**Q1.**

> requires

1..\*

**Payment Information**

Cardholder’s name

Cardholder’s address

Cardholder’s phone number

Card number

Card expiration date

Card security digits

Card issuer (AmEx, Visa, etc)

Bank account holder’s name

Bank account holder’s address

Bank name

Bank account number

Bank account sort code

*Etc…*

**Customer**

*Primary Key:* ID Number

Name

Address

Phone number

Payment Method

**Entities** (in bold)

Attributes (listed under entities)

Relationships (words outside of entities, describing relationships between entities)

< used for orders by

0..0

v contains

0..\*

^ pare parts of an

1..1

^ placed by

0..\*

v places

1..1

**Order**

Order ID number

Payment type

Payment amount

**Order item(s)**

Item type

Quantity

Price

Return?

**Q2.**

Additional help used for this response: <https://www.guru99.com/database-normalization.html>

**Original Table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Employee Number | Name | Department | City | Rating |
| 1 | Amit | EBIEE, ETL | NYC | Average |
| 2 | Divya | COGNOS | TX | Average |
| 3 | Rama | Admin | NYC | Star |

**First Normal Form (1NF):** one value per cell, all values must be unique

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Employee Number | Name | Department | City | Rating |
| 1 | Amit | EBIEE | NYC | Average |
| 1 | Amit | ETL | NYC | Average |
| 2 | Divya | COGNOS | TX | Average |
| 3 | Rama | Admin | NYC | Star |

**Second Normal Form (2NF):** 1NF rules, a single column primary key (key = Employee number)

|  |  |  |  |
| --- | --- | --- | --- |
| Employee Number | Name | City | Rating |
| 1 | Amit | NYC | Average |
| 2 | Divya | TX | Average |
| 3 | Rama | NYC | Star |

|  |  |
| --- | --- |
| Employee Number | Department |
| 1 | IBIEE |
| 1 | ETL |
| 2 | COGNOS |
| 3 | Admin |

**Third Normal Form (3NF):** 2NF rules, transitive functional dependencies in separate tables

Foreign Keys (for transitive columns):

|  |  |
| --- | --- |
| Department ID | Department |
| 0 | EBIEE |
| 1 | ETL |
| 2 | COGNOS |
| 3 | Admin |

|  |  |
| --- | --- |
| City ID | City |
| 0 | NYC |
| 1 | TX |

|  |  |
| --- | --- |
| Rating ID | Rating |
| 0 | Dangerous/Liable |
| 1 | Below Average |
| 2 | Average |
| 3 | Above Average |
| 4 | Star |

Primary Key (employee number):

|  |  |
| --- | --- |
| Employee Number | Name |
| 1 | Amit |
| 2 | Divya |
| 3 | Rama |

|  |  |  |
| --- | --- | --- |
| Employee Number | City ID | Rating ID |
| 1 | 1 | 2 |
| 2 | 2 | 2 |
| 3 | 1 | 4 |

|  |  |
| --- | --- |
| Employee Number | Department ID |
| 1 | 1 |
| 1 | 2 |
| 2 | 3 |
| 3 | 4 |

*\*this should still be 4 rows, else it will cease to satisfy NF1 rule: “each cell should contain a single value”.*