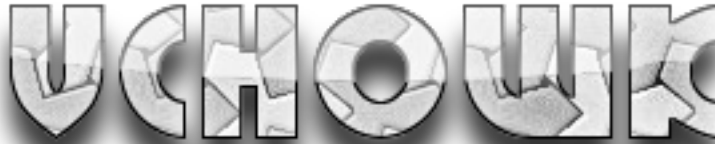


CS614 Data Warehousing Assignment No 1

IDEA SOLUTION!



Q: Normalize the given table (on the next page) up to 3rd normal form.

Read the below Guidelines carefully before solving the assignment.

- Show the data along with table structure.
- Do not send the archived file (.rar etc).
- Understand the scenario on the basis of given data only.
- Give the reason, if relation cannot be converted in any Particular Normal Form (1st, 2nd, 3rd).
- Don't convert the relation in to 3rd normal form directly. Show each normal form of the relation.

<u>DegreeProgram</u>	<u>Specialization</u> <u>Course</u>	<u>Course</u> <u>Instructor</u>	<u>Degree</u> <u>Duration</u>	<u>Degree</u> <u>Supervisor</u>	<u>Degree</u> <u>SupervisorOffice #</u>	<u>Campus</u>
MBA	Finance	Prof Sadiq	2 years	Prof Naveed	Office # 4	LHR-1
MBA	Marketing	Prof Wajid	2 years	Prof Naveed	Office # 4	LHR-2

MBA Executive	Finance	Prof Khan	1 year	Prof Naveed	Office # 4	LHR-1
MBA Executive	Marketing	Prof Nazar	1 year	Prof Naveed	Office # 4	LHR-2
BBA	Finance	Prof Usman	4 years	Prof Zeshan	Office # 19	LHR-1
BBA	Marketing	Prof Khizar	4 years	Prof Zeshan	Office # 19	LHR-2
MCS	ArtificialIntelligence	Prof Naeem	2 years	Prof Zafar	Office # 35	LHR-3
MCS	Networking	Prof Khalid	2 years	Prof Zafar	Office # 35	LHR-4
MIT	ArtificialIntelligence	Prof Naveed	2 years	Prof Akram	Office # 40	LHR-3
MIT	Networking	Prof Zaman	2 years	Prof Akram	Office # 40	LHR-4
BCS	ArtificialIntelligence	Prof Nawaz	4 years	Prof Zafar	Office # 35	LHR-3
BCS	Networking	Prof Fozia	4 years	Prof Zafar	Office # 35	LHR-4
BCS	Database	Prof Afifa	4 years	Prof Zafar	Office # 35	LHR-5

Solution:

Database Normalization

The main goal of Database Normalization is to restructure the logical data model of a database to:

Eliminate redundancy

Organize data efficiently

Reduce the potential for data anomalies.

1st Normal Form Requirements

The requirements to satisfy the 1st NF:

Each table has a primary key: minimal set of attributes which can uniquely identify a record

The values in each column of a table are atomic (No multi-value attributes allowed).

There are no repeating groups: two columns do not store similar information in the same table.

1st Normal Form

Example

Un-normalized Students table:

<u>Student#</u>	AdvID	AdvName	AdvRoom	Class1	Class2
123	123A	Jarnes	555	102-8	104-9
124	123B	Smith	467	209-0	102-8

Normalized Students table:

<u>Student#</u>	AdvID	AdvName	AdvRoom	Class#
123	123A	Jarnes	555	102-8
123	123A	Jarnes	555	104-9
124	123B	Smith	467	209-0
124	123B	Smith	467	102-8

2nd Normal Form Requirements

The requirements to satisfy the 2nd NF:

All requirements for 1st NF must be met.

Redundant data across multiple rows of a table must be moved to a separate table.

The resulting tables must be related to each other by use of foreign key.

2nd Normal Form Example

Students table

<u>Student#</u>	AdvID	AdvName	AdvRoom
123	123A	James	555
124	123B	Smith	467

Registration table

<u>Student#</u>	Class#
123	102-8
123	104-9
124	209-0
124	102-8

3rd Normal Form Requirements

The requirements to satisfy the 3rd NF:

All requirements for 2nd NF must be met.

Eliminate fields that do not depend on the primary key

That is, any field that is dependent not only on the primary key but also on another field must be moved to another table.

3rd Normal Form Example

Students table:

<u>Student#</u>	AdvID	AdvName	AdvRoom
123	123A	James	555
124	123B	Smith	467

Student table:

<u>Student#</u>	<u>AdvID</u>
123	123A
124	123B

Advisor table:

<u>AdvID</u>	AdvName	AdvRoom
123A	James	555
123B	Smith	467

3rd Normal Form Example Cont.

Students table:

<u>Student#</u>	<u>AdvID</u>
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123	123A
-----	------

124	123B
-----	------

Registration table:

<u>Student#</u>	<u>Class#</u>
-----------------	---------------

123	102-8
-----	-------

123	104-9
-----	-------

124	209-0
-----	-------

124	102-8
-----	-------

Advisor table:

<u>AdvID</u>	<u>AdvName</u>	<u>AdvRoom</u>
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123A	James	555
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123B	Smith	467
------	-------	-----

Conclusion

We have seen how Database Normalization can decrease redundancy, increase efficiency and reduce anomalies by implementing three of seven different levels of normalization called Normal Forms. The first three NF's are usually sufficient for most small to medium size applications.