

DATABASE NORMALIZATION

Relational Databases

- ▣ Advantages (Chang)
 - Each table in a relational database can be created, maintained, and edited separately from other tables
 - Tables can remain separate until they need to be linked for query or analysis

Normalization

- ▣ Definition (Chang)
 - ▣ A process of decomposition; breaking down into smaller tables while still maintaining necessary linkages between them

Normalization Example

Database tracking employees assigned to projects; pay rate (DatabaseJournal.com)

Project Number	Project Name	Employee number	Employee Name	Rate Category	Hourly Rate
1023	Madagascar travel site	11	Vincent Radebe	A	60
		12	Pauline James	B	50
		16	Charles Ramoraz	C	40
1056	Online estate agency	11	Vincent Radebe	A	60
		17	Monique Williams	B	50



Project Number	Project Name	Employee number	Employee Name	Rate Category	Hourly Rate
1023	Madagascar travel site	11	Vincent Radebe	A	60
1023	Madagascar travel site	12	Pauline James	B	50
1023	Madagascar travel site	16	Charles Ramoraz	C	40
1056	Online estate agency	11	Vincent Radebe	A	60
1056	Online estate agency	17	Monique Williams	B	50

First Normal Form:

- No Repeating Groups
- All key attributes defined
- All attributes dependent on primary key

□ Removing Duplications (Redundancies)

- Partial Dependencies – fields dependent on part of a key

Project Number	Project Name	Employee number	Employee Name	Rate Category	Hourly Rate
1023	Madagascar travel site	11	Vincent Radebe	A	60
1023	Madagascar travel site	12	Pauline James	B	50
1023	Madagascar travel site	16	Charles Ramoraz	C	40
1056	Online estate agency	11	Vincent Radebe	A	60
1056	Online estate agency	17	Monique Williams	B	50



Project Number	Employee number
1023	11
1023	12
1023	16
1056	11
1056	17

Employee number	Employee Name	Rate Category	Hourly Rate
11	Vincent Radebe	A	60
12	Pauline James	B	50
16	Charles Ramoraz	C	40
17	Monique Williams	B	50

Project Number	Project Name
1023	Madagascar travel site
1056	Online estate agency

Second Normal Form:

- Already in 1st Normal Form
- No Partial Dependencies

□ Continuing removal of redundancies

Employee number	Employee Name	Rate Category	Hourly Rate
11	Vincent Radebe	A	60
12	Pauline James	B	50
16	Charles Ramoraz	C	40
17	Monique Williams	B	50

Employee number	Employee Name	Rate Category
11	Vincent Radebe	A
12	Pauline James	B
16	Charles Ramoraz	C
17	Monique Williams	B

Rate Category	Hourly Rate
A	60
B	50
C	40

Third Normal Form:

- Already in 2nd Normal Form
- No Transitive Dependencies

□ Final Product

Project Number	Employee number
1023	11
1023	12
1023	16
1056	11
1056	17

Project Number	Project Name
1023	Madagascar travel site
1056	Online estate agency

Employee number	Employee Name	Rate Category
11	Vincent Radebe	A
12	Pauline James	B
16	Charles Ramoraz	C
17	Monique Williams	B

- Can add, delete, update data from attribute tables easily
- Reduces the opportunity for errors
- Can query data by linking tables using keys

Rate Category	Hourly Rate
A	60
B	50
C	40

References

- ▣ Chang Text
- ▣ Database Normalization, Author: Ian Gilfillan, site: DatabaseJournal.com, March 22, 2000.

http://www.databasejournal.com/sql/etc/article.php/26861_1428511_1/Database-Normalization.htm