1. Parts Order Form

customerNumbe	customerName	customerType	**date**	**time**	employee	**partNumber**	name	type	cageCode	quantityOrdered	unitPrice
HG54587	Jeff Peterson	Consumer	7/1/2024	10:30 AM	D. Harrison	10654	Float Control	Plumbing	G413	4	12
HG54587	Jeff Peterson	Consumer	7/1/2024	10:30 AM	D. Harrison	10456	Modulator	Electrical	H433	3	7
HG54587	Jeff Peterson	Consumer	7/1/2024	10:30 AM	D. Harrison	10776	Hose Assembly	Plumbing	G413	7	9
HG54587	Jeff Peterson	Consumer	7/1/2024	10:30 AM	D. Harrison	10657	Float Assembly	Plumbing	G413	5	10

Assumptions

Customer numbers are unique and apply to only one customer

Customer type is important for the process

Employees have unique names

Part Numbers are unique

Multiple parts can be on one cage

Orders can only be done one at a time (there aren't multiple registers/computers)

Each cage is designated to a type of part (Ex. cage G413 has all of the plumbing parts)

Step 1: is it in 1NF?

This database is tracking orders.

PK is customerNumber, date, time and partNumber.
There are no repeating groups.

Therefore, this table is in 1NF.

Step 2: is it in 2NF?

customerName and customerType are only dependent on the PK customerNumber.
name, type, cageCode, and unitPrice are only dependent on the PK partNumber.
employee, quantityOrdered are dependent on the PK date, PK time, PK partNumber, and PK customerNumber.

Not all the non-PK fields were dependent on ALL the PK fields
Therefore, the data is not in 2NF.
In order to resolve this I would:

> Move customerName and customerType to a "customer" table with a PK of customerNumber
> Move name, type, cageCode, and unitPrice to a "part" table with a PK of partNumber
> The remaining information would make the order table.

Now in 2NF:

customer

customerNumbe	customerName	customerType
HG54587	Jeff Peterson	Consumer

order

date	time	employee	partNumber	quantityOrdered	customerNumber
7/1/2024	10:30 AM	D. Harrison	10654	4	HG54587
7/1/2024	10:30 AM	D. Harrison	10456	3	HG54588
7/1/2024	10:30 AM	D. Harrison	10776	7	HG54589
7/1/2024	10:30 AM	D. Harrison	10657	5	HG54590

part

partNumber	name	type	cageCode	unitPrice
10654	Float Control	Plumbing	G413	12
10456	Modulator	Electrical	H433	7
10776	Hose Assembly	Plumbing	G413	9
10657	Float Assembly	Plumbing	G413	10

Step 3: is it in 3NF?

customer table: customerName is not dependent on customerType, and vice versa

order table: employee is not dependent on quantityOrdered, and vice versa

part table: cageCode is dependent on type

Because cageCode is dependent on a non-PK field, this table is not in 3NF.

I would remove cageCode and put it into a separate location table with a primary key of type.

Now in 3NF ....

customer

customerNumbe	customerName	customerType
HG54587	Jeff Peterson	Consumer

order

date	time	employee	partNumber	quantityOrdered	customerNumber
7/1/2024	10:30 AM	D. Harrison	10654	4	HG54587
7/1/2024	10:30 AM	D. Harrison	10456	3	HG54588
7/1/2024	10:30 AM	D. Harrison	10776	7	HG54589
7/1/2024	10:30 AM	D. Harrison	10657	5	HG54590

part

partNumber	name	type (FK)	unitPrice
10654	Float Control	Plumbing	12
10456	Modulator	Electrical	7
10776	Hose Assembly	Plumbing	9
10657	Float Assembly	Plumbing	10

location

type	cageCode
Plumbing	G413
Electrical	H433

2. Therapists

staffNo	therapistName	patNo	patName	apptDate apptTime	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

Assumptions

Therapists can work at many branches

Therapists only see patients at one branch per day

A patient will only see one therapist for one appointment

Patients can have multiple appointments in one day and multiple therapists

Step 1: is it in 1NF?

This is tracking therapists, NOT appointments

PK is staffNo, apptDate, apptTime

There were repeating groups, multiple values in one field (apptDate and apptTime).

Therefore this table was not in 1NF.

So I need to separate apptDate and apptTime into two separate attributes.

Now in 1NF:

therapist

staffNo (PK)	therapistName	patNo	patName	apptDate (PK)	apptTime (PK)	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

Step 2: is it in 2NF?

therapistName is only dependent on the PK staffNo.

patNo, patName is dependent on all three PK (staffNo, apptDate, apptTime).

branchNo is only dependent on the PK staffNo and PK apptDate.

Not all the non-PK fields were dependent on ALL the PK fields

Therefore, the data is not in 2NF.

In order to resolve this I would remove therapistName to create a separate table about staff.

I would keep patNo and patName with the three PK's to create an appointment table.

I would remove branchNo to create a separate location table with just the PK staffNo and PK apptDate.

Now in 2NF ....

staff

staffNo (PK)	therapistName
S1011	Fred Smith
S1011	Fred Smith
S1024	Heidi Pierce
S1024	Heidi Pierce
S1032	Richard Levin
S1032	Richard Levin

appointment

staffNo (PK)	patNo	patName	apptDate (PK)	apptTime (PK)
S1011	P100	Lily White	9/12/2022	10:00
S1011	P105	Jill Baker	9/12/2022	12:00
S1024	P108	Andy McKee	9/12/2022	10:00
S1024	P108	Andy McKee	9/14/2022	14:00
S1032	P105	Jill Baker	9/14/2022	16:30
S1032	P110	Jimmy Winter	9/15/2022	18:00

location

staffNo (PK)	apptDate (PK)	branchNo
S1011	9/12/2022	M15

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

Step 3: is it in 3NF?

staff table: therapistName is the only non PK field, so this table is fine.

appointment table: patName is dependent on patNo.

location table: branchNo is the only non PK field, so this table is also fine.

Because patName is dependent on a non-PK field, this table is not in 3NF.

I would remove patName and put it into a separate patients table with a primary key of patNo.

Now in 3NF ....

staff

staffNo (PK)	therapistName
S1011	Fred Smith
S1024	Heidi Pierce
S1032	Richard Levin

appointment

staffNo (PK)	patNo (FK)	apptDate (PK)	apptTime (PK)
S1011	P100	9/12/2022	10:00
S1011	P105	9/12/2022	12:00
S1024	P108	9/12/2022	10:00
S1024	P108	9/14/2022	14:00
S1032	P105	9/14/2022	16:30
S1032	P110	9/15/2022	18:00

location

staffNo (PK)	apptDate (PK)	branchNo

patient

patNo (PK)	patName

S1011	9/12/2022	M15
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

P100	Lily White
P105	Jill Baker
P108	Andy McKee
P110	Jimmy Winter

3. Maids Contract Hours

eNo (PK)	contractNo (PK)	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
1135	C1026	10	Smith J	H25	Queens

Assumptions

Employee Number (eNo) is unique for each staff member

Each contract only applies to one event

There might be many contracts for one event

Step 1: is it in 1NF?

This table is tracking employee hours against different contracts.

PK are eNo and contractNo.

There are no repeating groups

Already in 1NF!

Step 2: is it in 2NF?

hours is dependent on PK eNo and PK contractNo.

eName is only dependent on PK eNo.

eventNo and eventLoc is dependent on only PK contractNo.

Not all the non-PK fields were dependent on ALL the PK fields

Therefore, the data is not in 2NF.

In order to resolve this I would remove eName to create a separate table about employees with PK eNo.

I would keep hours with the two PK's to create an hours table.

I would remove eventNo and eventLoc to create a separate contract table with just the PK contractNo.

Now in 2NF ....

hours

eNo (PK)	contractNo (PK)	hours
1135	C1024	16
1057	C1024	24
1068	C1025	28
1135	C1025	15
1135	C1026	10

contract

contractNo (PK)	eventNo	eventLoc
C1024	H25	Queens
C1025	H4	Yonkers
C1026	H25	Queens

employee

eNo (PK)	eName
1135	Smith J
1057	Hocine D
1068	White T
1135	Smith J
1135	Smith J

Step 3: is it in 3NF?

hours table: hours is the only non PK field, so this table is fine.

employee table: eName is the only non PK field, so this table is also fine.

contract table: eventLoc is dependent on eventNo.

Because eventLoc is dependent on a non-PK field, this table is not in 3NF.

I would remove eventLoc and put it into a separate event table with a primary key of eventNo.

Now in 3NF ....

hours

eNo (PK)	contractNo (PK)	hours
1135	C1024	16
1057	C1024	24
1068	C1025	28
1135	C1025	15
1135	C1026	10

contract

contractNo (PK)	eventNo (FK)
C1024	H25
C1025	H4
C1026	H25

employee

eNo (PK)	eName
1135	Smith J
1057	Hocine D
1068	White T

event

eventNo (PK)	eventLoc
H25	Queens
H4	Yonkers