**Question 1 Parts Warehouse**

Assumptions:

1. There are no relations between cage code, type, and unit price. Cage code does not depend on type.
2. Cage code depends only on the part number, and different part can have the same cage code.
3. There is no special relationship between specific employees and customers. Employees help any and all different customers.
4. Customer number is unique to each customer.
5. Part number is unique to each part.
6. Employee is uniquely identified by its name.
7. One customer only has one order at a specific date and time.

The following table is in 1NF with customer number, date, and time as primary keys.

Order_detail

| **customerNumber PK** | customerName | customerType | **date PK** | **time PK** | 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 |

The table is not in 2NF because there is partial dependency. Customer name and customer type only depend on customer number, while the rest depend on all primary keys. So, we split the tables to reach 2NF:

customer

| **customerNumber PK** | customerName | customerType |
|---|---|---|
| HG54587 | Jeff Peterson | Consumer |
| HG54587 | Jeff Peterson | Consumer |
| HG54587 | Jeff Peterson | Consumer |
| HG54587 | Jeff Peterson | Consumer |

order_detail

| customerNumber PK | date PK | time PK | employee | partNumber | name | type | cageCode | quantityOrdered | unitPrice |
|---|---|---|---|---|---|---|---|---|---|
| HG54587 | 7/1/2024 | 10:30 AM | D. Harrison | 10654 | Float Control | Plumbing | G413 | 4 | 12 |
| HG54587 | 7/1/2024 | 10:30 AM | D. Harrison | 10456 | Modulator | Electrical | H433 | 3 | 7 |
| HG54587 | 7/1/2024 | 10:30 AM | D. Harrison | 10776 | Hose Assembly | Plumbing | G413 | 7 | 9 |
| HG54587 | 7/1/2024 | 10:30 AM | D. Harrison | 10657 | Float Assembly | Plumbing | G413 | 5 | 10 |

The tables are not in 3NF because there are transitive dependencies. Name, type, cage code, and unit price depend on the part number. Moving these data out to get the final tables in 3NF:

customer

| customerNumber PK | customerName | customerType |
|---|---|---|
| HG54587 | Jeff Peterson | Consumer |
| HG54587 | Jeff Peterson | Consumer |
| HG54587 | Jeff Peterson | Consumer |
| HG54587 | Jeff Peterson | Consumer |

order_detail

| *customerNumber PK, FK* | date PK | time PK | employee | quantityOrdered | *partNumber PK, FK* |
|---|---|---|---|---|---|
| *HG54587* | 7/1/2024 | 10:30 AM | D. Harrison | 4 | *10654* |
| *HG54587* | 7/1/2024 | 10:30 AM | D. Harrison | 3 | *10456* |
| *HG54587* | 7/1/2024 | 10:30 AM | D. Harrison | 7 | *10776* |
| *HG54587* | 7/1/2024 | 10:30 AM | D. Harrison | 5 | *10657* |

part

| partNumber PK | 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 |

**Question 2 Panacea Mental Health**

Assumptions:

1. Appointment date and time are stored as a timestamp. They are kept in one column.
2. Therapists are uniquely identified by staffNo.
3. Patients are uniquely identified by patNo.
4. One therapist sees only one patient at a time.
5. There is no special relation between branchNo and appointment time and date.

The table is in 1NF since there are no repeating groups. The primary keys are staffNo and patNo.

Appointment

| **staffNo PK** | therapistName | **patNo PK** | patName | appointment_date_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 |

The table is not in 2NF because therapist name is partially dependent on staffNo and patName is partially dependent on patNo. So, the tables in 2NF are:

therapist

| **staffNo PK** | therapistName |
|---|---|
| S1011 | Fred Smith |
| S1011 | Fred Smith |
| S1024 | Heidi Pierce |
| S1024 | Heidi Pierce |
| S1032 | Richard Levin |
| S1032 | Richard Levin |

patient

| **patNo PK** | patName |
|---|---|
| P100 | Lily White |
| P105 | Jill Baker |
| P108 | Andy McKee |
| P108 | Andy McKee |
| P105 | Jill Baker |
| P110 | Jimmy Winter |

appointment

| **staffNo PK** | **patNo PK** | appointment_date_time | | branchNo |
|---|---|---|---|---|
| S1011 | P100 | 9/12/2022 | 10:00 | M15 |
| S1011 | P105 | 9/12/2022 | 12:00 | M15 |
| S1024 | P108 | 9/12/2022 | 10:00 | Q10 |
| S1024 | P108 | 9/14/2022 | 14:00 | Q10 |
| S1032 | P105 | 9/14/2022 | 16:30 | M15 |
| S1032 | P110 | 9/15/2022 | 18:00 | B13 |

The tables are in 3NF since there are no transitive dependencies. The tables in 3NF are:

therapist

| **staffNo PK** | therapistName |
|---|---|
| S1011 | Fred Smith |
| S1011 | Fred Smith |
| S1024 | Heidi Pierce |
| S1024 | Heidi Pierce |
| S1032 | Richard Levin |
| S1032 | Richard Levin |

patient

| **patNo PK** | patName |
|---|---|
| P100 | Lily White |
| P105 | Jill Baker |
| P108 | Andy McKee |
| P108 | Andy McKee |
| P105 | Jill Baker |
| P110 | Jimmy Winter |

appointment

| ***staffNo PK, FK*** | ***patNo PK, FK*** | appointment_date_time | | branchNo |
|---|---|---|---|---|
| *S1011* | *P100* | 9/12/2022 | 10:00 | M15 |
| *S1011* | *P105* | 9/12/2022 | 12:00 | M15 |
| *S1024* | *P108* | 9/12/2022 | 10:00 | Q10 |
| *S1024* | *P108* | 9/14/2022 | 14:00 | Q10 |
| *S1032* | *P105* | 9/14/2022 | 16:30 | M15 |
| *S1032* | *P110* | 9/15/2022 | 18:00 | B13 |

**Question 3 Event Management**

Assumptions:

1. eNo is unique for each member of staff. eName only depends on eNo.
2. Each contract only applies to one event, which has one event location.
3. Multiple employees can work on the same event. One employee can work on different events.
4. Event location depends on eventNo.
5. eNo and contractNo uniquely identify each record of events and contracts in 1NF.

The table is in 1NF with primary keys of eNo and contractNo. There are no repeating groups.

event_contract

| **eNo PK** | **contractNo PK** | hour | 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 |

The table is not in 2NF because employee name depends only on eNo, and eventNo and eventLoc depend only on contractNo. So, the tables in 2NF are:

employee

| **eNo PK** | eName |
|---|---|
| 1135 | Smith J |
| 1057 | Hocine D |
| 1068 | White T |
| 1135 | Smith J |
| 1135 | Smith J |

event_contract

| **contractNo PK** | eventNo | eventLoc |
|---|---|---|
| C1024 | H25 | Queens |
| C1024 | H25 | Queens |
| C1025 | H4 | Yonkers |
| C1025 | H4 | Yonkers |
| C1026 | H25 | Queens |

hour

| **eNo PK** | **contractNo PK** | hour |
|---|---|---|
| 1135 | C1024 | 16 |
| 1057 | C1024 | 24 |
| 1068 | C1025 | 28 |
| 1135 | C1025 | 15 |
| 1135 | C1026 | 10 |

The tables are not in 3NF since there is transitive dependency. EventLoc depends on eventNo. So, the tables in 3NF are:

employee

| **eNo PK** | eName |
|---|---|
| 1135 | Smith J |
| 1057 | Hocine D |
| 1068 | White T |
| 1135 | Smith J |
| 1135 | Smith J |

event

| **eventNo PK** | eventLoc |
|---|---|
| H25 | Queens |
| H25 | Queens |
| H4 | Yonkers |
| H4 | Yonkers |
| H25 | Queens |

event_contract

| **contractNo PK** | *eventNo, FK* |
|---|---|
| C1024 | *H25* |
| C1024 | *H25* |
| C1025 | *H4* |
| C1025 | *H4* |
| C1026 | *H25* |

hour

| ***eNo PK, FK*** | ***contractNo PK, FK*** | hour |
|---|---|---|
| *1135* | *C1024* | 16 |
| *1057* | *C1024* | 24 |
| *1068* | *C1025* | 28 |
| *1135* | *C1025* | 15 |
| *1135* | *C1026* | 10 |