

### Exercise 1

Happy Supplies Parts Warehouse					
Customer Name: Jeff Peterson		Date: 7/1/2024			
Customer Number: H G54587		Time: 10:30am			
Employee: D. Harrison					
Customer Type: Consumer					
Part Number	Name	Type	Cage Code	Quantity Ordered	Unit Price
10654	Float Control	Plumbing	G413	4	12
10456	Modulator	Electrical	H433	3	7
10776	Hose Assembly	Plumbing	G413	7	9
10657	Float Assembly	Plumbing	G413	5	10

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 unique 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)
Jeff Peterson	HG54587	Consumer	7/1/2024	10:30am	D.Harrison	10654
Jeff Peterson	HG54587	Consumer	7/1/2024	10:30am	D.Harrison	10456
Jeff Peterson	HG54587	Consumer	7/1/2024	10:30am	D.Harrison	10776
Jeff Peterson	HG54587	Consumer	7/1/2024	10:30am	D.Harrison	10657

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

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

customer		
customerNumber (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

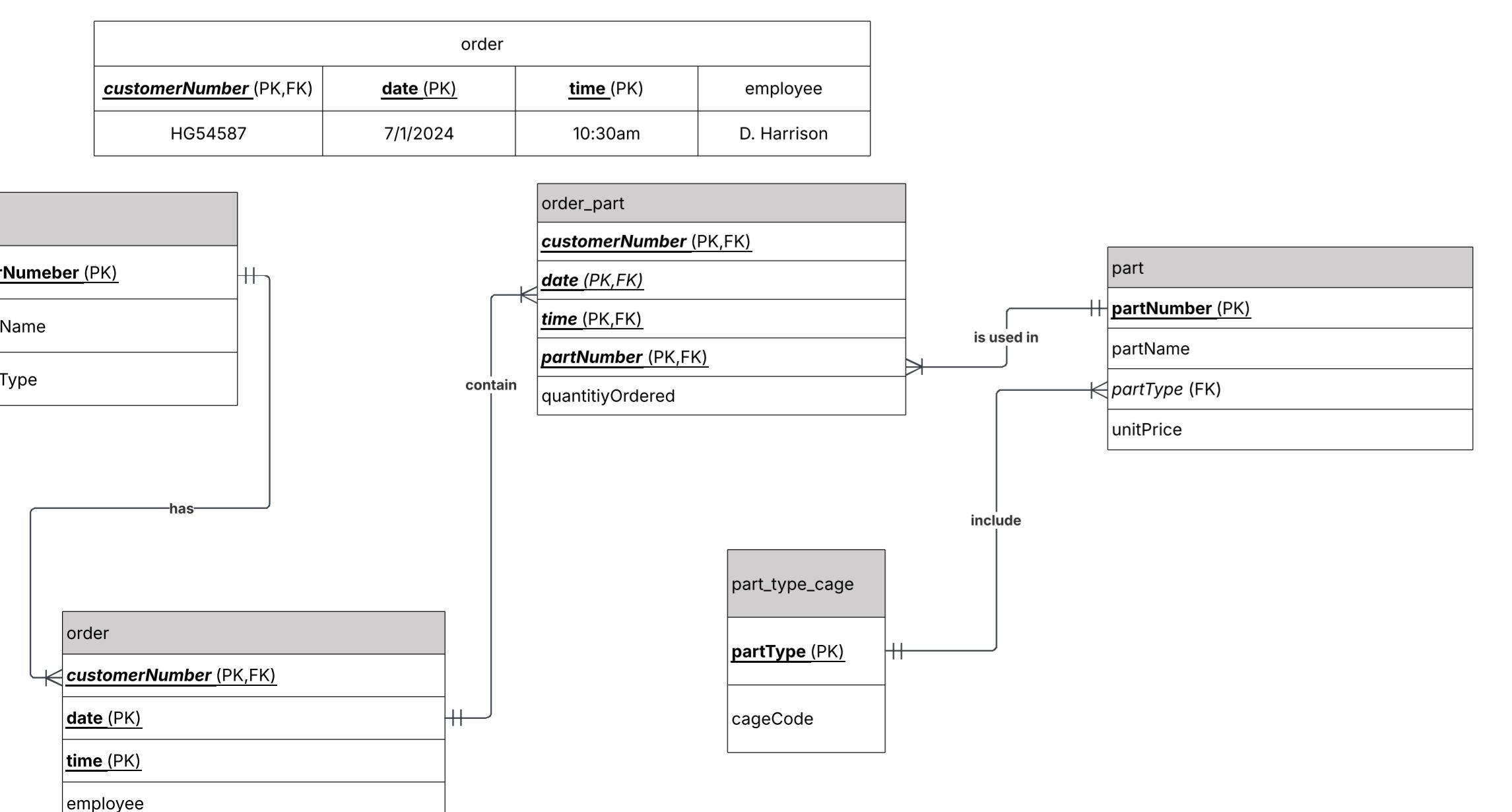
2NF TO 3NF  
 Problem: There are transitive dependencies.  
 A transitive dependency exists here because cageCode depends on partType and not directly on partNumber.  
 Thus, we separate "part" table into 2 tables below:

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)	quantityOrdered
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		
customerNumber (PK)	customerName	customerType
HG54587	Jeff Peterson	Consumer



### Exercise 2

2. The data shown below is used by the Panacea Mental Health Corporation to track its therapists. Therapists may work at a number of different branches, but they only see patients at one specific branch on any given day. A patient is given an appointment at a specific time and date at a particular branch with one therapist. Patients may have multiple appointments in any given day and with multiple different therapists.

staffNo	therapistName	patNo	patName	appointment date	appointment 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

Assumptions:  
 1. Therapists may work at a number of different branches, but they only see patients at one specific branch on any given day 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 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.

INF TO 2NF  
 Problem: There are partial dependencies. therapistName only depends on staffNo, patName only depends on patNo, branchNo 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

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