If there are any groups in the table / relationship, they are not in 1 NF.

A relation is in 1NF if it has no repeating groups.

* Given an relation – Need to analysis attributes (whether multiple data is possible or not )
* Given a table with data -- By seeing if there are any groups in table
* Given an ER diagram -- Need to analysis attributes

Student (**stuId**, FirstName , LastName, gpa, Phone number) is this in 1NF?

* No (Student may have multiple phone numbers)

A relation is in 2NF if the relation is in 1NF and has no partial dependencies.

Partial dependency = that can be determined by part of PK.

A relation is in 3NF if it is in **2NF** and has **no transitive Dependencies**.

Non key determining another non key attribute then it is a transitive dependence.

10000 students in a university

University offers 50 majors

Each student is enrolled in all majors

We need to store the data of all the students with following attributes.

Stuid , firstname, lastname, gpa,Majorld,majorGpa.

Question Find the number of redundant cells before and after applying 2NF?

10000-> {50 majors} (grouped data)

10000 \* 50 for single value = 500000 \*7 =3500000 ->it is in 1NF

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Stuid | firstname | lastname | gpa | Majorld | hrs.required | majorGpa |

* 2nf

|  |  |  |  |
| --- | --- | --- | --- |
| Stuid | firstname | lastname | gpa |

|  |  |  |
| --- | --- | --- |
| Stuid | MajorId | majorGpa |

|  |  |
| --- | --- |
| Majorld | hrs.required |

10000 \*4 = 40000 + (10000\*50)

You have a relation R(A1,A2,A3,A4………A10)

A1

A2

A3

A4

BCNF left irreducible