**Normalization Model #2**

* A company has a number of salespeople who work in different company departments. A salesperson has a name, a sales commission percentage, the year of hire, and the department where they work. Salespeople sell products which have a product name and a unit price. The quantity of products sold by each salesperson is shown.



Normalize this information to 1 NF, then to 2 NF, then to 3 NF. Indicate the names of the relations and primary keys.  You can either underscore the columns or place an asterisk next to the column to indicate primary keys.   Use the following table structure to show your work.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **UNF** | **1NF** | **2NF** | **3NF** | **Entity** |
| Salesperson\_ID\* | Salesperson\_ID\* | Salesperson\_ID\* | Salesperson\_ID\* | Salesperson |
| Salesperson\_name | Salesperson\_name | Salesperson\_name | Salesperson\_name |  |
| Department\_ID | Department\_ID | Department\_ID | Sales\_Commission |  |
| Department\_Name | Department\_Name | Department\_Name | Hire\_Year |  |
| Sales\_Commission | Sales\_Commission | Sales\_Commission | Department\_ID (FK) |  |
| Hire\_Year | Hire\_Year | Hire\_Year |  |  |
| Product\_ID\* ) |  |  | Department\_ID\* | Department |
| Prod\_Name ) | Salesperson\_ID\* | Salesperson\_ID\* | Department\_Name |  |
| Unit\_Price ) | Product\_ID\* | Product\_ID\* |  |  |
| Quantity\_Sold ) | Prod\_Name | Quantity\_Sold | Salesperson\_ID\* | Product\_Sale |
|  | Unit\_Price |  | Product\_ID\* |  |
|  | Quantity\_Sold | Product\_ID\* | Quantity\_Sold |  |
|  |  | Prod\_Name |  |  |
|  |  | Unit\_Price | Product\_ID\* | Product |
|  |  |  | Prod\_Name |  |
|  |  |  | Unit\_Price |  |

**Hint:** 3NF has 4 entities.

**Marks:** – 10 marks: 3 for 1NF,3 for 2NF, 3 for 3NF and 1 for entity names.