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**The MERGE Statement**

Starting with SQL Server 2008, you can use a MERGE statement to modify data in a target table based on data in a source table. The statement joins the target to the source by using a column common to both tables, such as a primary key. You can then insert, modify, or delete data from the target table—all in one statement—according to how the rows match up as a result of the join.

USE AdventureWorks2008

IF OBJECT\_ID ('BookInventory', 'U') IS NOT NULL

DROP TABLE dbo.BookInventory;

CREATE TABLE dbo.BookInventory  -- **target**

(

  TitleID INT NOT NULL PRIMARY KEY,

  Title NVARCHAR(100) NOT NULL,

  Quantity INT NOT NULL

    CONSTRAINT Quantity\_Default\_1 DEFAULT 0

);

IF OBJECT\_ID ('BookOrder', 'U') IS NOT NULL

DROP TABLE dbo.BookOrder;

CREATE TABLE dbo.BookOrder  -- **source**

(

  TitleID INT NOT NULL PRIMARY KEY,

  Title NVARCHAR(100) NOT NULL,

  Quantity INT NOT NULL

    CONSTRAINT Quantity\_Default\_2 DEFAULT 0

);

INSERT BookInventory VALUES

  (1, 'The Catcher in the Rye', 6),

  (2, 'Pride and Prejudice', 3),

  (3, 'The Great Gatsby', 0),

  (5, 'Jane Eyre', 0),

  (6, 'Catch 22', 0),

  (8, 'Slaughterhouse Five', 4);

INSERT BookOrder VALUES

  (1, 'The Catcher in the Rye', 3),

  (3, 'The Great Gatsby', 0),

  (4, 'Gone with the Wind', 4),

  (5, 'Jane Eyre', 5),

  (7, 'Age of Innocence', 8);

**Implementing the WHEN MATCHED Clause**

MERGE BookInventory bi

USING BookOrder bo

ON bi.TitleID = bo.TitleID

WHEN MATCHED THEN

  UPDATE

  SET bi.Quantity = bi.Quantity + bo.Quantity;

SELECT \* FROM BookInventory;

|  |  |  |
| --- | --- | --- |
| **TitleID** | **Title** | **Quantity** |
| 1 | The Catcher in the Rye | 9 |
| 2 | Pride and Prejudice | 3 |
| 3 | The Great Gatsby | 0 |
| 5 | Jane Eyre | 5 |
| 6 | Catch 22 | 0 |
| 8 | Slaughterhouse Five | 4 |

You might have noticed that the book with the BookID value of 3 (*The Great Gatsby*) originally had a Quantity value of 0 in both the source and target tables. Suppose you want to remove from the BookInventory table any book whose Quantity value is 0 in both the target and source tables. You can easily delete such rows by adding a second WHEN MATCHED clause to your MATCH statement, as shown in the following example:

MERGE BookInventory bi

USING BookOrder bo

ON bi.TitleID = bo.TitleID

WHEN MATCHED AND

  bi.Quantity + bo.Quantity = 0 THEN

  DELETE

WHEN MATCHED THEN

  UPDATE

  SET bi.Quantity = bi.Quantity + bo.Quantity;

SELECT \* FROM BookInventory;

|  |  |  |
| --- | --- | --- |
| **TitleID** | **Title** | **Quantity** |
| 1 | The Catcher in the Rye | 9 |
| 2 | Pride and Prejudice | 3 |
| 5 | Jane Eyre | 5 |
| 6 | Catch 22 | 0 |
| 8 | Slaughterhouse Five | 4 |

As you can see, the book *The Great Gatsby* has been removed from the inventory. You should note, however, that a MERGE statement can include at most only two WHEN MATCHED clauses. Whenever you do include two of these clauses, the first clause must include the AND keyword, followed by a search condition, as I’ve done here. The second WHEN MATCHED clause is then applied only if the first one is not.

**Implementing the WHEN NOT MATCHED [BY TARGET] Clause**

MERGE BookInventory bi

USING BookOrder bo

ON bi.TitleID = bo.TitleID

WHEN MATCHED AND

  bi.Quantity + bo.Quantity = 0 THEN

  DELETE

WHEN MATCHED THEN

  UPDATE

  SET bi.Quantity = bi.Quantity + bo.Quantity

WHEN NOT MATCHED BY TARGET THEN

  INSERT (TitleID, Title, Quantity)

  VALUES (bo.TitleID, bo.Title,bo.Quantity);

SELECT \* FROM BookInventory;

|  |  |  |
| --- | --- | --- |
| **TitleID** | **Title** | **Quantity** |
| 1 | The Catcher in the Rye | 9 |
| 2 | Pride and Prejudice | 3 |
| 4 | Gone with the Wind | 4 |
| 5 | Jane Eyre | 5 |
| 6 | Catch 22 | 0 |
| 7 | Age of Innocence | 8 |
| 8 | Slaughterhouse Five | 4 |

**Implementing the WHEN NOT MATCHED BY SOURCE Clause**

**NOTE:** Like the WHEN MATCHED clause, you can include up to two WHEN NOT MATCHED BY SOURCE clauses in your MERGE statement. If you include two, the first clause must include the AND keyword followed by a search condition.

The following example includes a WHEN NOT MATCHED BY SOURCE clause that specifies that any rows with a quantity of 0 that do not match the source should be deleted:

MERGE BookInventory bi

USING BookOrder bo

ON bi.TitleID = bo.TitleID

WHEN MATCHED AND

  bi.Quantity + bo.Quantity = 0 THEN

  DELETE

WHEN MATCHED THEN

  UPDATE

  SET bi.Quantity = bi.Quantity + bo.Quantity

WHEN NOT MATCHED BY TARGET THEN

  INSERT (TitleID, Title, Quantity)

  VALUES (bo.TitleID, bo.Title,bo.Quantity)

WHEN NOT MATCHED BY SOURCE

  AND bi.Quantity = 0 THEN

  DELETE;

SELECT \* FROM BookInventory;

|  |  |  |
| --- | --- | --- |
| **TitleID** | **Title** | **Quantity** |
| 1 | The Catcher in the Rye | 9 |
| 2 | Pride and Prejudice | 3 |
| 4 | Gone with the Wind | 4 |
| 5 | Jane Eyre | 5 |
| 7 | Age of Innocence | 8 |
| 8 | Slaughterhouse Five | 4 |

**Implementing the OUTPUT Clause**

When SQL Server 2005 was released, it included support for the OUTPUT clause in several data modification language (DML) statements.

DECLARE @MergeOutput TABLE

(

  ActionType NVARCHAR(10),

  DelTitleID INT,

  InsTitleID INT,

  DelTitle NVARCHAR(50),

  InsTitle NVARCHAR(50),

  DelQuantity INT,

  InsQuantity INT

);

MERGE BookInventory bi

USING BookOrder bo

ON bi.TitleID = bo.TitleID

WHEN MATCHED AND

  bi.Quantity + bo.Quantity = 0 THEN

  DELETE

WHEN MATCHED THEN

  UPDATE

  SET bi.Quantity = bi.Quantity + bo.Quantity

WHEN NOT MATCHED BY TARGET THEN

  INSERT (TitleID, Title, Quantity)

  VALUES (bo.TitleID, bo.Title,bo.Quantity)

WHEN NOT MATCHED BY SOURCE

  AND bi.Quantity = 0 THEN

  DELETE

OUTPUT

    $action,

    DELETED.TitleID,

    INSERTED.TitleID,

    DELETED.Title,

    INSERTED.Title,

    DELETED.Quantity,

    INSERTED.Quantity

  INTO @MergeOutput;

SELECT \* FROM BookInventory;

SELECT \* FROM @MergeOutput;

|  |  |  |
| --- | --- | --- |
| **TitleID** | **Title** | **Quantity** |
| 1 | The Catcher in the Rye | 9 |
| 2 | Pride and Prejudice | 3 |
| 4 | Gone with the Wind | 4 |
| 5 | Jane Eyre | 5 |
| 7 | Age of Innocence | 8 |
| 8 | Slaughterhouse Five | 4 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ActionType** | **DelTitleID** | **InsTitleID** | **DelTitle** | **InsTitle** | **DelQuantity** | **InsQuantity** |
| UPDATE | 1 | 1 | The Catcher in the Rye | The Catcher in the Rye | 6 | 9 |
| DELETE | 3 | NULL | The Great Gatsby | NULL | 0 | NULL |
| INSERT | NULL | 4 | NULL | Gone with the Wind | NULL | 4 |
| UPDATE | 5 | 5 | Jane Eyre | Jane Eyre | 0 | 5 |
| DELETE | 6 | NULL | Catch 22 | NULL | 0 | NULL |
| INSERT | NULL | 7 | NULL | Age of Innocence | NULL | 8 |

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