Unnormalized Form (UNF)

➤ All data is together, there is no table separation, some columns contain multiple values or related information.

book_id	bookTitle	imageURL	category	description	PDFURL	admin_id	author_id
1	Intro to Java	java.jpg	Programming	A Java book	java.pdf	101	201
2	Python Basics	python.jpg	Programming	Python guide	python.pdf	101	201
3	HTML & CSS	html.jpg	Web Dev	Web design	html.pdf	102	202
4	Data Structures in C	c.jpg	Programming	DS in C	ds.pdf	103	203
5	Machine Learning Intro	ml.jpg	AI/ML	ML for beginners	ml.pdf	102	204
6	Advanced Python	advpy.jpg	Programming	Deep dive in Python	advpy.pdf	101	201
7	Responsive Web Design	rwd.jpg	Web Dev	Design for mobile	rwd.pdf	103	202

1NF (First Normal Form)

➤ Except for repeating groups/complex fields, all columns will contain only atomic values.

book_id	bookTitle	imageURL	category	description	PDFURL	admin_id	author_id
1	Intro to Java	java.jpg	Programming	A Java book	java.pdf	101	201
2	Python Basics	python.jpg	Programming	Python guide	python.pdf	101	201
3	HTML & CSS	html.jpg	Web Dev	Web design	html.pdf	102	202
4	Data Structures in C	c.jpg	Programming	DS in C	ds.pdf	103	203
5	Machine Learning Intro	ml.jpg	AI/ML	ML for beginners	ml.pdf	102	204
6	Advanced Python	advpy.jpg	Programming	Deep dive in Python	advpy.pdf	101	201
7	Responsive Web Design	rwd.jpg	Web Dev	Design for mobile	rwd.pdf	103	202

Final result: All columns now contain single (atomic) values.

2NF (Second Normal Form)

➢ 1NF + Removal of partial dependency.
➢ Separate the admin table.

Books Table

book_id	bookTitle	authorName	imageURL	category	description	PDFURL	admin_id
1	Intro to Java	John Doe	java.jpg	Programming	A Java book	java.pdf	101
2	Python Basics	John Doe	python.jpg	Programming	Python guide	python.pdf	101
3	HTML & CSS	Jane Smith	html.jpg	Web Dev	Web design	html.pdf	102
4	Data Structures in C	Mark Robinson	c.jpg	Programming	DS in C	ds.pdf	103
5	Machine Learning Intro	Emily Johnson	ml.jpg	AI/ML	ML for beginners	ml.pdf	102
6	Advanced Python	John Doe	advpy.jpg	Programming	Deep dive in Python	advpy.pdf	101
7	Responsive Web Design	Jane Smith	rwd.jpg	Web Dev	Design for mobile	rwd.pdf	103

Admin Table

admin_id	admin_name	admin_email
101	Siam	siam@mail.com
102	Jilani	jilani@mail.com
103	Musa	musa@mail.com

Final result: admin_name and admin_email are now stored in a separate table through admin_id.

3NF (Third Normal Form)

- ➢ 2NF + Removal of transitive dependency.
- ➢ Separate the author table.

Books Table

book_id	bookTitle	imageURL	category	description	PDFURL	admin_id	author_id
1	Intro to Java	java.jpg	Programming	A Java book	java.pdf	101	201
2	Python Basics	python.jpg	Programming	Python guide	python.pdf	101	201
3	HTML & CSS	html.jpg	Web Dev	Web design	html.pdf	102	202
4	Data Structures in C	c.jpg	Programming	DS in C	ds.pdf	103	203
5	Machine Learning Intro	ml.jpg	AI/ML	ML for beginners	ml.pdf	102	204
6	Advanced Python	advpy.jpg	Programming	Deep dive in Python	advpy.pdf	101	201
7	Responsive Web Design	rwd.jpg	Web Dev	Design for mobile	rwd.pdf	103	202

Author Table

author_id	author_name
201	John Doe
202	Jane Smith
203	Mark Robinson
204	Emily Johnson

Admin Table

admin_id	admin_name	admin_email
101	Siam	siam@mail.com
102	Jilani	jilani@mail.com
103	Musa	musa@mail.com

Final result: authorName is now stored in a separate table using author_id. Transitive dependency has been removed. All dependencies now rely solely on the primary key.