Normalization Practice

❖ **Case1: Company system – UNF table**

EmployeeID	EmployeeName	Department	Projects	Manager
E001	Ahmed	IT	P101:Website, P102:Mobile App	Eng. Khalid
E002	Salim	HR	P103:Recruitment	Ms. Amal
E003	Aisha	IT	P102:Mobile App, P104:Database Upgrade	Eng. Khalid

Repeating groups : we have multi-value in projects
1NF:

EmpID	EmpName	Dep	PID	PName	manager
E001	Ahmed	IT	P101	Website	Eng.Khalid
E001	Ahmed	IT	P102	Mobile App	Eng.Khalid
E002	Salim	HR	P103	Recruitment	Ms.Amal
E003	Aisha	IT	P102	Mobile App	Eng.Khalid
E003	Aisha	IT	P104	Database upgrade	Eng.Khalid

Partial dependencies: empName depend only in EmpID and PID depend only on PName
2NF:
EMP table:

EmpID	EmpName
E001	Ahmed
E002	Salim
E003	Aisha

Project table:

PID	PName
P101	Website
P102	Mobile App
P103	Recruitment
P104	Database upgrade

Department table:

EmpID	Dep	manager
E001	IT	Eng.Khalid
E002	HR	Ms.Amal
E003	IT	Eng.Khalid

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❖ Case 2: University System – UNF Table

StudentID	StudentName	Department	Courses Enrolled	Advisor
S001	Reem	CS	C101:DB, C102:AI	Dr. Omar
S002	Tariq	Business	C103:Marketing	Dr. Sarah
S003	Noura	CS	C101:DB, C104:Cybersecurity	Dr. Omar

Repeating groups : we have multi-value in COURSE
1NF:

SID	SName	Dep	CID	CName	Advisor
S001	REEM	CS	PC101	DB	DR.OMAR
S001	REEM	CS	C102	AI	DR.OMAR
S002	TARIQ	BUSINESS	C103	MARKETING	DR.SARAH
S003	NOURA	CS	C101	DB	DR.OMAR
S003	NOURA	CS	C104	CYBER	DR.OMAR

Partial dependencies: SudentName depend only in SID and CID depend only on CName
2NF:

Student table:

SID	SName
S001	REEM
S002	TARIQ
S003	NOURA

Course table:

CID	CName
C101	DB
C102	AI
C103	MARKETING
C104	CYBER

Department table:

SID	Dep	ADVISOR
S001	CS	DR.OMAR
S002	BUSINESS	DR.SARAH
S003	CS	DR.OMAR

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❖ Case 3: Airline System – UNF Table

BookingID	PassengerName	Flights	SeatNumbers	PaymentMethod
B001	Salem	F101:Muscat-Dubai, F102:Dubai-London	12A, 14C	Credit Card
B002	Fatma	F103:Muscat-Istanbul	10B	PayPal
B003	Zayed	F104:Istanbul-Paris, F105:Paris-Oslo	9A, 13A	Credit Card

Repeating groups : we have multi-value in FLIGHT and SEAT NUMBER

1NF:

BID	PName	FlightID	FlightLeg	SeatNum	PMethod
B001	SALEM	F101	MUSCAT-DUBAI	12A	CREDIT CARD
B001	SALEM	F102	DUBAI-LONDAN	14C	CREDIT CARD
B002	FATMA	F103	MUSCAT-ISTAMBUL	10B	PAYPAL
B003	ZAYED	F104	ISTANBUL-PARIS	9A	CREDIT CARD
B003	ZAYED	F105	PARIS-OSLO	13A	CREDIT CARD

Partial dependencies: PASSNGERName depend only in BOOKINGID and FLIGHTID depend only on FLIGHT LEG and SEAT NUMBER
2NF:
BOOKING table:

BID	PNUM	PMethod
B001	SALEM	CREDIT CARD
B002	FATMA	CREDIT CARD
B003	ZAYED	PAYPAL
B001	SALEM	CREDIT CARD
B003	ZAYED	CREDIT CARD

FLIGHT table:

FlightID	FLIGHT LEG	SEAT NUMBER
F101	MUSCAT-DUBAI	12A
F102	DUBAI-LONDAN	14C
F103	MUSCAT-ISTAMBUL	10B
F104	ISTANBUL-PARIS	9A
F105	PARIS-OSLO	13A

AIRLINE table:

FlightID	BID
F101	B001
F102	B001
F103	B002
F104	B003
F105	B003