**Normalization**

**Table: farmer**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| F\_ID(PK) | Password | | First\_name | | Last\_name | state | district | Registration\_date |
| Birth\_date | | Contact\_No | | Yearly\_income | |

|  |  |
| --- | --- |
| FD | Minimal cover |
| F\_ID🡪First\_name  F\_ID 🡪Last\_name  F\_ID 🡪 State  F\_ID 🡪Birth\_date  F\_ID 🡪 Contact\_no  F\_ID 🡪 Registration\_date  F\_ID 🡪 Yearly\_income | F\_ID🡪 First\_name  F\_ID 🡪Last\_name  F\_ID 🡪State  F\_ID 🡪Birth\_date  F\_ID 🡪Contact\_no  F\_ID 🡪Registration\_date  F\_ID 🡪Yearly\_income |

**Candidate Key:-** F\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: farm**

|  |  |  |
| --- | --- | --- |
| F\_ID | Farm\_ID (PK) | Area\_of\_farm |

|  |  |
| --- | --- |
| FD | Minimal cover |
| Farm\_ID 🡪 F\_ID  Farm\_ID 🡪 Area | Farm\_ID 🡪 F\_ID  Farm\_ID 🡪 Area |

**Candidate Key:-** Farm\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: crop\_info**

|  |  |
| --- | --- |
| crop\_ID (PK) | crop\_name |

|  |  |
| --- | --- |
| FD | Minimal cover |
| crop\_ID 🡪 crop\_name | crop\_ID 🡪 crop\_name |

**Candidate Key:-** crop\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: current\_season\_crop**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| F\_ID (PK) | crop\_ID | | Farm\_ID (PK) | Expected\_production | Expected\_price |
| sowing\_Month (PK) | | harvest\_month (PK) | | crop\_delivery\_month |

|  |  |
| --- | --- |
| FD | Minimal cover |
| Farm\_ID 🡪 F\_ID  Farm\_ID 🡪 crop\_ID  Farm\_ID 🡪 sowing\_month  Farm\_ID 🡪 sowing\_year  Farm\_ID 🡪 harvest\_month  Farm\_ID 🡪 harvest\_year | Farm\_ID 🡪 F\_ID  Farm\_ID 🡪 crop\_ID  Farm\_ID 🡪 sowing\_month  Farm\_ID 🡪 sowing\_year  Farm\_ID 🡪 harvest\_month  Farm\_ID 🡪 harvest\_year |

**Candidate Key:-** Farm\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: crop\_buyer**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CB\_ID (PK) | | Password | | First\_name | | Last\_name | state | | district | Registration\_date |
| Birth\_date | Ratings | | Yearly\_income | | Total\_deals\_done | | |

|  |  |
| --- | --- |
| FD | Minimal cover |
| CB\_ID 🡪 Ratings  CB\_ID 🡪 Total\_deals\_done  CB\_ID🡪First\_name  CB\_ID🡪Last\_name  CB\_ID 🡪 State  CB\_ID 🡪 Birth\_date  CB\_ID 🡪 Contact\_no  CB\_ID 🡪 Registration\_date  CB\_ID 🡪 Yearly\_income | CB\_ID 🡪 Ratings  CB\_ID 🡪 Deals\_done  CB\_ID🡪First\_name  CB\_ID🡪Last\_name  CB\_ID 🡪 State  CB\_ID 🡪 Birth\_date  CB\_ID 🡪 Contact\_no  CB\_ID 🡪 Registration\_date  CB\_ID 🡪 Yearly\_income |

**Candidate Key:-** CB\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: crop\_buyer\_need**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CB\_ID(PK) | crop\_id | Needed\_quantity | Affordable\_Price | Deadline\_month |

|  |  |
| --- | --- |
| FD | Minimal cover |
| (CB\_ID)(crop\_ID) 🡪 needed\_quantity  (CB\_ID)(crop\_ID) 🡪 Affordable\_price  (CB\_ID)(crop\_ID) 🡪 Deadline\_month  (CB\_ID)(crop\_ID) 🡪 Deadline\_year | (CB\_ID)(crop\_ID) 🡪 needed\_quantity  (CB\_ID)(crop\_ID) 🡪 Affordable\_price  (CB\_ID)(crop\_ID) 🡪 Deadline\_month  (CB\_ID)(crop\_ID) 🡪 Deadline\_year |

**Candidate Key:-** (CB\_ID)(crop\_ID)

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: deals\_with**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| F\_ID(PK) | CB\_ID (PK) | crop\_ID (PK) | quantity\_of\_crop | payment\_type | Amount\_paid | deal\_time (PK) |

|  |  |
| --- | --- |
| FD | Minimal cover |
| (CB\_ID)(crop\_ID)(F\_ID)(deal\_time) 🡪quantity\_of\_crop  (CB\_ID)(crop\_ID)(F\_ID)(deal\_time)  🡪payment\_type  (CB\_ID)(crop\_ID)(F\_ID)(deal\_time)  🡪Amount\_paid | (CB\_ID)(crop\_ID)(F\_ID)(deal\_time) 🡪quantity\_of\_crop  (CB\_ID)(crop\_ID)(F\_ID)(deal\_time)  🡪payment\_type  (CB\_ID)(crop\_ID)(F\_ID)(deal\_time)  🡪Amount\_paid |

**Candidate Key:-** (CB\_ID)(crop\_ID)(F\_ID)(deal\_time)

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: soil\_analytical\_lab**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Lab\_ID (PK) | Password | Lab\_Name | Contact\_NO | state | district | Pin\_code | opening\_time |
| closing\_time |

|  |  |
| --- | --- |
| FD | Minimal cover |
| Lab\_ID 🡪 Lab\_name  Lab\_ID 🡪 Contact\_NO  Lab\_ID 🡪 state  Lab\_ID 🡪 district  Lab\_ID 🡪 opening\_time  Lab\_ID 🡪closing\_time | Lab\_ID 🡪 Lab\_name  Lab\_ID 🡪 contact\_no  Lab\_ID 🡪 state  Lab\_ID 🡪 district  Lab\_ID 🡪 opening\_time  Lab\_ID 🡪closing\_time |

**Candidate Key:-** Lab\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: test**

|  |  |  |
| --- | --- | --- |
| Test\_name | Test\_ID (PK) | Price |

|  |  |
| --- | --- |
| FD | Minimal cover |
| Test\_ID 🡪 Test\_name | Test\_ID 🡪 Test\_name |

**Candidate Key:-** Test\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: test\_info**

|  |  |  |  |
| --- | --- | --- | --- |
| Lab\_ID(PK) | Test\_ID (PK) | Test\_price | Time\_to\_complete\_test |

|  |  |
| --- | --- |
| FD | Minimal cover |
| (Test\_ID)(Lab\_ID) 🡪 Test\_price  (Test\_ID)(Lab\_ID) 🡪Days\_for\_test | (Test\_ID)(Lab\_ID) 🡪 Test\_price  (Test\_ID)(Lab\_ID) 🡪Days\_for\_test |

**Candidate Key:-** (Test\_ID)(Lab\_ID)

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: provides\_soil\_analysis**

|  |  |  |  |
| --- | --- | --- | --- |
| Test\_ID(PK) | payment\_type | amount\_paid | sample\_given\_date (PK) |
| Report\_recieved\_date | date\_of\_payment | Lab\_ID (PK) | F\_ID (PK) |

|  |  |
| --- | --- |
| FD | Minimal cover |
| (Test\_ID)(sample\_given\_date)(Lab\_ID)(F\_ID) 🡪 (Payment\_type)(amount) (Report\_received\_date) | (Test\_ID)(sample\_given\_date)(Lab\_ID)(F\_ID) 🡪 (Payment\_type)(amount) (Report\_received\_date) |

**Candidate Key:-** (Test\_ID)(sample\_given\_date)(Lab\_ID)(F\_ID)

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: fertilizer\_dealer**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Fd\_ID(PK) | First\_name | Last\_name | State | District | Pin\_code | Yearly\_Income | Contact\_No |

|  |  |
| --- | --- |
| FD | Minimal cover |
| FD\_ID🡪First\_name  FD\_ID 🡪Last\_name  FD\_ID 🡪 State  FD\_ID 🡪Birth\_date  FD\_ID 🡪 Contact\_no  FD\_ID 🡪 Registration\_date  FD\_ID 🡪 Yearly\_income | FD\_ID🡪First\_name  FD\_ID 🡪Last\_name  FD\_ID 🡪 State  FD\_ID 🡪Birth\_date  FD\_ID 🡪 Contact\_no  FD\_ID 🡪 Registration\_date  FD\_ID 🡪 Yearly\_income |

**Candidate Key:-** FD\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: fertilizer**

|  |  |
| --- | --- |
| Fertilizer\_ID (PK) | Fertilier\_name |

|  |  |
| --- | --- |
| FD | Minimal cover |
| Fertilizer\_ID 🡪 Fertilizer\_name | Fertilizer\_ID 🡪 Fertilizer\_name |

**Candidate Key:-** Fertilizer\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: fertilizer\_availability**

|  |  |  |  |
| --- | --- | --- | --- |
| Fd\_ID (PK) | Fertilizer\_ID (PK) | Price | Available\_stock |

|  |  |
| --- | --- |
| FD | Minimal cover |
| (FD\_ID)(Fertilizer\_ID) 🡪 Price  (FD\_ID)(Fertilizer\_ID) 🡪 Available\_stock | (FD\_ID)(Fertilizer\_ID) 🡪 Price  (FD\_ID)(Fertilizer\_ID) 🡪 Available\_stock |

**Candidate Key:-** (FD\_ID)(Fertilizer\_ID)

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: fertilizer\_deal**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| F\_ID(PK) | Fd\_ID (PK) | Quantity\_of\_Fertilizer | Amount\_paid | Fertilizer\_ID (PK) | Payment\_type | Deal\_time (PK) |

|  |  |
| --- | --- |
| FD | Minimal cover |
| (F\_ID)(FD\_ID)(Fertilizer\_ID)  (Deal\_time)🡪  (Amount\_paid)(Payment\_type)  (quantity\_of\_fertilizer) | (F\_ID)(FD\_ID)(Fertilizer\_ID)  (Deal\_time)🡪  (Amount\_paid)(Payment\_type)  (quantity\_of\_fertilizer) |

**Candidate Key:-** (F\_ID)(FD\_ID)(Fertilizer\_ID)(Deal\_time)

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: irrigation\_system**

|  |  |  |  |
| --- | --- | --- | --- |
| Farm\_ID (PK) | temperature | humidity | methane\_amount |

|  |  |
| --- | --- |
| FD | Minimal cover |
| Farm\_ID 🡪 temperature  Farm\_ID 🡪 humidity  Farm\_ID 🡪 methane\_amount | Farm\_ID 🡪 temperature  Farm\_ID 🡪 humidity  Farm\_ID 🡪 methane\_amount |

**Candidate Key:-** Farm\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: transportation\_provider**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| First\_name | Last\_name | | TP\_ID (PK) | Registration\_date | Ratings | Availability |
| location\_latitude | | location\_longitude | |

|  |  |
| --- | --- |
| FD | Minimal cover |
| TP\_ID 🡪 First\_name  TP\_ID 🡪 Last\_name  TP\_ID 🡪 Registration\_date  TP\_ID 🡪 Ratings  TP\_ID 🡪Availability  TP\_ID 🡪location\_latitude  TP\_ID 🡪 location\_longitude | TP\_ID 🡪 First\_name  TP\_ID 🡪 Last\_name  TP\_ID 🡪 Registration\_date  TP\_ID 🡪 Ratings  TP\_ID 🡪Availability  TP\_ID 🡪location\_latitude  TP\_ID 🡪 location\_longitude |

**Candidate Key:-** TP\_ID

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: transportation\_vehicle**

|  |  |  |
| --- | --- | --- |
| TP\_ID | Rc\_book\_number | Vehicle\_number (PK) |

|  |  |
| --- | --- |
| FD | Minimal cover |
| Vehicle\_number 🡪  TP\_ID  Vehicle\_number🡪  Vehicle\_model  Vehicle\_number🡪  Rc\_book\_number | Vehicle\_number 🡪  TP\_ID  Vehicle\_number 🡪  Vehicle\_model  Vehicle\_number 🡪  Rc\_book\_number |

**Candidate Key:-** Vehicle\_number

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes

**Table: circulation\_deal**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CB\_ID (PK) | | TP\_ID (PK) | Source\_latitude | | Source\_longitude | | Destination\_latitude | | Destination\_longitude |
| item | Payment\_type | | | Amount\_Paid | | Time\_of\_payment (PK) | |

|  |  |
| --- | --- |
| FD | Minimal cover |
| (CB\_ID)(TP\_ID)(Time\_of\_payment) 🡪Source  (CB\_ID)(TP\_ID)(Time\_of\_payment) 🡪Destination,item  (CB\_ID)(TP\_ID)(Time\_of\_payment)  🡪 Payment\_type  (CB\_ID)(TP\_ID)(Time\_of\_payment)  🡪 Amount\_Paid | (CB\_ID)(TP\_ID)(Time\_of\_payment) 🡪Source  (CB\_ID)(TP\_ID)(Time\_of\_payment) 🡪Destination,item  (CB\_ID)(TP\_ID)(Time\_of\_payment)  🡪 Payment\_type  (CB\_ID)(TP\_ID)(Time\_of\_payment)🡪 Amount |

**Candidate Key:-** (CB\_ID)(TP\_ID)(Time\_of\_payment)

**Normalization:**

1NF 🡪 Yes

2NF 🡪 Yes

3NF 🡪 Yes

BCNF 🡪 Yes