

Normalization example

ID	NAME	CITY	CITY-CODE	COURSE-ID	COURSE	HOURS	MARKS
111	ALI	BAGHDAD	010	101	DB	80	55
111	ALI	BAGHDAD	010	202	OS	70	23
111	ALI	BAGHDAD	010	303	MATH	90	55
222	AHMED	BABEL	020	101	DB	80	60
222	AHMED	BABEL	020	020	OS	70	43
222	AHMED	BABEL	020	030	MATH	90	55
333	HEBA	MOUSEL	030	101	DB	80	70
333	HEBA	MOUSEL	030	020	OS	70	100
333	HEBA	MOUSEL	030	030	MATH	90	90

SOLUTION

1NF (REMOVE REPEATING GROUP) (إزالة المجموعة المتكررة)

ID	NAME	CITY	CITY-CODE
111	ALI	BAGHDAD	010
222	AHMED	BABEL	020
333	HEBA	MOUSEL	030

ID	CITY-CODE	COURSE-ID	COURSE	HOURS	MARKS
111	010	101	DB	80	55
111	010	202	OS	70	23
111	010	303	MATH	90	55
222	020	101	DB	80	60
222	020	020	OS	70	43
222	020	030	MATH	90	55
333	030	101	DB	80	70
333	030	020	OS	70	100
333	030	030	MATH	90	90

2NF (REMOVE PARTIAL DEPENDENCY) إزالة التبعية الجزئية

ID	NAME	CITY	CITY-CODE
111	ALI	BAGHDAD	010
222	AHMED	BABEL	020
333	HEBA	MOUSEL	030

COURSE-ID	COURSE	HOURS
101	DB	80
202	OS	70
303	MATH	90

ID	COURSE-ID	MARKS
111	101	55
111	202	23
111	303	55
222	101	60
222	020	43
222	030	55
333	101	70
333	020	100
333	030	90

3NF (REMOVE TRANSITIVE DEPENDENCY) إزالة التبعية العابية

ID	NAME
111	ALI
222	AHMED
333	HEBA

COURSE-ID	COURSE	HOURS
101	DB	80
202	OS	70
303	MATH	90

CITY	CITY-CODE
BAGHDAD	010
BABEL	020
MOUSEL	030

ID	CITY-CODE	COURSE-ID	MARKS
111	010	101	55
111	010	202	23
111	010	303	55
222	020	101	60
222	020	020	43
222	020	030	55
333	030	101	70
333	030	020	100
333	030	030	90