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

								<u>.                                      </u>		<u> </u>	
				Happy Supplies	s Parts War	ehouse					
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)

First step: Put everything on a table. It is already an 1NF.

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

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

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

	ord	der	
ustomerNumber	<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 • Resolves: employeeName depends on the order, not individual parts

employeeName

- **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)

FK: custom	nerNumbe	<i>r</i> references	Custome
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customer Not transitive   customerNumber customerName customerType   HG5487 Jeff Peterson Consumer   order_line Not transitive	iatamarNi imbar	ardarData	ordorTimo	 +Nlumbar	auanti	ituOrdorod		part	Number	pa
customer     NOT transitive       customerNumber     customerName     customerType         customerNumber     orderDate     order			order_line	N	ot tra	nsitive				
customer NOL (TallSILIVE	HG5487	Jeff Peterson	Consumer	<u>HG548</u>	<u>37</u>	7/1/20	24		<u>10:3</u>	0am
customer NOT Transitive	ustomerNumber	customerName	customerType	customerN	<u>umber</u>	orderD	ate	<u> </u>	order	Tim
Not transitive order		customer	Not transitive					ord	der	

	•	<u> </u>		
		order_line	N	ot transitive
customerNumber	<u>orderDate</u>	<u>orderTime</u>	partNumber	quantityOrdere
<u>HG5487</u>	7/1/2024	<u>10:30am</u>	<u>10654</u>	4
<u>HG5487</u>	7/1/2024	<u>10:30am</u>	10456	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

- FK: customerNumber, orderDate, orderTime references Order (composite FK)
- FK: partNumber references Part

<u>HG5487</u> <u>7/1/20</u> 2		<u> 24</u>	<u>4</u> <u>10:30am</u>		D.Harrison			
Not transitive					ра	rt		
mber	quantityOrdered		pai	tNumber	partNar	ne	partType	unitPrice
<u> </u>	quanti	tyordered		10654	Float Cor	ntrol	Plumbing	12
54		4		10456	Modulat	tor	Electrical	7

Part (partNumber, partName, partType, unitPrice)

Plumbing

Plumbing

PK: partNumber

10776

10657

• FK: partType references PartType

Hose

Float

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

9

10

# Part\_Type (partType, cageCode)

- part\_type PK: partType <u>partType</u> cageCode
  - New table created to store the relationship between part types and their cage locations

#### G413 • Resolves: cageCode now depends directly on its primary key H433 Electrical

# (partType)

# First step: 1NF

	Sepe	rate appointmen	tDate and app	ointmentTime to mak	e it 1NF			
	Panacea Mental Health Corporation							
staffNo	therapistName	<u>patNo</u>	patName	appointmentDate	appointmentTime	branchNo		
<u>\$1011</u>	Fred Smith	<u>P100</u>	Lily White	9/12/2022	10:00	M15		
<u>\$1011</u>	Fred 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	<u>16:30</u>	M15		
<u>\$1032</u>	Richard Levin	<u>P110</u>	Jimmy Winter	9/15/2022	18:00	B13		

# Second step: 2NF

the	erapist
<u>staffNo</u>	therapistName
<u>\$1011</u>	Fred Smith
<u>\$1024</u>	Heidi Pierce
S1032	Richard Levin

- Resolves: therapistName
- depends on the complete primary key

#### patient patName <u>patNo</u> Lily White P100 P105 Jill Baker P108 Andy Mckee P110 Jimmy Winter

EX2

- PK: patNo
- Resolves: patName now
- depends on the complete primary key

# **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

### First step: 1NF

EX3

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	H25	Queens
<u>1068</u>	<u>C1025</u>	28	White T	H4	Yonkers
<u>1135</u>	<u>C1025</u>	15	Smith J	H4	Yonkers
<u>1135</u>	<u>C1026</u>	10	Smith J	H25	Queens

Table is already in 1NF

### Second step: Second Normal Form(2NF)

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

- Resolves: eName now depends on the complete primary key

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

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

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

staffNo

S1011

S1011

S1024

S1024

			_		
employee_contract			employee		
eNo	contractNo	hours		<u>eNo</u>	eName
1135	C1024	16		<u>1135</u>	Smith J
1057	C1024	24		<u>1057</u>	Hocine D
1068	C1025	28		<u>1068</u>	White T
1135	<u>C1025</u>	15	1	• <b>PK:</b> eNo	
1135	<u>C1026</u>	10	1	No changes from	om

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

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

- PK: contractNo
- **FK**: eventNo references Event
- Resolves: Removed eventLoc; now only contains contractNo and its associated 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	

- PK: staffNo, appointmentDate
- Resolves: branchNo now depends on the complete primary key (tracks which branch a therapist works at on each day)

event		
<u>eventNo</u>	eventLoc	
<u>H25</u>	Queens	
<u>H4</u>	Yonkers	
• PK: eventNo		

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

ti	therapist_schedule			
staffNo appointmentDate branchN		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		
<u>\$1032</u>	9/15/2022	B13		

- S1032 P105 9/14/2022 16:30 S1032 P110 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

appointment

appointmentDate

9/12/2022

9/12/2022

9/12/2022

9/14/2022

10:00

10:00

14:00

patNo

P100

P105

P108

P108

# Final stan: 3NF

Filial Step. SINF			
the	therapist		
staffNo	therapistName		
<u>\$1011</u>	Fred Smith		
S1024	Heidi Pierce		
S1032	S1032 Richard Levin		

- Same as 2NF
- patNo P100 P105 P108 P110 • PK: staffNo
  - Same as 2NF
- patient staffNo appointmentDate branchNo patName S1011 9/12/2022 Lily White S1024 9/12/2022 Q10 Jill Baker S1024 9/14/2022 Q10 Andy Mckee <u>\$1032</u> M15 9/14/2022 Jimmy Winter • PK: patNo S1032 9/15/2022 B13
  - FK: staffNo references Therapist

therapist\_schedule

- appointment staffNo appointmentDate appointmentTime S1011 P100 9/12/2022 10:00 S1011 P105 9/12/2022 12:00 S1024 P108 9/12/2022 10:00 P108 9/14/2022 S1024 14:00 S1032 P105 9/14/2022 16:30 <u>\$1032</u> <u>P110</u> 9/15/2022 18:00
- 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