Second Normal Form

Second Normal form

- Redundancy in the table which cause what is called **update anomalies**

- **Update –** change in name requires multiple updates

- **Inconsistent Data-** nothing to prevent the course names from being different

Student Number	Student Name	Coordinator ID	Coordinator	Course Number	Course Name
2001	Clark Kent	1001	Peter Nikita	MAD 100	Java Programming 1
2001	Clark Kent	1001	Peter Nikita	MAD101	Working With Graphics
2001	Clark Kent	1001	Peter Nikita	MAD102	Introduction To Programming
2001	Clark Kent	1001	Peter Nikita	MAD103	Data Fundamentals
2001	Clark Kent	1001	Peter Nikita	WEB110	HTML and CSS
2002	Bruce Wayne	1002	Andrew Steele	WEB 101	Working With Graphics
2002	Bruce Wayne	1002	Andrew Steele	WEB 110	HTML & CSS
2002	Bruce Wayne	1002	Andrew Steele	MAD 101	Introduction to Programming/C#
2002	Bruce Wayne	1002	Andrew Steele	MAD 103	Data Fundamentals
2002	Bruce Wayne	1002	Andrew Steele	MIT 203	Information Technology Essentials
2003	Diana Prince	1001	P Nikita	MAD 100	Java Programming 1

Second Normal Form

Additions – cumbersome due to absence of unique identifier

Deletions – will remove customer information when deleting a course

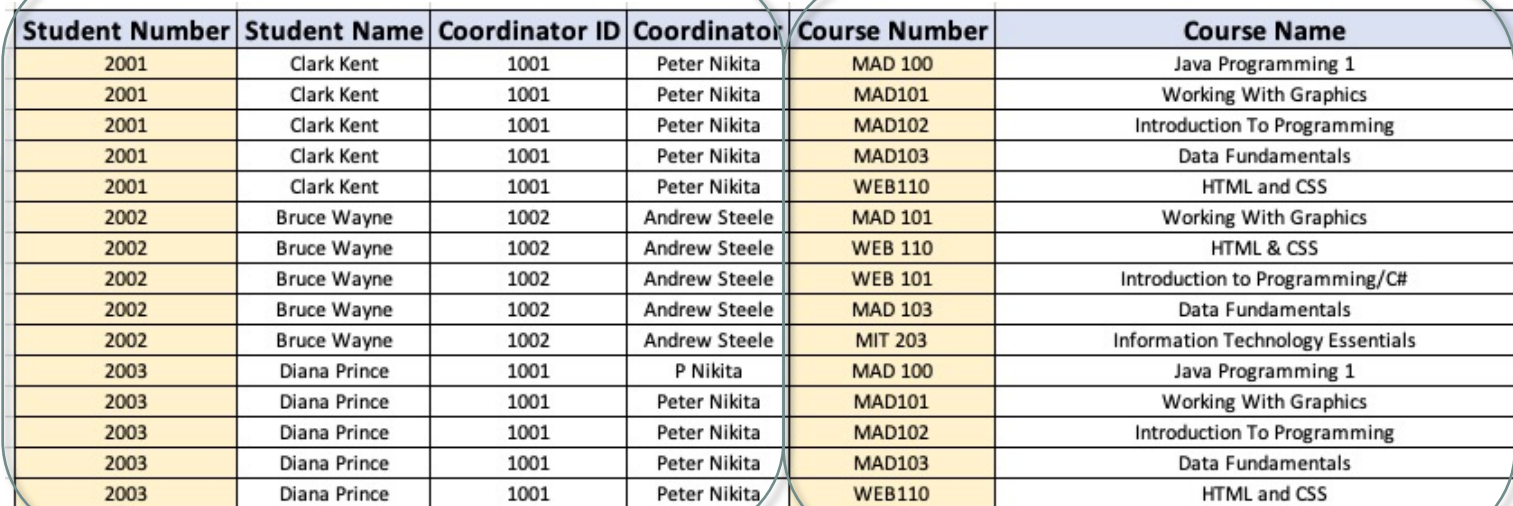| Student Number	Student Name	Coordinator ID	Coordinator	Course Number	Course Name
2001	Clark Kent	1001	Peter Nikita	MAD 100	Java Programming 1
2001	Clark Kent	1001	Peter Nikita	MAD101	Working With Graphics
2001	Clark Kent	1001	Peter Nikita	MAD102	Introduction To Programming
2001	Clark Kent	1001	Peter Nikita	MAD103	Data Fundamentals
2001	Clark Kent	1001	Peter Nikita	WEB110	HTML and CSS
2002	Bruce Wayne	1002	Andrew Steele	MAD 101	Working With Graphics
2002	Bruce Wayne	1002	Andrew Steele	WEB 110	HTML & CSS
2002	Bruce Wayne	1002	Andrew Steele	WEB 101	Introduction to Programming/C#
2002	Bruce Wayne	1002	Andrew Steele	MAD 103	Data Fundamentals
2002	Bruce Wayne	1002	Andrew Steele	MIT 203	Information Technology Essentials
2003	Diana Prince	1001	P Nikita	MAD 100	Java Programming 1
2003	Diana Prince	1001	Peter Nikita	MAD101	Working With Graphics

Conversion to Second Norm

- A table is in second normal form (2NF) if it is in the first normal form and no nonkey field is dependent on only a portion of the primary key.

- If the primary key of a table contains only a single field, the table is automatically in the second normal form.

Solution

- Create tables that house the Student and Courses

Student Number	Student Name	Coordinator ID	Coordinator	Course Number	Course Name
2001	Clark Kent	1001	Peter Nikita	MAD 100	Java Programming 1
2001	Clark Kent	1001	Peter Nikita	MAD101	Working With Graphics
2001	Clark Kent	1001	Peter Nikita	MAD102	Introduction To Programming
2001	Clark Kent	1001	Peter Nikita	MAD103	Data Fundamentals
2001	Clark Kent	1001	Peter Nikita	WEB110	HTML and CSS
2002	Bruce Wayne	1002	Andrew Steele	MAD 101	Working With Graphics
2002	Bruce Wayne	1002	Andrew Steele	WEB 110	HTML & CSS
2002	Bruce Wayne	1002	Andrew Steele	WEB 101	Introduction to Programming/C#
2002	Bruce Wayne	1002	Andrew Steele	MAD 103	Data Fundamentals
2002	Bruce Wayne	1002	Andrew Steele	MIT 203	Information Technology Essentials
2003	Diana Prince	1001	P Nikita	MAD 100	Java Programming 1
2003	Diana Prince	1001	Peter Nikita	MAD101	Working With Graphics
2003	Diana Prince	1001	Peter Nikita	MAD102	Introduction To Programming
2003	Diana Prince	1001	Peter Nikita	MAD103	Data Fundamentals
2003	Diana Prince	1001	Peter Nikita	WEB110	HTML and CSS

Convert to 2NF

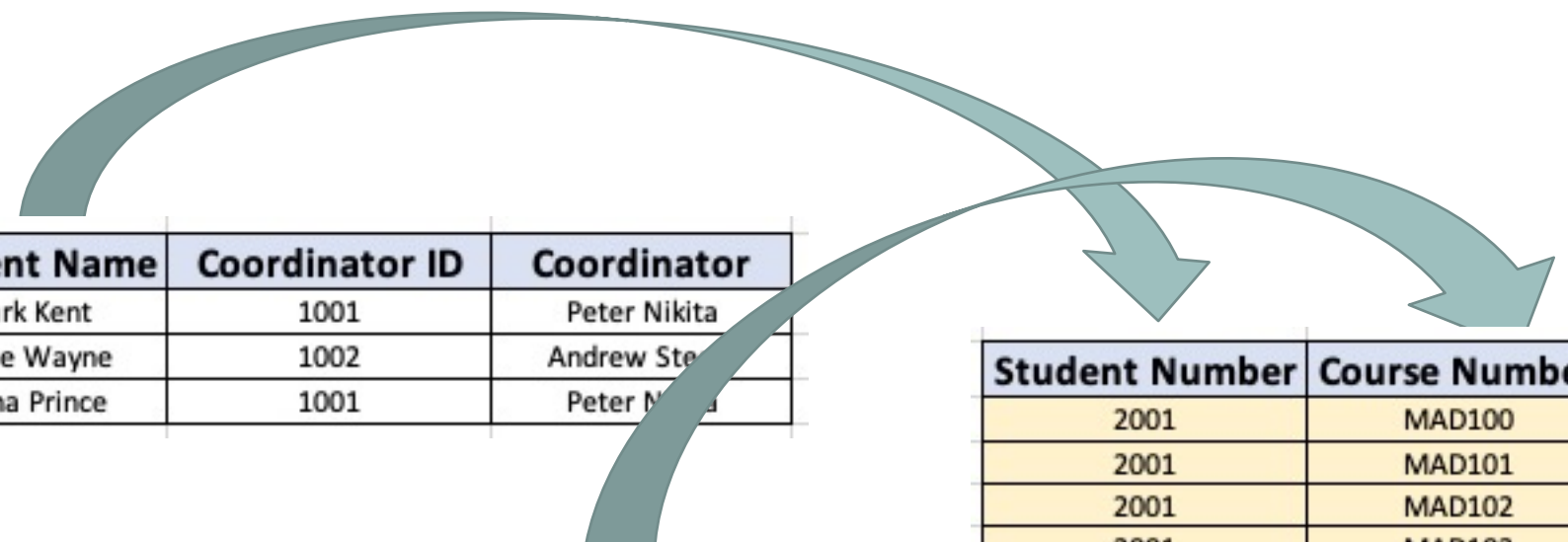*… and no nonkey field is dependent on only a portion of the primary key*

Student Number	Student Name	Coordinator ID	Coordinator
2001	Clark Kent	1001	Peter Nikita
2001	Clark Kent	1001	Peter Nikita
2001	Clark Kent	1001	Peter Nikita
2001	Clark Kent	1001	Peter Nikita
2001	Clark Kent	1001	Peter Nikita
2002	Bruce Wayne	1002	Andrew Steele
2002	Bruce Wayne	1002	Andrew Steele
2002	Bruce Wayne	1002	Andrew Steele
2002	Bruce Wayne	1002	Andrew Steele
2002	Bruce Wayne	1002	Andrew Steele
2003	Diana Prince	1001	P Nikita
2003	Diana Prince	1001	Peter Nikita
2003	Diana Prince	1001	Peter Nikita
2003	Diana Prince	1001	Peter Nikita
2003	Diana Prince	1001	Peter Nikita

Course Number	Course Name
MAD 100	Java Programming 1
MAD101	Working With Graphics
MAD102	Introduction To Programming
MAD103	Data Fundamentals
WEB110	HTML and CSS
MAD 101	Working With Graphics
WEB 110	HTML & CSS
WEB 101	Introduction to Programming/C#
MAD 103	Data Fundamentals
MIT 203	Information Technology Essentials
MAD 100	Java Programming 1
MAD101	Working With Graphics
MAD102	Introduction To Programming
MAD103	Data Fundamentals
WEB110	HTML and CSS

Key to each record is a combination of the Student Number and Course Code

Convert to 2NF

Student Number	Student Name	Coordinator ID	Coordinator
2001	Clark Kent	1001	Peter Nikita
2002	Bruce Wayne	1002	Andrew Ste...
2003	Diana Prince	1001	Peter N...

Course Number	Course Name
MAD100	Java Programming 1
MAD101	Working With Graphics
MAD102	Introduction To Programming
MAD103	Data Fundamentals
WEB110	HTML and CSS
WEB101	Introduction to Programming/C#
MIT 203	Information Technology Essentials

Student Number	Course Number
2001	MAD100
2001	MAD101
2001	MAD102
2001	MAD103
2001	WEB110
2002	MAD101
2002	MAD103
2002	WEB101