

Assumption:

1. One employee helps one customer all the time
2. Each customer can order different supplies at the same time
3. Each customer only belongs to one customer type
4. Supplies within a order always have the same unit price
5. Each type of supply will only be put into one cage within a order
6. Each employee only serve one type of customer
7. One item (partNumber) can only be sold once and this partNumber will only occur once

order										
customerName	customerNumber	customerType	date	time	employee	partNumber	name	type	cageCode	quantityOrdered unitPrice
Jeff Peterson	HG54587	Consumer	7/1/2024	10:30am	D. Harrison	10654	Float Control	Plumbing	G413	4 12
Jeff Peterson	HG54588	Consumer	7/2/2024	10:31am	D. Harrison	10456	Modulator	Electrical	H433	3 7
Jeff Peterson	HG54589	Consumer	7/3/2024	10:32am	D. Harrison	10776	Hose Assembly	Plumbing	G413	7 9

PK is customerNumber + partNumber + date + time together

The table is in 1NF because it has one PK and no repeating groups.

The table is not in 2NF because it has two fields making up the PK and there are attributes that depends only on one PK such as customerType on customerNumber.

To make it 2NF, we need to make all attributes only depending on one field of PK

"quantityOrdered" is associated with specific order so it will be in the order table

"customerName" only depends on "customerNumber" so they form a separate table

Only one "employee" will serve each order and this table will state the relationships between customer and employee within this order.

Each "partNumber" has their corresponding name, type, cageCode, and unitPrice. I assume cageCode is associated with the partNumber

Each "employee" will only service one types of customer.

The table is also in 3NF because there is no transitive dependency.

2NF & 3NF

order					
customerNumber	date	time	partNumber	quantityOrdered	unitPrice
HG54587	7/1/2022		0.4375 10654	4	
HG54587	7/1/2022		0.4375 10456	3	
HG54587	7/1/2022		0.4375 10776	7	

PK: date+time+partNumber+customerNumber

FK: customerNumber (to the customer_account table)

customerNumber+date+time (to the customer_employee table)

partNumber (to the part_info table)

customer_account	
customerNumber	customerName
HG54587	Jeff Peterson

PK: customerNumber

customer_employee			
customerNumber	date	time	employee
HG54587	7/1/2022		0.4375 D.Harrison

PK: customerNumber + date + time

FK: employee (to the department_arrangement table)

department_arrangement	
employee	customerType
D.Harrison	consumer

PK: customerNumber

part_info				
partNumber	name	type	cageCode	unitPrice
10654	float control	plumbing	G413	12
10456	modulator	electrical	H433	7
10776	hose assembly	plumbing	G413	9

PK: partNumber

Assumption:

1. A therapist only has one staffNo and one patient only has one patNo

appointment						
staffNo	therapistName	patNo	patName	appointmentDate	time	branchNo
S1011	Fred Smith	P100	Lily White	9/12/2022	10:00	M15
S1011	Fred Smith	P105	Jill Baker	9/12/2022	12:00	M15
S1024	Heidi Pierce	P108	Andy Mckee	9/12/2022	10:00	Q10
S1024	Heidi Pierce	P108	Andy Mckee	9/14/2022	14:00	Q10
S1032	Richard Levin	P105	Jill Baker	9/14/2022	16:30	M15
S1032	Richard Levin	P110	Jimmy Winter	9/15/2022	18:00	B13

I divide date and time into two separate attributes.

PK is staffNo, appointmentDate, and time combined.

It's in 1NF because it has no repeating group and a primary key

It's not in 2NF because there are multiple fields for PK and other attributes depend on different attribute not the same key. For example, therapistName only depends on staffNo.

To get 2NF, we moved these attributes (staffNo+appointmentDate and staffNo) out as separate tables.

appointment				
staffNo	patNo	patName	appointmentDate	time
S1011	P100	Lily White	9/12/2022	0.416666667
S1011	P105	Jill Baker	9/12/2022	0.5
S1024	P108	Andy Mckee	9/12/2022	0.416666667
S1024	P108	Andy Mckee	9/14/2022	0.583333333
S1032	P105	Jill Baker	9/14/2022	0.6875
S1032	P110	Jimmy Winter	9/15/2022	0.75

location		
staffNo	appointmentDate	branchNo
S1011	9/12/2022	M15
S1024	9/12/2022	Q10
S1024	9/14/2022	Q10
S1032	9/14/2022	M15
S1032	9/15/2022	B13

PK: staffNo, appointmentDate, and time combined

FK: staffNo, appointmentDate

PK: staffNo, appointmentDate combined

therapist	
staffNo	therapistName
S1011	Fred Smith
S1024	Heidi Pierce
S1032	Richard Levin

PK: staffNo

patNo and patName have transitive dependency and we need to move them out to get 3NF

appointment				
staffNo	patNo	appointmentDate	time	
S1011	P100	9/12/2022	0.416666667	
S1011	P105	9/12/2022	0.5	
S1024	P108	9/12/2022	0.416666667	
S1024	P108	9/14/2022	0.583333333	
S1032	P105	9/14/2022	0.6875	
S1032	P110	9/15/2022	0.75	

patient	
patNo	patName
P100	Lily White
P105	Jill Baker
P108	Andy Mckee
P108	Andy Mckee
P105	Jill Baker
P110	Jimmy Winter

PK: staffNo, appointmentDate, and time combined

FK: patNo (to the patient table), staffNo (to the therapist table), staffNo+appointmentDate (to the location table)

PK: patNo

location		
staffNo	appointmentDate	branchNo
S1011	9/12/2022	M15
S1024	9/12/2022	Q10
S1024	9/14/2022	Q10
S1032	9/14/2022	M15
S1032	9/15/2022	B13

therapist	
staffNo	therapistName
S1011	Fred Smith
S1024	Heidi Pierce
S1032	Richard Levin

PK: staffNo, appointmentDate combined

PK: staffNo

Assumptions:

1. One event is only handled by one contract.
2. One contract is one event, and one contract records the employee and hours required.

work assignment					
eNo	contractNo	hours	eName	eventNo	eventLoc
1135	C1024	16	Smith J	H25	Queens
1057	C1024	24	Hocine D	H25	Queens
1068	C1025	28	White T	H4	Yonkers
1135	C1025	15	Smith J	H4	Yonkers

PK: eNo and contractNo together

There is no repeating group and this table has PK, so it is in 1NF.

This table is not in 2NF because it has a composite PK and there are attributes dependent upon only part of the PK, for example eName only depends on eNo, eventNo is only dependent on contractNo, and eventLoc is only dependent on contractNo.

Moving these attributes out of the table results in the following 2NF version:

work assignment		
eNo	contractNo	hours
1135	C1024	16
1057	C1024	24
1068	C1025	28
1135	C1025	15

PK: eNo+contractNo

FK: eNo, contractNo

employee	
eNo	eName
1135	Smith J
1057	Hocine D
1068	White T

PK: eNo

contract record		
contractNo	eventNo	eventLoc
C1024	H25	Queens
C1024	H25	Queens
C1025	H4	Yonkers
C1025	H4	Yonkers

PK: contractNo

eventNo and eventLoc has transitive dependency. EventLoc depends on eventNo. Move these out to get 3NF.

work assignment		
eNo	contractNo	hours
1135	C1024	16
1057	C1024	24
1068	C1025	28
1135	C1025	15

PK: eNo+contractNo

FK: eNo (to the employee table), contractNo (to the contract_record table)

employee	
eNo	eName
1135	Smith J
1057	Hocine D
1068	White T

PK: eNo

contract_record	
contractNo	eventNo
C1024	H25
C1024	H25
C1025	H4
C1025	H4

PK: contractNo

FK: eventNo (to the event_location table)

event_location	
eventNo	eventLoc
H25	Queens
H25	Queens
H4	Yonkers
H4	Yonkers

PK: eventNo

