Exercise 1

Assumptions:
1. All employees can help any and all different customers and there is no special relationships that bond any pair of employees and customers.
2. Each customer has a unique customer number, and each part has a uniuqe part number.
3. A customer can have many orders and an order can contain multiple parts, and one part only has one specific unit price.
4. A part can be ordered in multiple orders.
5. A cage code is the identifier of the cages (or shelves) that the inventory is stored in and multiple parts can belong to the same type and stored in the same cage and, thus, share the same cage code.

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

Normalizing Process: The table above is in 1NF because it has a primary key(compite PK, customerNumber+date+time+partNumber) and there are no repeating groups

1NF TO 2NF
Problem: Therearepartial dependencies. customerName,customerType are only dependent on customerNumber;
employee isonly dependent on (customerNumber, date, time);
partName, partType, cageCode, unitPrice are only dependent on partNumber.
Thus, we separate them into four tables below:

customer		
customerNumeber (PK)	customerName	customerType
HG54587	Jeff Peterson	Consumer

order			
customerNumber (PK)	**date** (PK)	**time** (PK)	employee
HG54587	7/1/2024	10:30am	D. Harrison

part				
partNumber (PK)	partName	partType	cageCode	unitPrice
10654	Float Control	Plumbing	G413	12
10456	Modulator	Electrical	H433	7
10776	HoseAssembly	Plumbing	G413	9
10657	Float Assembly	Plumbing	G413	10

order_part				
customerNumber (PK)	**date** (PK)	**time** (PK)	**partNumber** (PK)	quantitiyOrdered
HG54587	7/1/2024	10:30am	10654	4
HG54587	7/1/2024	10:30am	10456	3
HG54587	7/1/2024	10:30am	10776	7
HG54587	7/1/2024	10:30am	10657	5

2NF TO 3NF
Problem: There are transitivedependencies.
A transitive dependency exists here because cageCode depends on partType and not directly on partNumber.
Thus, we separate “part” table into 2 tables below:

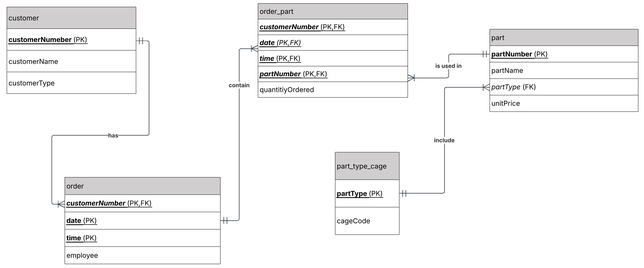
part				
partNumber (PK)	partName	*partType* (FK)	unitPrice
10654	Float Control	Plumbing	12
10456	Modulator	Electrical	7
10776	HoseAssembly	Plumbing	9
10657	Float Assembly	Plumbing	10

part_type_cage	
partType (PK)	cageCode
10654	G413
10456	H433
10776	G413
10657	G413

order_part				
customerNumber (PK,FK)	***date*** *(PK,FK)*	***time*** (PK,FK)	***partNumber*** (PK,FK)	quantitiyOrdered
HG54587	7/1/2024	10:30am	10654	4
HG54587	7/1/2024	10:30am	10456	3
HG54587	7/1/2024	10:30am	10776	7
HG54587	7/1/2024	10:30am	10657	5

customer		
customerNumeber (PK)	customerName	customerType
HG54587	Jeff Peterson	Consumer

order			
customerNumber (PK,FK)	**date** (PK)	**time** (PK)	employee
HG54587	7/1/2024	10:30am	D. Harrison



Exercise 2

Assumptions:
1. Therapists may work at a number of different branches, but they only see patients at one specific branch on any given date and they can only see one patient at any given appointment time.
2. A patient is given an appointment at a specific appointment time and date with only one branch and only one therapist.
3. Patients may have multiple appointments, each with a possibly different therapist.
4. Each therapist has a unique staffNo, each patient has a unique patNo and each branch has a unique branchNo and it is defined by staffNo and appointmentDate.

appointment_schedule						
staffNo (PK)	therapistName	patNo	patName	**appointmentDate** (PK)	**appointmentTime** (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

Normalizing Process:
The above table is already in 1NF because there is primary key (composite PK, staffNo + appointmentDate + appointmentTime) and there are no repeating groups.

1NF TO 2NF
Problem: Therearepartial dependencies.therapistName only depends on staffNo, patName only depends on patNo, brachNo only depends on staffNo and appointmentDate
Thus, we separate them into four tables below:

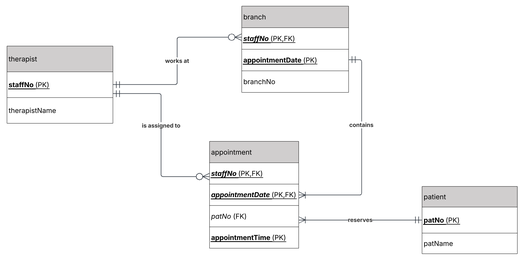
therapist	
staffNo (PK)	therapistName
S1011	Fred Smith
S1024	Heidi Pierce
S1032	Richard Levin

patient	
patNo (PK)	patName
P100	Lily White
P105	Jill Baker
P108	Andy McKee
P110	Jimmy Winter

branch		
staffNo (PK,FK)	**appointmentDate** (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

appointment			
staffNo (PK,FK)	***appointmentDate*** (PK,FK)	*patNo* (FK)	**appointmentTime** (PK)
S1011	9/12/2022	P100	10:00
S1011	9/12/2022	P105	12:00
S1024	9/12/2022	P108	10:00
S1024	9/14/2022	P108	14:00
S1032	9/14/2022	P105	16:30
S1032	9/15/2022	P110	18:00

2NF TO 3NF
No problem of transitivedependencies exist, so the above tables are already in 3NF



Exercise 3

Assumptions:
1. The Employee Number (eNo) is unique for each member of staff
2. Each contract only applies to one event and represented by one contractNo
3. There may be different contracts for an event,and one event has only one unique eventNo and one eventLoc
4. Each contract only applies to one event, and can behandled by multiplestaff members, and one staff can work on multiple contracts.

employees_track_sheet					
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

Normalizing Process:
The above table is already in 1NF because there is a primary key (compositePK, eNo + contractNo), and there are no repeating groups

1NF TO 2NF
Problem: Therearepartial dependencies.eName only depends on eNo, eventLoc and eventNo only depend on contractNo
Thus, we separate them into three tables below:

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

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

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

2NF TO 3NF
Problem: There are transitivedependencies.
A transitive dependency exists here because eventLoc depends on eventNo and not directly on contractNo
Thus, we separate “contract” table into 2 tables below:

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

event	
eventNo(PK)	eventLoc
H25	Queens
H4	Yonkers

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

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