

COS20031

Database Design Project

Irene Moser

Semester One, 2025

Week 4



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Acknowledgement of Country

We respectfully acknowledge the Wurundjeri People of the Kulin Nation, who are the Traditional Owners of the land on which Swinburne's Australian campuses are located in Melbourne's east and outer-east, and pay our respect to their Elders past, present and emerging.

We are honoured to recognise our connection to Wurundjeri Country, history, culture, and spirituality through these locations, and strive to ensure that we operate in a manner that respects and honours the Elders and Ancestors of these lands.

We also respectfully acknowledge Swinburne's Aboriginal and Torres Strait Islander staff, students, alumni, partners and visitors.

We also acknowledge and respect the Traditional Owners of lands across Australia, their Elders, Ancestors, cultures, and heritage, and recognise the continuing sovereignties of all Aboriginal and Torres Strait Islander Nations.

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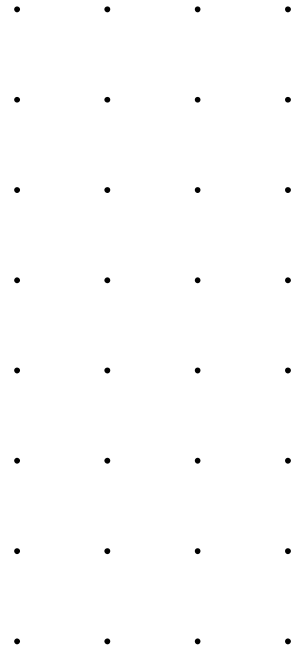
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Week 4 Live Online

Topics

1. Week 3 Retrospect
2. Week 4 Outlook
3. Check-in survey
4. Questions about Project
5. Presentation about Topic



Week 3 Retrospect

What you have achieved

- Gained an understanding of the usefulness and principles of relational data storage
- Found a way to draw ER diagrams

Assessment

- These items are part of your Project Proposal due Week 4 (30 March)



Week 4 Outlook

What you will achieve

Requirements

- Project Brief, Archery Scoring Details
- Stakeholders, requirements

Data modelling

- First diagram of your project database

Assessment

- These items are part of your Project Proposal due Week 4 (due 30 March) (20%)
- Tutorial is assessable as an individual assessment (due 6 April) (10%)



Week 4 Tutorial

Individual assessment 1, worth 10%

4 Steps to creating a database

- Write a mission statement and objectives for this scenario
- Identify the stakeholders in this scenario.
- Discuss and decide on the requirements of each actor and the potential business rules/constraints.
- Identify the tables and associated fields based on your analysis.

Scenario

- Vinyl records



Check-in Survey

How is the unit going so far?

3 Tick-box Items

- I am satisfied with this unit so far. (1 – 10)
- I am actively engaged in my learning in this unit. (1 – 10)
- I am confident that I can successfully manage the academic requirements of this unit. (1 – 10)

2 Free-text items

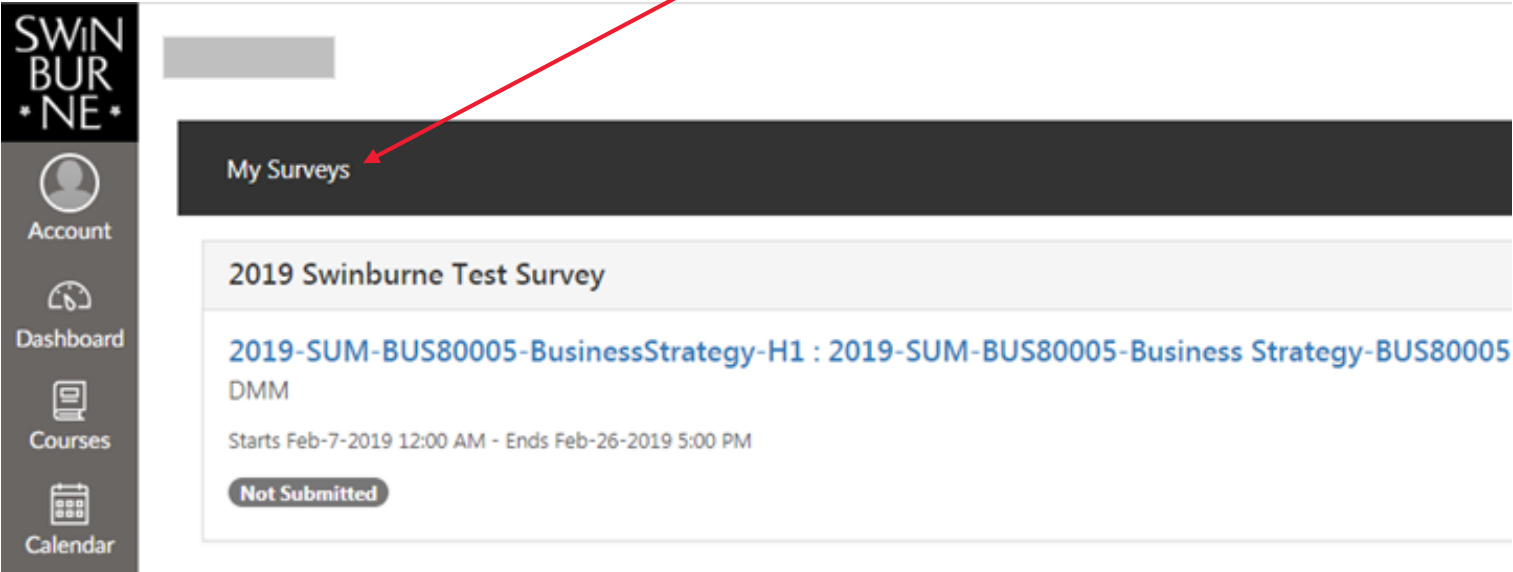
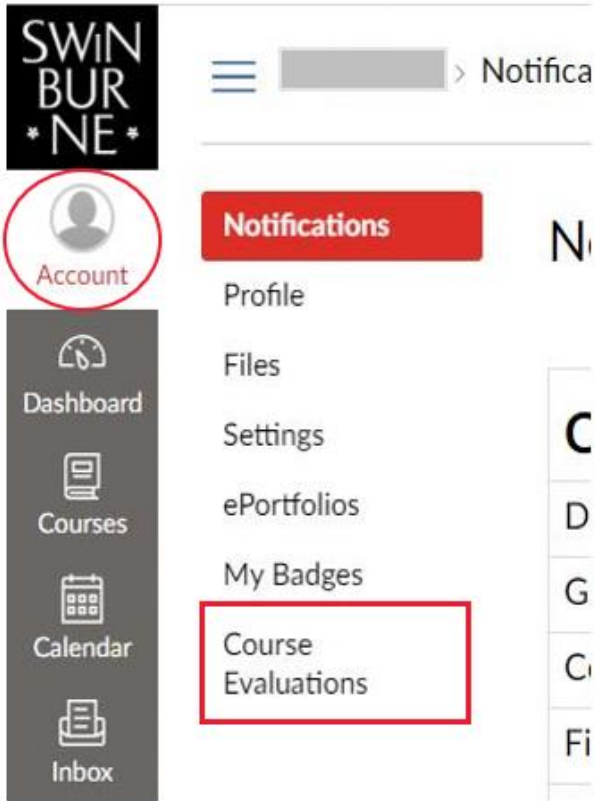
- What do you like most about this unit?
- What is the one thing that Swinburne could do to improve this unit?



Canvas access to the survey

- 1. Log in to Canvas
- 2. Click the **Account** tab
- 3. Select the **Notifications** tab
- 4. Then select **Course Evaluations**

On this dashboard, you will see all your current surveys and their status



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Questions about the project



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Introduction to Relational Database Design



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Illustrative Example

ORDERS

John Lee ordered 5 tablets on 13 January. They cost \$119 each and were delivered on 5 February.

Peter Brown ordered 10 PCs on 20 January. They cost \$450 each and were delivered on 27 January.

Stephen Nguyen ordered 5 printers on 1 February. They cost \$250 each and were delivered on 7 February.

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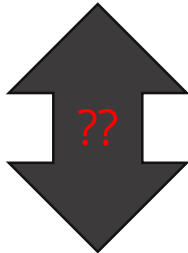
How many
laptops did we
sell??

Who bought
what kind of
equipment??

How to link the information?

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Order									
order_id	firstname	lastname	order_date	product	quantity	unit	price	currency	delivered
o1234	John	Lee	13/01/2025	Tablet	5	unit	119	AUD	05/02/2025
o1235	Peter	Brown	20/01/2025	PC	10	unit	450	AUD	27/01/2025



Cardinality?

Customer				
cust_id	firstname	lastname	address	suburb
c1234	John	Lee	22 Boundary Lane	Camberwell
c1235	Amber	Lockley	7 James St	Truganina
c1236	Peter	Brown	5 Through St	Reservoir

How to check cardinality

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Order									
order_id	firstname	lastname	order_date	product	quantity	unit	price	currency	delivered
o1234	John	Lee	13/01/2025	Tablet	5	unit	119	AUD	05/02/2025
o1235	Peter	Brown	20/01/2025	PC	10	unit	450	AUD	27/01/2025

For **each** order, how many customers? \longrightarrow min 1...max 1

Customer				
cust_id	firstname	lastname	address	suburb
c1234	John	Lee	22 Boundary Lane	Camberwell
c1235	Amber	Lockley	7 James St	Truganina
c1236	Peter	Brown	5 Through St	Reservoir

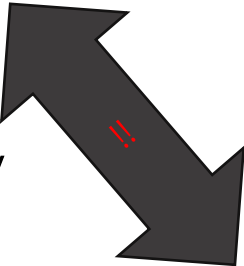
For **each** customer, how many orders? \longrightarrow min 0 (or 1)...max n

Cardinality and Foreign Key

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Order										
order_id	<u>cust_id</u>	firstname	lastname	order_date	product	quantity	unit	price	currency	delivered
o1234	c1234	John	Lee	13/01/2025	Tablet	5	unit	119	AUD	05/02/2025
o1235	c1236	Peter	Brown	20/01/2025	PC	10	unit	450	AUD	27/01/2025

Duplication = redundancy



0...n

1...1

Customer				
<u>cust_id</u>	firstname	lastname	address	suburb
c1234	John	Lee	22 Boundary Lane	Camberwell
c1235	Amber	Lockley	7 James St	Truganina
c1236	Peter	Brown	5 Through St	Reservoir

Remove Duplication

Order								
order_id	<u>cust_id</u>	order_date	product	quantity	unit	price	currency	delivered
o1234	c1234	13/01/2025	Tablet	5	unit	119	AUD	05/02/2025
o1235	c1236	20/01/2025	PC	10	unit	450	AUD	27/01/2025

0...n

1...1

Customer				
<u>cust_id</u>	firstname	lastname	address	suburb
c1234	John	Lee	22 Boundary Lane	Camberwell
c1235	Amber	Lockley	7 James St	Truganina
c1236	Peter	Brown	5 Through St	Reservoir

What is a Foreign Key?

- › To keep a connection between two tables (relations)...
 - we have to put the **primary key columns** of one table **into the other table** as a foreign key.
- › The foreign key goes **only into one** of the two tables.
 - Which one does it go in?
- › To find out, we have to look at cardinalities (degrees) of relationships.
 - One-to-one
 - One-to-many

But NOT
Many-to-
Many!



Uniqueness Exception: Foreign Keys

Order

<u>Order_id</u>	Given_name	Family_name	Product	Quantity	Delivered
P20034249	John	Lee	Tablet	5	05/02/2025



Invoice

<u>Order_id</u>	Total	Due
P20034249	5545.15	05/03/2025

Modelling question: unique or not?
Cardinality?

Uniqueness Exception: Composite Foreign Keys

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Order

Given_name	Family_name	Product	Quantity	Delivered
John	Lee	Tablet	5	05/02/2025

Invoice

Given_name	Family_name	Product	Quantity	Total	Due
John	Lee	Tablet	5	5545.15	05/03/2025

Data Table to ER Notation



Order								
<u>order_id</u>	<u>cust_id</u>	order_date	product	quantity	unit	price	currency	delivered
1234	1234	13/01/2025	Tablet	5	unit	119	AUD	05/02/2025

0...n
1...1

Customer				
<u>cust_id</u>	firstname	lastname	address	suburb
1234	John	Lee	22 Boundary Lane	Camberwell



ER Notation and Composite Keys

Customer

Given_name	Family_name	Phone_no
John	Lee	0405 999 555

Order

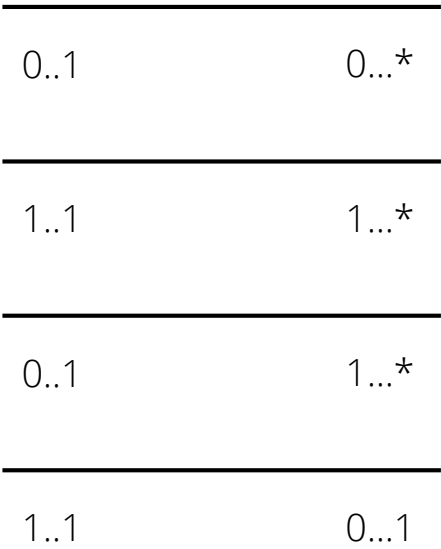
Given_name	Family_name	Product	Quantity	Delivered
John	Lee	tablet	5	05/02/2023
John	Lee	PC	10	10/06/2023



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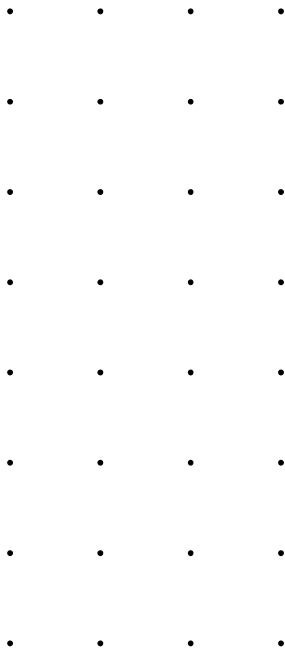
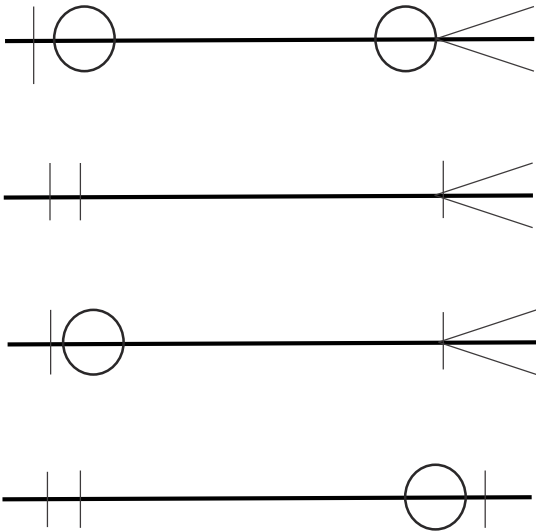
ER Notation and Composite Keys

Chen's notation



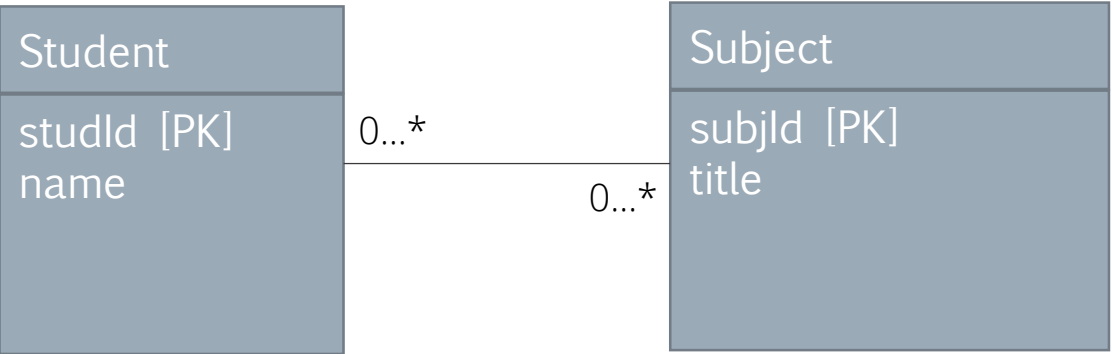
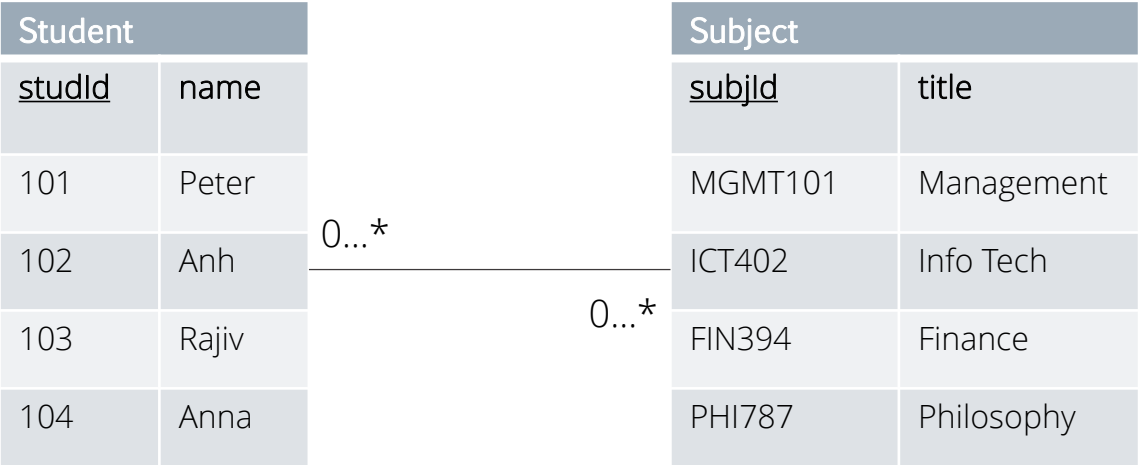
one to many
one to many
one to many
one to one

Crow's feet notation



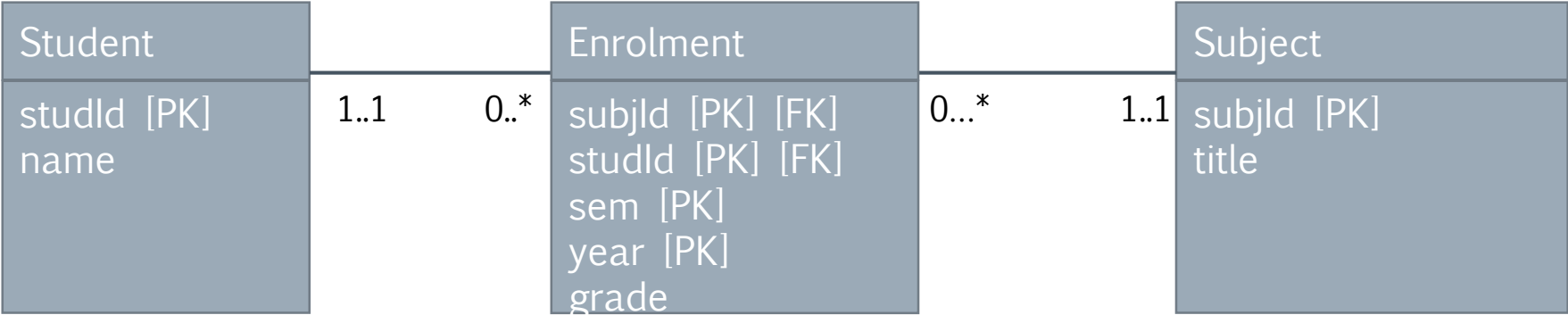
New Scenario - Student Enrolments

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Adding a Weak Entity

Student		Enrolment					Subject	
<u>studId</u>	name	<u>studId</u>	<u>subjId</u>	<u>sem</u>	<u>year</u>	grade	<u>subjId</u>	title
101	Peter	101	MGMT101	1	2024	85HD	MGMT101	Management
102	Anh	101	ICT402	2	2024	77D	ICT402	Info Tech
103	Rajiv	103	ICT402	1	2023	60C	FIN394	Finance
104	Anna	104	PHI787	2	2024	65C	PHI787	Philosophy



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Have an interesting and
productive week.



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