**Design 1 Shipments Database**

Databases are essentially a computerised version of a filing cabinet for paper records/folders. We will start by examining a paper card/file format or paper filing system. Imagine millions of these paper receipts; or a filing cabinet full of college applications forms etc.

Supplier Name Address

S1 Smith London Card No 1 in the list

Shipping list

PartNo Name Qty

* P1 Nut 200 Note: only one entry here

Supplier Name Address

S2 Jones Paris Card No 2 in the list

Shipping list

PartNo Name Qty

* + P3 Screw 400 Note: two entries here
  + P5 Wheel 100

S3 Blake Paris Card No 3 in the list

* P3 Screw 200
* P4 Screw 500
* P5 Wheel 350 Note: Three entries

Note that a person has designed the paper form to be that structure.

Note that each card has a variable number of entries. This is an issue for the design. **Data like this is called a repeating group.** Repeating groups cause problems for design because you do not know in advance the number of items on any given list.

Relational databases only allow a data structure called a table defined by 2 **properties/rules**.

Rule 1: a uniform number of columns i.e. each row has a fixed number of columns.

Rule 2: intersection of a row - column is one data value (i.e. no repeating groups)

When a table you organise (design) adheres to the rules, it is called a normal form (e.g. 1NF means first Normal Form). So, when we structure data according to rules, we normalise it.

Design approach: Start with a one table solution. i.e. list all attributes in the paper form. We will add in other attribute for part, part weight, colour.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sno | SName | City | Phone\_No | Pno | PName | Colour | Weight | Qty |
| S1 | Smith | London | 2343234 | P1 | Nut | Red | 12 | 200 |
| S2 | Jones | Paris | 2412343 | P3 | Screw | Blue | 17 | 400 |
| S2 | Jones | Paris | 2412343 | P5 | Cam | Blue | 12 | 100 |
| S3 | Blake | Paris | 2224344 | P3 | Screw | Blue | 17 | 200 |
| S3 | Blake | Paris | 2224344 | P4 | Screw | Red | 14 | 500 |

1. Criticise this initial design i.e. analyse/examine this solution for possible problems.

Add the following extra design rule. Why? Discuss in class.

Rule 3: each row in a table must be unique. In other words, no two rows can be the same.

1. Redesign (or develop a new design) to eliminate the problems.

Suppliers

|  |  |  |  |
| --- | --- | --- | --- |
| **Sno** | **SName** | **City** | **PhoneNo** |
| S1 | Smith | London | 2343234 |
| S2 | Jones | Paris | 2412343 |
| S3 | Blake | Paris | 2224344 |

Parts

|  |  |  |  |
| --- | --- | --- | --- |
| **Pno** | **PName** | **Colour** | **Weight** |
| P1 | Nut | Red | 12 |
| P3 | Screw | Blue | 17 |
| P4 | Screw | Red | 14 |
| P5 | Cam | Blue | 12 |

Shipment

|  |  |  |  |
| --- | --- | --- | --- |
| **InvoiceNo** | **Pno** | **Qty** | **Sno** |
| 1 | P1 | 200 | S1 |
| 2 | P3 | 400 | S2 |
| 3 | P3 | 200 | S3 |
| 4 | P4 | 500 | S3 |
| 5 | P5 | 100 | S2 |