

Database Normalisation Cheat Sheet

A cheat sheet to the database normalisation steps.

Starting Point

Our table before normalisation

subject_enrolment

student_name	student_email	subject_name	lecturer_name	lecturer_office	semester	classroom	enrolment_date
John Smith	jsmith@abcuniversity.com	Introduction to Algorithms, Introduction to HTML	Mr Dwayne Gleeson, Mrs Joan Field	105, 110	2025-01	B10, B15	2024-09-01, 2024-09-01
Sarah Jones	sjones@abcuniversity.com	Introduction to HTML	Mrs Joan Field	110	2025-01	B15	2024-09-23
Michael Brown	mbrown@abcuniversity.com	Advanced HTML, Introduction to CSS	Mrs Joan Field, Mr Chris Smith	110, 108	2025-01, 2025-02	B8, B12	2024-10-04, 2024-11-05
John Smith	jsmith@abcuniversity.com	Advanced HTML	Mrs Joan Field	110	2025-02	B10	2025-03-14

subject_enrolment

student_name	varchar
student_email	varchar
subject_name	varchar
lecturer_name	varchar
lecturer_office	varchar
semester	int
classroom	varchar
enrolment_date	date

First Normal Form

No mixed data or repeating data, tables have primary keys

subject_enrolment

id	student_name	student_email	subject_name	lecturer_name	lecturer_office	semester	classroom	enrolment_date
1	John Smith	jsmith@abcuniversity.com	Introduction to Algorithms	Mr Dwayne Gleeson	105	2025-01	B10	2024-09-01
2	John Smith	jsmith@abcuniversity.com	Introduction to HTML	Mrs Joan Field	110	2025-01	B15	2024-09-01
3	Sarah Jones	sjones@abcuniversity.com	Introduction to HTML	Mrs Joan Field	110	2025-01	B15	2024-09-23
4	Michael Brown	mbrown@abcuniversity.com	Advanced HTML	Mrs Joan Field	110	2025-01	B8	2024-10-04
5	Michael Brown	mbrown@abcuniversity.com	Introduction to CSS	Mr Chris Smith	108	2025-02	B12	2024-11-05
6	John Smith	jsmith@abcuniversity.com	Advanced HTML	Mrs Joan Field	110	2025-02	B10	2025-03-14

subject_enrolment

id 🔗	int
student_name	varchar
student_email	varchar
subject_name	varchar
lecturer_name	varchar
lecturer_office	varchar
semester	varchar
classroom	varchar
enrolment_date	date

Second Normal Form

Every non-key value must depend on the primary key

subject_enrolment

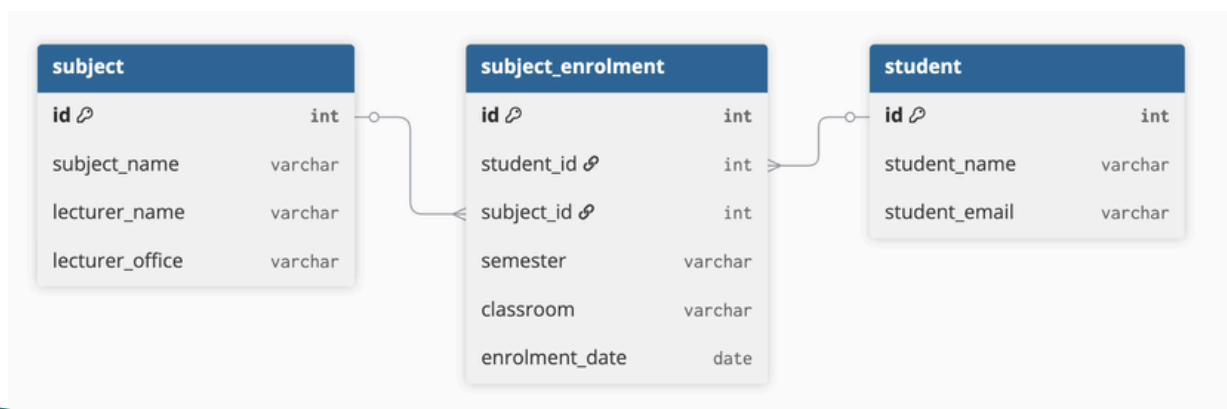
id	student_id	subject_id	semester	classroom	enrolment_date
1	1	1	2025-01	B10	2024-09-01
2	1	2	2025-01	B15	2024-09-01
3	2	2	2025-01	B15	2024-09-23
4	3	3	2025-01	B8	2024-10-04
5	3	4	2025-02	B12	2024-11-05
6	1	3	2025-02	B10	2025-03-14

subject

id	subject_name	lecturer_name	lecturer_office
1	Introduction to Algorithms	Mr Dwayne Gleeson	105
2	Introduction to HTML	Mrs Joan Field	110
3	Advanced HTML	Mrs Joan Field	110
4	Introduction to CSS	Mr Chris Smith	108

student

id	student_name	student_email
1	John Smith	jsmith@abcuniversity.com
2	Sarah Jones	sjones@abcuniversity.com
3	Michael Brown	mbrown@abcuniversity.com



Third Normal Form

No transitive dependencies

subject_enrolment

id	student_id	subject_id	semester	classroom_id	enrolment_date
1	1	1	2025-01	2	2024-09-01
2	1	2	2025-01	4	2024-09-01
3	2	2	2025-01	4	2024-09-23
4	3	3	2025-01	1	2024-10-04
5	3	4	2025-02	3	2024-11-05
6	1	3	2025-02	2	2025-03-14

lecturer

id	lecturer_name	lecturer_office
1	Mr Dwayne Gleeson	105
2	Mrs Joan Field	110
3	Mr Chris Smith	108

subject

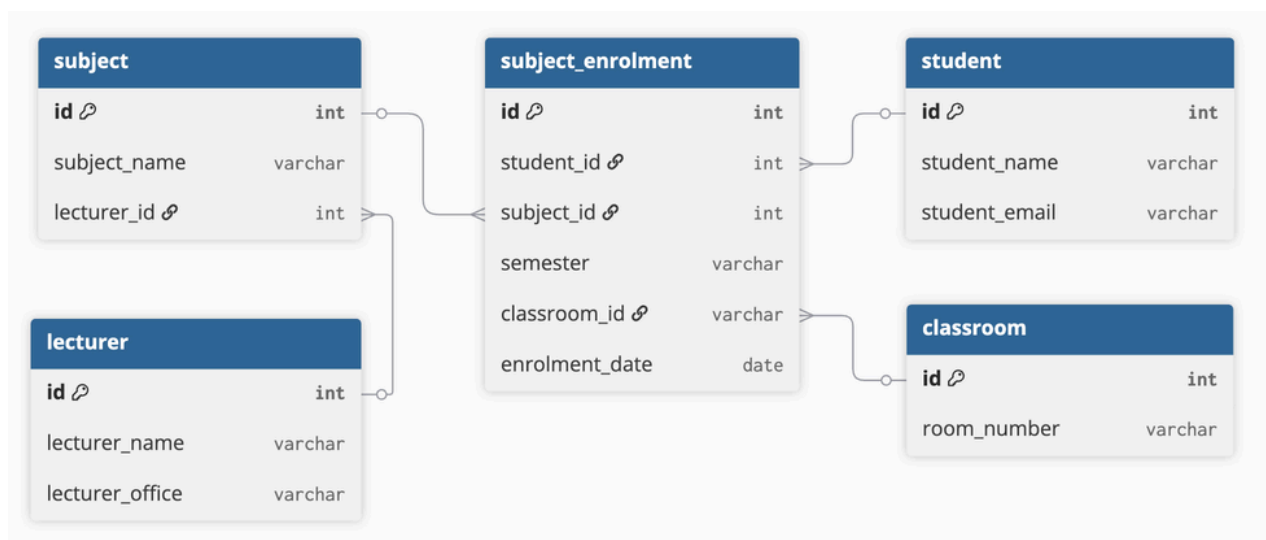
id	subject_name	lecturer_id
1	Introduction to Algorithms	1
2	Introduction to HTML	2
3	Advanced HTML	2
4	Introduction to CSS	3

student

id	student_name	student_email
1	John Smith	jsmith@abcuniversity.com
2	Sarah Jones	sjones@abcuniversity.com
3	Michael Brown	mbrown@abcuniversity.com

classroom

id	room_number
1	B8
2	B10
3	B12
4	B15



Fourth Normal Form

Avoid multivalued dependencies

Before:

subject_material

subject_id	textbook_title	guest_lecturer
1	System Algorithms	Dr. White
1	System Algorithms	Prof. Green
1	Computer Science Basics	Dr. White
1	Computer Science Basics	Prof. Green

After:

subject_textbooks

subject_id	textbook_title
1	System Algorithms
1	Computer Science Basics

subject_guest_lecturer

subject_id	guest_lecturer
1	Dr. White
1	Prof. Green

Fifth Normal Form

Avoid unnecessary decompositions

Before:

lecturer_department

subject_id	textbook_title	guest_lecturer
1	Computer Science	Dr. White
1	Computer Science	Prof. Green
2	Maths	Dr. Lee

After:

department

id	department
1	Computer Science
2	Maths

lecturer_department

department_id	lecturer
1	Dr. White
1	Prof. Green
2	Dr. Lee

subject_lecturer

subject_id	lecturer
1	Dr. White
1	Prof. Green
1	Dr. Lee