***Normalization Form general rules:***

* scan and extract columns that has most duplicated record as independent, atomic, unique table

**NF 1 Rules :**

* ensure that the values in all record of a table are atomic and unique

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Id | Fullname | Gender | Powers | Address | City | Country |
| 1 | Clark Kent | Male | super human strength | 123 A street | Jakarta | Indonesia |
| 2 | Clark Kent | Male | flight | 333 A street | Jakarta | Indonesia |
| 3 | Clark Kent | Male | x-ray vision | 234 A street | Jakarta | Indonesia |
| 4 | Clark Kent | Male | heat vision | 123 A street | Jakarta | Indonesia |
| 5 | Barry Allen | Male | super speed | 321 A street | Jakarta | Indonesia |
| 6 | Barry Allen | Male | phasing | 122 A street | Jakarta | Indonesia |
| 7 | Barry Allen | Male | time travel | 111 A street | Jakarta | Indonesia |
| 8 | Barry Allen | Male | dimensional travel | 221 A street | Jakarta | Indonesia |
| 9 | Diana Prince | Female | super human strength | 432 A street | Jakarta | Indonesia |
| 10 | Diana Prince | Female | super human reflexes | 453 A street | Jakarta | Indonesia |
| 11 | Diana Prince | Female | super human agility | 132 A street | Jakarta | Indonesia |
| 12 | Diana Prince | Female | super human flight | 231 A street | Jakarta | Indonesia |
| 13 | Bruce Banner | Male | super human strength | 521 A street | Jakarta | Indonesia |
| 14 | Bruce Banner | Male | thunder clap | 444 A street | Jakarta | Indonesia |
| 15 | Bruce Banner | Male | super healing factor | 222 A street | Jakarta | Indonesia |
| 16 | Wanda Maximoff | Female | reality manipulation | 524 A street | Jakarta | Indonesia |
| 17 | Wanda Maximoff | Female | astral projection | 324 A street | Jakarta | Indonesia |
| 18 | Wanda Maximoff | Female | psionic | 635 A street | Jakarta | Indonesia |

**NF2 Rules:**

* Extract the the most duplicated columns to independent table
* Distinct extracted columns
* Give Primary Key Id to extracted columns
* Follow the rule NF1, all records in each table should be unique

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Id** | **Fullname** | **Gender** | **Powers** | **Address** |
| 1 | Clark Kent | Male | super human strength | 123 A street |
| 2 | Clark Kent | Male | flight | 333 A street |
| 3 | Clark Kent | Male | x-ray vision | 234 A street |
| 4 | Clark Kent | Male | heat vision | 123 A street |
| 5 | Barry Allen | Male | super speed | 321 A street |
| 6 | Barry Allen | Male | phasing | 122 A street |
| 7 | Barry Allen | Male | time travel | 111 A street |
| 8 | Barry Allen | Male | dimensional travel | 221 A street |
| 9 | Diana Prince | Female | super human strength | 432 A street |
| 10 | Diana Prince | Female | super human reflexes | 453 A street |
| 11 | Diana Prince | Female | super human agility | 132 A street |
| 12 | Diana Prince | Female | super human flight | 231 A street |
| 13 | Bruce Banner | Male | super human strength | 521 A street |
| 14 | Bruce Banner | Male | thunder clap | 444 A street |
| 15 | Bruce Banner | Male | super healing factor | 222 A street |
| 16 | Wanda Maximoff | Female | reality manipulation | 524 A street |
| 17 | Wanda Maximoff | Female | astral projection | 324 A street |
| 18 | Wanda Maximoff | Female | psionic | 635 A street |

*\* Here extraction result of NF1 table after filtering the most duplicated columns* ***City*** *and* ***Country****. We can see that total record is still equal with the NF1*

|  |  |  |
| --- | --- | --- |
| **Id** | **City** | **Country** |
| 1 | Jakarta | Indonesia |

*\* here we can see that columns* ***City*** *and* ***Country*** *is related each other*

**NF3 Rules:**

* Remember the general rules
* Look the most duplicated or repetitive record in tables
* Follow rules from NF2. Extract and distinct the most duplicated record to independent table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Id** | **Fullname** | **Gender** | **Address** |
| 1 | Clark Kent | Male | 123 A street |
| 2 | Clark Kent | Male | 333 A street |
| 3 | Clark Kent | Male | 234 A street |
| 4 | Barry Allen | Male | 321 A street |
| 5 | Barry Allen | Male | 122 A street |
| 6 | Barry Allen | Male | 111 A street |
| 7 | Barry Allen | Male | 221 A street |
| 8 | Diana Prince | Female | 432 A street |
| 9 | Diana Prince | Female | 453 A street |
| 10 | Diana Prince | Female | 132 A street |
| 11 | Diana Prince | Female | 231 A street |
| 12 | Bruce Banner | Male | 521 A street |
| 13 | Bruce Banner | Male | 444 A street |
| 14 | Bruce Banner | Male | 222 A street |
| 15 | Wanda Maximoff | Female | 524 A street |
| 16 | Wanda Maximoff | Female | 324 A street |
| 17 | Wanda Maximoff | Female | 635 A street |

|  |  |
| --- | --- |
| **Id** | **Powers** |
| 1 | super human strength |
| 2 | flight |
| 3 | x-ray vision |
| 4 | heat vision |
| 5 | super speed |
| 6 | phasing |
| 7 | time travel |
| 8 | dimensional travel |
| 9 | super human reflexes |
| 10 | super human agility |
| 11 | super human flight |
| 12 | thunder clap |
| 13 | super healing factor |
| 14 | reality manipulation |
| 15 | astral projection |
| 16 | psionic |

*\* Here extracted* ***Powers*** *columns from main table of NF2. We see the total record has been minus 2 cause we identified duplicate record of:*

|  |  |
| --- | --- |
| 1 | super human strength |

*appear 3 times*

|  |  |  |
| --- | --- | --- |
| **Id** | **City** | **Country** |
| 1 | Jakarta | Indonesia |

**NF4 Rules:**

* Remember the general rules
* Look the most duplicated or repetitive record in tables
* Follow rules from NF2. Extract and distinct the most duplicated record to independent table.

|  |  |  |
| --- | --- | --- |
| **Id** | **Fullname** | **Gender** |
| 1 | Clark Kent | Male |
| 2 | Barry Allen | Male |
| 3 | Diana Prince | Female |
| 4 | Bruce Banner | Male |
| 5 | Wanda Maximoff | Female |

*\* Here extraction result of NF3 for column* ***Fullname*** *and* ***Gender****. We see the total record has been minus 12 cause we identified duplicate record of all hero’s name appear multiple times*

|  |  |
| --- | --- |
| **Id** | **Address** |
| 1 | 123 A street |
| 2 | 333 A street |
| 3 | 234 A street |
| 4 | 321 A street |
| 5 | 122 A street |
| 6 | 111 A street |
| 7 | 221 A street |
| 8 | 432 A street |
| 9 | 453 A street |
| 10 | 132 A street |
| 11 | 231 A street |
| 12 | 521 A street |
| 13 | 444 A street |
| 14 | 222 A street |
| 15 | 524 A street |
| 16 | 324 A street |
| 17 | 635 A street |

*\* Here extraction result of column* ***Address*** *from NF3 tale. We split out the column from table, caused its been unique and independent from Fullname and Gender.*

|  |  |
| --- | --- |
| **Id** | **Powers** |
| 1 | super human strength |
| 2 | flight |
| 3 | x-ray vision |
| 4 | heat vision |
| 5 | super speed |
| 6 | phasing |
| 7 | time travel |
| 8 | dimensional travel |
| 9 | super human reflexes |
| 10 | super human agility |
| 11 | super human flight |
| 12 | thunder clap |
| 13 | super healing factor |
| 14 | reality manipulation |
| 15 | astral projection |
| 16 | psionic |

|  |  |  |
| --- | --- | --- |
| **Id** | **City** | **Country** |
| 1 | Jakarta | Indonesia |

**NF5 Rules:**

* Remember the general rules
* Look the most duplicated or repetitive record in tables
* Follow rules from NF2. Extract and distinct the most duplicated record to independent table.

|  |  |
| --- | --- |
| **Id** | **Fullname** |
| 1 | Clark Kent |
| 2 | Barry Allen |
| 3 | Diana Prince |
| 4 | Bruce Banner |
| 5 | Wanda Maximoff |

*\* Here extraction result of NF3 for column* ***Fullname*** *because all record was unique no action required.*

|  |  |
| --- | --- |
| **Id** | **Gender** |
| 1 | Male |
| 2 | Female |

*\* Here extraction result of NF4 table after filtering the most duplicated columns* ***Gender****. We can see that total record has been decreased after we removing duplicate rows.*

|  |  |
| --- | --- |
| **Id** | **Address** |
| 1 | 123 A street |
| 2 | 333 A street |
| 3 | 234 A street |
| 4 | 321 A street |
| 5 | 122 A street |
| 6 | 111 A street |
| 7 | 221 A street |
| 8 | 432 A street |
| 9 | 453 A street |
| 10 | 132 A street |
| 11 | 231 A street |
| 12 | 521 A street |
| 13 | 444 A street |
| 14 | 222 A street |
| 15 | 524 A street |
| 16 | 324 A street |
| 17 | 635 A street |

|  |  |
| --- | --- |
| **Id** | **Powers** |
| 1 | super human strength |
| 2 | flight |
| 3 | x-ray vision |
| 4 | heat vision |
| 5 | super speed |
| 6 | phasing |
| 7 | time travel |
| 8 | dimensional travel |
| 9 | super human reflexes |
| 10 | super human agility |
| 11 | super human flight |
| 12 | thunder clap |
| 13 | super healing factor |
| 14 | reality manipulation |
| 15 | astral projection |
| 16 | psionic |

|  |  |  |
| --- | --- | --- |
| **Id** | **City** | **Country** |
| 1 | Jakarta | Indonesia |