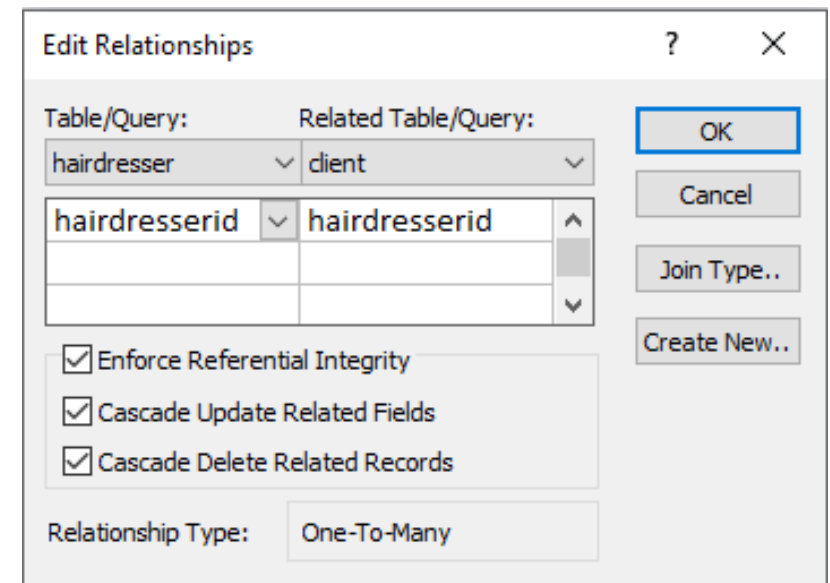# Design: Referential Integrity

Definition

Referential Integrity is process of **only** allowing foreign key values that have matching primary key values in a related table.

Referential Integrity is a version of restricted choice where the values are restricted to those entered in another table. This is used to ensure that a value entered in for the foreign key has a matching value as a primary key in the related table.

Referential Integrity Example

Referential integrity means that the relationship between two tables should always be consistent.

In the hairdresser/client database, the hairdresserid is the primary key of the hairdresser table and it is also a foreign key in the client table.

hairdresser

hairdresserid	firstname	lastname	contactnumber	salon
2210	Huda	Quhshi	07700 900477	West Style
2019	Sharon	Watt	07700 900582	On The Corner
1928	Phillip	Christie	07700 900142	Cuts & Co

client

hairdresserid	clientid	clientfirstname	clientlastname	phonenumber
1928	10290	Wen	Qiu	0141 496 0536
1928	11766	Michael	Waters	07700 900556
1928	12654	Faseeha	al-Allam	07700 900569
2019	10291	Peta	Mulisdottir	0151 496 0838
2019	20533	Egisto	Mario	0131 496 0294
2210	36172	Phillip	Roach	0131 496 0734
2210	32100	Emily	Sieff	0207 946 0126

Referential Integrity Example

The client table is impacted if Huda Quhshi is removed from the hairdresser table.

As hairdresserid is a foreign key in the client table, there is no longer a corresponding primary key value of 2210 for hairdresserid in the hairdresser table. The tables will look like this.

hairdresser

hairdresserid	firstname	lastname	contactnumber	salon
2019	Sharon	Watt	07700 900582	On The Corner
1928	Phillip	Christie	07700 900142	Cuts & Co

client

hairdresserid	clientid	clientfirstname	clientlastname	phonenumber
1928	10290	Wen	Qiu	0141 496 0536
1928	11766	Michael	Waters	07700 900556
1928	12654	Faseeha	al-Allam	07700 900569
2019	10291	Peta	Mulisdottir	0151 496 0838
2019	20533	Egisto	Mario	0131 496 0294
2210	36172	Phillip	Roach	0131 496 0734
2210	32100	Emily	Sieff	0207 946 0126

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Referential Integrity Example

Deleting the row for Huda Quhshi creates inconsistent rows in the client table - it breaks the link between the two tables.

Enforcing referential integrity means that there cannot be foreign key values which do not have a corresponding primary key value in the linked table.

- It prevents breaking the link between primary and foreign keys in related tables.
- It prevents new rows being added in a table where the foreign key does not have a matching primary key value in the linked table.

Cascade Deletes

If referential integrity is enforced then removing a row which has the primary key value should also delete all the rows in the linked table with the related foreign key. This process is called **cascade delete**.

hairdresser

hairdresserid	firstname	lastname	contactnumber	salon
2019	Sharon	Watt	07700 900582	On The Corner
1928	Phillip	Christie	07700 900142	Cuts & Co

client

hairdresserid	clientid	clientfirstname	clientlastname	phonenumber
1928	10290	Wen	Qiu	0141 496 0536
1928	11766	Michael	Waters	07700 900556
1928	12654	Faseeha	al-Allam	07700 900569
2019	10291	Peta	Mulisdottir	0151 496 0838
2019	20533	Egisto	Mario	0131 496 0294

So, deleting the row for Huda Quhshi in the hairdresser table will also delete all the related rows in the client table.

Cascade Updates

If there is an update to the primary key value, then it is important that all the linked foreign keys are also updated. This process is called **cascade update** – any changes to a primary key value are also copied to all the related foreign key values.

hairdresser

hairdresserid	firstname	lastname	contactnumber	salon
3982	Sharon	Watt	07700 900582	On The Corner
1928	Phillip	Christie	07700 900142	Cuts & Co

client

hairdresserid	clientid	clientfirstname	clientlastname	phonenumber
1928	10290	Wen	Qiu	0141 496 0536
1928	11766	Michael	Waters	07700 900556
1928	12654	Faseeha	al-Allam	07700 900569
3982	10291	Peta	Mulisdottir	0151 496 0838
3982	20533	Egisto	Mario	0131 496 0294

If the primary key for Sharon Watt is changed from 2019 to 3982 in hairdresser, then all the related foreign key values in client are also updated to 3982.