Shipping Date
2675124	2812	21 Lever St., M1 3PL	17/2/2022
8897651	9322	48 Oxford Rd., WL2 5ZY	28/4/2022
8907871	2324	122 Radford Blvd, NG7 3BL	30/4/2022
5536728	2812	21 Lever St., M1 3PL	12/3/2022
2422315	1122	86 Radcliffe Av., OX8 4MK	12/2/2022
1478659	3167	32 Strefford Rd., SL1 2BL	22/3/2022

RELATIONAL MODEL
– *RELATIONSHIPS (1-TO-1) & FK*



User

User_id	Membership type	Registration date

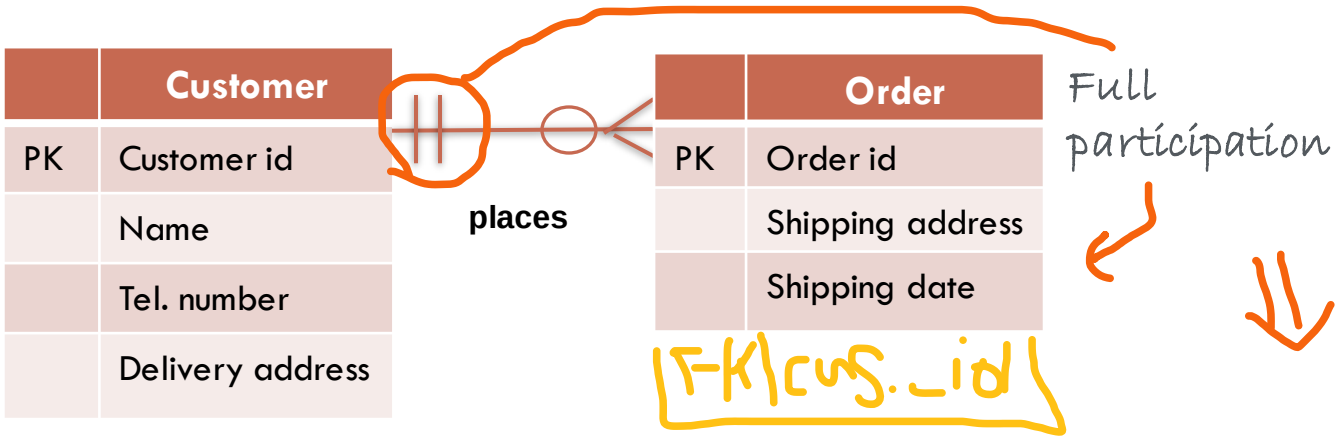
Customer

FK

Customer_id	Name	Tel. number	Delivery address	User_id

user_id will always exist and FKs cannot be null.

RELATIONAL MODEL
– RELATIONSHIPS (1-TO-MANY) & FK



Customer

Customer_id	Name	Tel. number	Delivery address

Order

FK

Order_id	Shipping address	Shipping date	Customer_id

RELATIONAL MODEL
– *RELATIONSHIPS (MANY-TO-MANY) & FK*

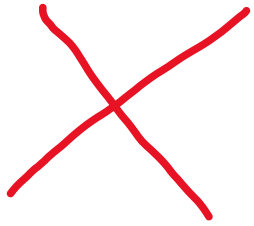
	Order
PK	Order id
	Shipping address
	Shipping date
FK	Customer id

	Product
PK	Product id
	Product type
	Quantity
FK	Order id

Order

FK

Order_id	Shipping address	Shipping date	Product_id



Product

FK

Product_id	Product type	Quantity	Order_id

RELATIONAL MODEL
– *RELATIONSHIPS (MANY-TO-MANY) & FK*

Order Table

Order_ID	Customer_ID	Shipping address	Shipping Date	Product_ID
2675124	2812	21 Lever St., M1 3PL	17/2/2022	1, 2, 3
8897651	9322	48 Oxford Rd., WL2 5ZY	28/4/2022	2, 3
8907871	2324	122 Radford Blvd, NG7 3BL	30/4/2022	1, 3

Product Table

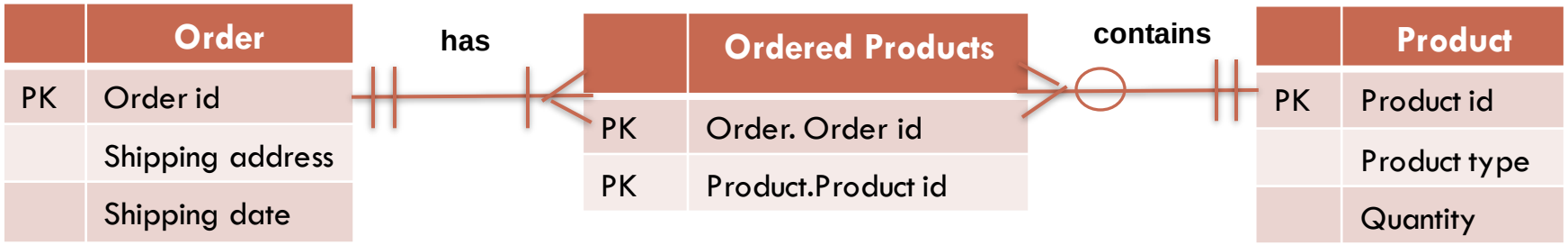
Product_ID	Product Type	Quantity	Order_ID
1	Pillow	10	2675124, 5536728
2	Lamp	3	2675124, 8907871
3	Hat	2	2675124

Atomicity is violated – we can't store **multiple** values in a **single** attribute.

RELATIONAL MODEL
– *RELATIONSHIPS (MANY-TO-MANY) & FK*

We can add a "bridge" (joining/intersection/junction) entity in our logical model.

- *Will hold the PKs of each table in the many-to-many relationship.*



RELATIONAL MODEL
– *RELATIONSHIPS (MANY-TO-MANY) & FK*

All many-to-many relationships should be resolved at this point.

Order Table

Order_ID	Customer_ID	Shipping address	Shipping Date	Product_ID
2675124	2812	21 Lever St., M1 3PL	17/2/2022	1, 2, 3
8897651	9322	48 Oxford Rd., WL2 5ZY	28/4/2022	2, 3
8907871	2324	122 Radford Blvd, NG7 3BL	30/4/2022	1, 3

Product Table

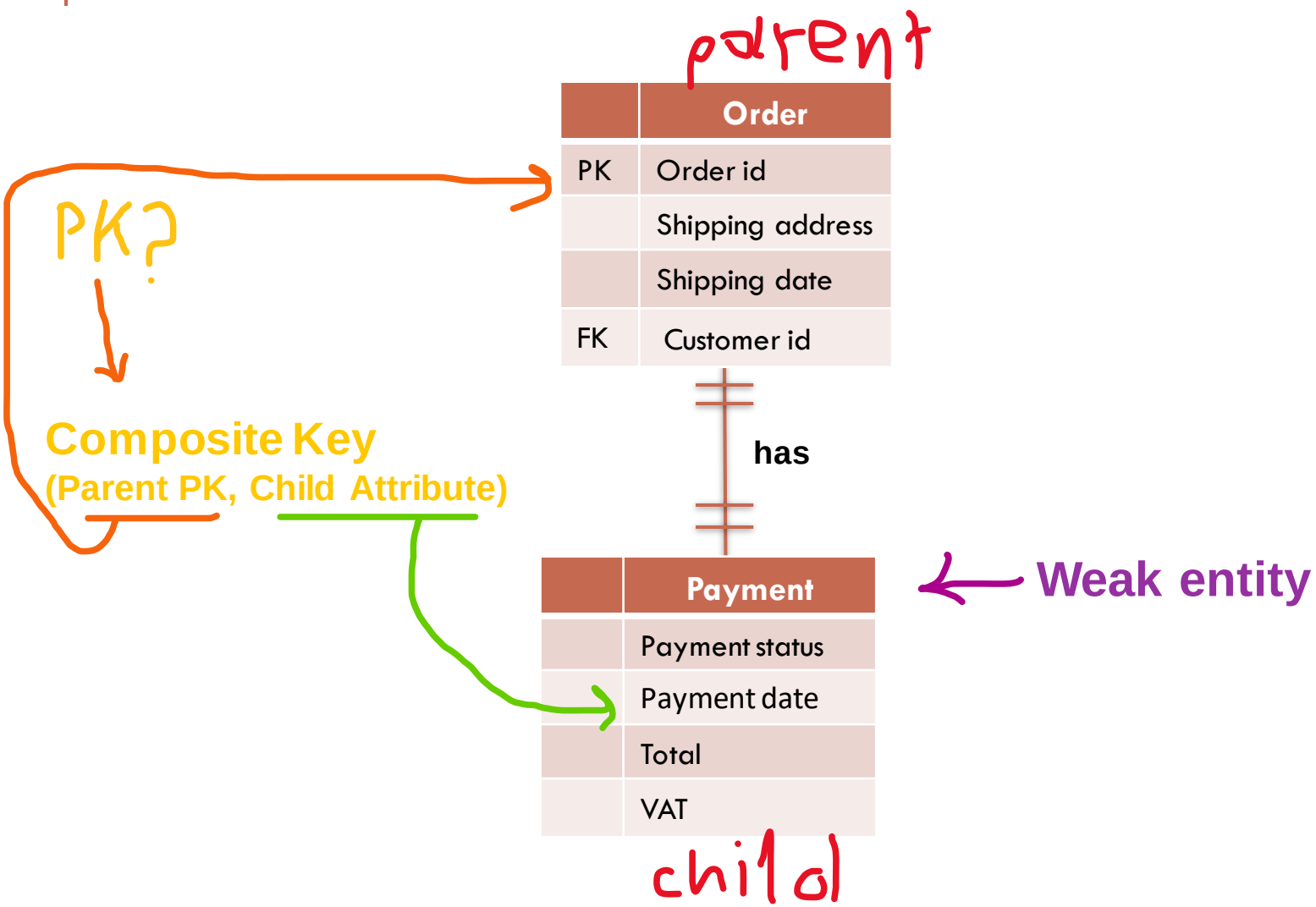
Product_ID	Product Type	Quantity	Order_ID
1	Pillow	10	2675124, 5536728
2	Lamp	3	2675124, 8907871
3	Hat	2	2675124

Ordered Products

Order_ID	Product_ID
2675124	1
2675124	2
2675124	3

In our database, the joining table with composite (order_id, product_id) PK.

RELATIONAL MODEL
– *WEAK ENTITY RELATIONSHIP*



LOGICAL (RELATIONAL) DATA MODEL