EX1

Assumptions:

- 1. This is not even a table
- 2. Each customer is uniquely identified by customer Number
- 3. Each part is uniquely identified by partNumber
- 4. An order is uniquely identified by the combination of customerNumber, orderDate, and orderTime (assuming a
- customer can only place one order at a specific date and time)
- 5. Employees can help any customer (no special
- employee-customer relationship)
- First step: Put everything on a table. It is already an 1NF.

6. A part is stored in one specific cage location (cageCode)

Happy Supplies Parts Warehouse											
customerNumber	customerName	customerType	partNumber	employeeName	partName	partType	cageCode	quantityOrdered	unitPrice	orderDate	orderTime
HG5487	Jeff Peterson	Consumer	10654	D.Harrison	Float Control	Plumbing	G413	4	12	7/1/2024	10:30am
HG5487	Jeff Peterson	Consumer	10456	D.Harrison	Modulator	Electrical	H433	3	7	7/1/2024	10:30am
HG5487	Jeff Peterson	Consumer	10776	D.Harrison	Hose assembly	Plumbing	G413	7	9	7/1/2024	10:30am
HG5487	Jeff Peterson	Consumer	10657	D.Harrison	Float assembly	Plumbing	G413	5	10	7/1/2024	10:30am

Second step: Second Normal Form(2NF)

customer					
customerNumber	customerName	customerType			
HG5487	Jeff Peterson	Consumer			

Customer (customerNumber, customerName, customerType)

PK: customerNumber

• Resolves: customerName and customerType depend only on customerNumber

order_line								
customerNumber	<u>orderDate</u>	<u>orderTime</u>	<u>partNumber</u>	quantityOrdered				
<u>HG5487</u>	7/1/2024	<u>10:30am</u>	10654	4				
<u>HG5487</u>	7/1/2024	<u>10:30am</u>	<u>10456</u>	3				
<u>HG5487</u>	7/1/2024	<u>10:30am</u>	<u>10776</u>	7				
<u>HG5487</u>	7/1/2024	<u>10:30am</u>	<u>10657</u>	5				

part								
partNumber	partName	partType	cageCode	unitPrice				
10654	Float Control	Plumbing	G413	12				
10456	Modulator	Electrical	H433	7				
10776	Hose	Plumbing	G413	9				
10657	Float	Plumbing	G413	10				

- Part (partNumber, partName, partType, cageCode, unitPrice)
- PK: partNumber
- Resolves: Part attributes depend only on partNumber

order							
customerNumber	<u>orderDate</u>	orderTime	employeeName				
<u>HG5487</u>	7/1/2024	<u>10:30am</u>	D.Harrison				

Order (customerNumber, orderDate, orderTime,

employeeName)

• PK: customerNumber + orderDate + orderTime

Not transitive

employeeName

• Resolves: employeeName depends on the order, not individual parts

OrderLine (customerNumber, orderDate, orderTime, partNumber, quantityOrdered)

- PK: customerNumber + orderDate + orderTime + partNumber • Contains only attributes dependent on full composite key

Final step: Third Normal Form(3NF)

partNumber quantityOrdered partNumber	nar	orderTime	orderDate	customerNumber
Not transitive		order_line		
<u>HG5487</u> <u>7/1/2024</u> <u>10:3</u>		Consumer	Jeff Peterson	<u>HG5487</u>
<u>customerNumber</u> <u>orderDate</u> <u>order</u>		customerType	customerName	customerNumber
			Castorner	
		Not transitive	customer	

		order_line	N	lot transitive				
customerNumber	<u>orderDate</u>	<u>orderTime</u>	partNumber	quantityOrdered				
<u>HG5487</u>	7/1/2024	<u>10:30am</u>	<u>10654</u>	4				
<u>HG5487</u>	7/1/2024	<u>10:30am</u>	<u>10456</u>	3				
<u>HG5487</u>	7/1/2024	<u>10:30am</u>	<u>10776</u>	7				
HG5487	7/1/2024	<u>10:30am</u>	<u>10657</u>	5				

H433

• FK: customerNumber, orderDate, orderTime references Order (composite FK)

part_type

Plumbing

Electrical

• FK: partNumber references Part

548	<u>87</u>	7/1/20	<u>24</u>	10:3	<u>Oam</u>		D.Harrison			
Not transitive				part						
	quantityOrdered		quantityOrdered		par	tNumber	partNam	ie	partType	unitPrice
-			1	10654	Float Cont	trol	Plumbing	12		
		4	1	10456	Modulato	or	Electrical	7		
				10776	Hose		Plumbing	9		
		_				$\overline{}$				

- Part (partNumber, partName, partType, unitPrice)
- PK: partNumber
- FK: partType references PartType

10657 Float Plumbing

• Resolves: Removed cageCode since it depends on partType, not

Part_Type (partType, cageCode)

- PK: partType
- New table created to store the relationship between part types
- partTypes cageCode and their cage locations G413
 - Resolves: cageCode now depends directly on its primary key (partType)

First step: 1NF

Seperate appointmentDate and appointmentTime to make it 1NF								
Panacea Mental Health Corporation								
staffNo	therapistName	<u>patNo</u>	patName	lame appointmentDate appointmentTime branch				
<u>\$1011</u>	Fredd Smith	<u>P100</u>	Lily White	9/12/2022	10:00	M15		
<u>\$1011</u>	Fredd Smith	<u>P105</u>	Jill Baker	9/12/2022	12:00	M15		
<u>\$1024</u>	Heidi Pierce	<u>P108</u>	Andy Mckee	9/12/2022	10:00	Q10		
<u>\$1024</u>	Heidi Pierce	<u>P108</u>	Andy Mckee	9/14/2022	14:00	Q10		
<u>\$1032</u>	Richard Levin	<u>P105</u>	Jill Baker	9/14/2022	16:30	M15		
<u>\$1032</u>	Richard Levin	<u>P110</u>	Jimmy Winter	9/15/2022	<u>18:00</u>	B13		

Second step: 2NF

therapist				
<u>staffNo</u>	therapistName			
<u>\$1011</u>	Fredd Smith			
S1024	Heidi Pierce			
S1032	Richard Levin			

- Resolves: therapistName
- depends on the complete primary key
- Resolves: patName now depends on the complete primary key

patient

<u>patNo</u>

P100

P105

P108

P110

EX2

Andy Mckee

Jimmy Winter

patName Fredd Smith Jill Baker

• PK: patNo

10:00

12:00

10:00

14:00

16:30

18:00

key (tracks which branch a therapist works at on each day)

Assumptions

- 1. Each employee is uniquely identified by eNo (Employee Number)
- 2. Each contract is uniquely identified by contractNo
- 3. Each event is uniquely identified by eventNo
- 4. An employee can work on multiple contracts 5. The hours attribute represents the number of hours an
- employee worked on a specific contract

Maid Better temp agency								
<u>eNo</u>	<u>contractNo</u>	hours	eName	eventNo	eventLoc			
<u>1135</u>	<u>C1024</u>	16	Smith J	H25	Queens			
<u>1057</u>	<u>C1024</u>	24	Hocine D	H4	Yonkers			
<u>1068</u>	<u>C1025</u>	28	White T	H4	Yonkers			
<u>1135</u>	<u>C1025</u>	15	Smith J	H25	Queens			

Smith J

10

Table is already in 1NF

1135

EX3

First step: 1NF

Second step: Second Normal Form(2NF)

C1026

employee		
<u>eNo</u> eName		
<u>1135</u>	Smith J	
<u>1057</u>	Hocine D	
1068	White T	

- Resolves: eName now depends on the complete primary key

employee_contract				
eNo contractNo hours				
<u>1135</u>	<u>C1024</u>	16		
<u>1057</u>	<u>C1024</u>	24		
<u>1068</u>	<u>C1025</u>	28		
<u>1135</u>	<u>C1025</u>	15		
<u>1135</u>	<u>C1026</u>	10		

	contract				
contractNo	eventNo	eventLoc			
<u>C1024</u>	H25	Queens			
<u>C1025</u>	H4	Yonkers			
<u>C1026</u>	H25	Queens			

Queens

- PK: contractNo
- Resolves: eventNo and eventLoc now depend on the complete primary key

H25

- PK: eNo, contractNo
- Resolves: hours depends on the complete primary key (tracks hours worked by each employee on each contract)

Final step: Third Normal Form(3NF)

emp	loyee_contract		em	ployee	
	contractNo	hours	<u>eNo</u>	<u>eNo</u> eNa	
	C1024	16	<u>1135</u>	Smit	
	C1024	24	<u>1057</u>	Hocin	
	C1025	28	1068	Whit	
	C1025	15	• PK: eNo		
	C1026	10	• No changes from		

contract

contractNo

C1024

C1025

C1026

• FK: eventNo references Event

• Resolves: Removed eventLoc; now only

contains contractNo and its associated eventNo

• PK: contractNo

- **PK:** eNo, contractNo • **FK:** eNo references Employee
- **FK:** contractNo references Contract
- No changes from 2NF

<u>eNo</u>

<u>1135</u>

1057

1068

1135

1135

<u>eNo</u>	eName		
<u>1135</u>	Smith J		
<u>1057</u>	Hocine D		
1068 White T			
• PK: eNo			

2NF

eventNo

H25

Н4

H25

- eventNo eventLoc H25 Queens Н4 Yonkers
- **PK:** eventNo
- New table created to eliminate transitive dependency
- **Resolves:** eventLoc now depends directly on its primary key (eventNo)

therapist_schedule					
staffNo appointmentDate branchNo					
<u>\$1011</u>	9/12/2022	M15			
S1024	9/12/2022	Q10			
<u>\$1024</u>	9/14/2022	Q10			
<u>\$1032</u>	9/14/2022	M15			
S1032	9/15/2022	B13			

- **PK:** staffNo, appointmentDate
- Resolves: branchNo now depends on the complete primary

appointment				
staffNo	appointmentTime			
<u>\$1011</u>	<u>P100</u>	9/12/2022	10:00	
<u>\$1011</u>	<u>P105</u>	9/12/2022	12:00	
<u>\$1024</u>	<u>P108</u>	9/12/2022	10:00	
S1024	<u>P108</u>	9/14/2022	14:00	
S1032	<u>P105</u>	9/14/2022	<u>16:30</u>	
S1032	<u>P110</u>	9/15/2022	18:00	

- PK: staffNo, patNo, appointmentDate, appointmentTime
- Resolves: No non-key attributes remain; this table represents the many-to-many relationship between therapists and patients at specific times

Final step: 3NF

therapist		
staffNo therapistNam		
<u>\$1011</u>	Fredd Smith	
S1024	Heidi Pierce	
<u>\$1032</u>	Richard Levin	

therapist			patient		
<u>staffNo</u>	therapistName		patNo patName		
<u>\$1011</u>	1011 Fredd Smith <u>P100</u>		Fredd Smith		
S1024	Heidi Pierce		P105	Jill Baker	
S1032	Richard Levin		P108 Andy Mckee		
<u> </u>			<u>P110</u>	Jimmy Winter	

tient	oatier	ntient	therapist_schedule			
patName		patName	<u>staffNo</u>	staffNo appointmentDate		
Fredd Smith	F	Fredd Smith	<u>\$1011</u>	9/12/2022	M15	
Jill Baker		Jill Baker	<u>\$1024</u>	9/12/2022	Q10	
Andy Mckee	A		<u>\$1024</u>	9/14/2022	Q10	
Jimmy Winter	Ji	Jimmy Winter	<u>\$1032</u>	9/14/2022	M15	
			<u>\$1032</u>	9/15/2022	B13	
		•				

- FK: staffNo references Therapist
- appointment appointmentDate appointmentTime staffNo patNo S1011 P100 9/12/2022 P105 S1011 9/12/2022 S1024 P108 9/12/2022 S1024 P108 9/14/2022 S1032 P105 9/14/2022 S1032 P110 9/15/2022
- FK: staffNo references Therapist
- FK: patNo references Patient
- FK: (staffNo, appointmentDate) references TherapistSchedule

Assumptions

- 1. Each therapist is uniquely identified by staffNo
- 2. Each patient is uniquely identified by patNo
- 3. Each branch is uniquely identified by branchNo
- 4. An appointment is uniquely identified by the combination of staffNo, patNo, appointmentDate, and appointmentTime