

Database Management- 1

1. Understanding Databases

Keywords

- A database is simply a software that stores data. However, the data are kept in a way that creates a certain order and meaning.
- For example; the person's name alone indicates data. Similarly, many examples such as age, gender, product purchased, salary represent a single piece of data. Data are combined to form information. For example; It is an information about which products are purchased in which age group according to gender.
 - "Women in the 25-30 age group mostly buy clothing related products"
 - "Both men and women in the 30-40 age group mostly buy childcare products«
- Information like these two examples can only be reached with regularly kept data. So what does it mean to keep data regularly?

Keywords

- Consider how you received attendance in faculty courses. Each student writes the student number, name, surname, e-mail, in a single row, and signs on the far right that they are in the course. Similar information of each student is provided below.

StudentID	Name	Surname	e-Mail	Sign
123456	Ayşe	Yıldız	ayildiz@gmail.com	***
123457	Ali	Korkmaz	akorkmaz@gmail.com	***

- A course attendance list taken in this way is the simplest example of a database you can encounter in daily life. When you examine the attendance list, you are keeping the information about who attended and who did not.

Tables/Records/Fields

- The data you keep in the form of a list is the table in the database.
- Tables consist of fields (columns) and records (rows).
- Fields contain the same type of data related to different entities (object, person, etc.), while records contain different types of data belonging to the same entity.

ID	First Name	Last Name	Street Address	City	State
52	Denver	Johnson	856 Cook St.	Raleigh	NC
53	John	Emory	99 Hillsborough St.	Garner	NC
54	Ebony	Farmer	872 W. Morgan St.	Raleigh	NC
55	Kim	Doe	553 Wayne St.	Raleigh	NC
56	Coretta	Diaz	781 Bloodsworth St.	Raleigh	NC
57	Victor	Denver	31 St. Mary's St.	Raleigh	NC
58	Hamish	David	21 Cameron Ct.	Raleigh	NC
59	Erin	Counts	763 E. West St.	Raleigh	NC
60	Harris	Collman	455 E. Edenton St.	Raleigh	NC
61	Melissa	Chantay	3201 Glenwood Ave.	Raleigh	NC
62	Emmanual	Colin	11 Sassafras Way	Raleigh	NC
63	Illa	Carlson	563 Oberlin Rd.	Raleigh	NC
64	Tyrone	Rodgers	453 Pine St.	Raleigh	NC

Retrieved from: <https://edu.gcfglobal.org/en/access2013/working-with-tables/1/>

Example Databases

- Let's give some examples where such data are kept in everyday life.
- For example; companies where plane or bus reservations are made, e-government applications, bank account information, hospital appointment system.
- All of these examples hold data for their own purposes. For example, bus reservation systems keep track of who goes from where to where at what time.
- In the bank account information, data such as the amount of money transferred to or sent from the account, to whom or from whom the money was transferred, and when this transaction was made are kept.

Database Organization

- As a result, the basic logic of the database for whatever purpose is to structure the data to be kept in accordance with the purpose. So what exactly does the configuration process mean? This process, in its simplest sense, is to determine the data types and formats to be kept within the fields. For example;

Number	Text	Text	Time	Number	Yes/No
Process no.	Who	To Whom	When	How Much	Sending Status
1	Ayşe	Ali	20.06.2020	2500 TL	Yes
2	Ali	Fatma	5.5.2020	500 TL	No

- When creating a table, the data can be structured according to different types such as number, text, date, currency, yes / no. What kind of data will be kept in which field is determined in advance. Thus, it is ensured that the data are entered in a consistent and meaningful way. For example: A monetary value is kept in the "How much" field. It is not allowed to have the name "Ali" in this field. Or similarly, no other data other than date can be kept in the "When" field.

Database Organization

- However, you can specify the data type of the fields, as well as the format (field size, format, default value). For example;
 - The "Who" field can contain up to 20 characters.
 - You can keep data in the form of "30.05.2018" in the "When" field, as well as "30 May 2018".
 - If no data is entered in the "Sending Status" field, "No" is written as default.

Primary Key in Databases

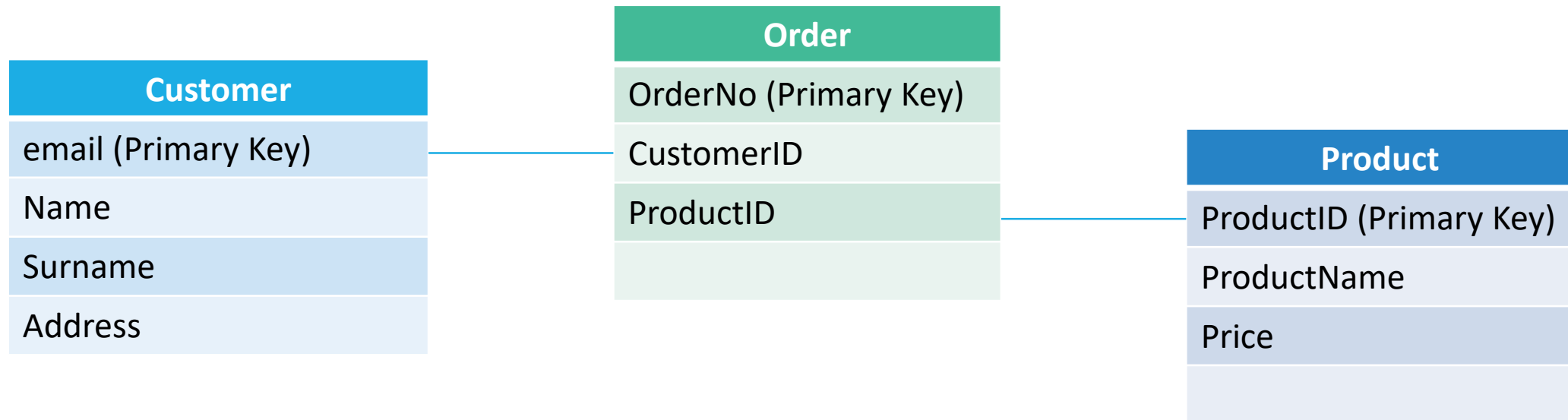
- Another advantage of the database is to get rid of data duplication. For example; Two data with the same student number cannot be kept in the course attendance list. Or two students with different names with the same student number cannot be. Therefore, a limitation should be imposed here while creating the tables. In database operations, this restriction is called primary key. If the StudentID field is specified as **primary key**, the situations in the examples will not be realized.
 - In a bank account system, TR Identity Number is the primary key. Because, in order not to confuse bank customers with each other, the unique TR Identity Number is used for everyone.
 - Email is the primary key on an online shopping site. Because e-mail is also unique for customers.

Relations in Databases

- Databases consist of one or more tables.
- In order to keep data consistent, understandable and non-repetitive in more than one table, it is necessary to determine the relationships between the tables.
- For example; Let's consider an online shopping site. At least three tables (Customer, Product, Order) are needed to keep a logical database of which product has been purchased by whom.
- What does it mean that these three tables are interrelated?
 - Except for the fields that are linked to each other in all three tables, there can be no fields that hold the same information. This also avoids data redundancy. So there is no room for unnecessary data in the tables. The order table cannot keep data about a person not included in the Customer table. The order table cannot keep data about a product that is not included in the product table. This also ensures the integrity of the data.
 - As a result of these relationships;
 - Data that take up unnecessary space in the system are not allowed.
 - However, it is ensured that the person in the customer table can only order the product in the product table.

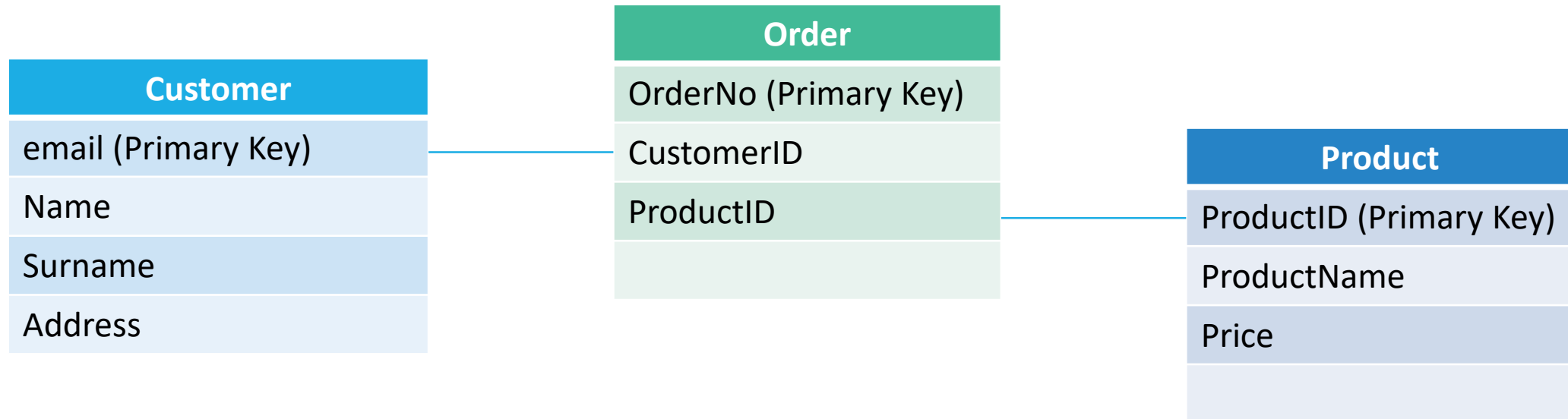
Sample Database

Let's try to explain in detail over the example in the picture. In the Customer table, the e-mail field is the primary key, and in the Product table, the ProductCode field is the primary key. In other words, there cannot be a second person with the same e-mail in the customer table. This table holds the data of different people. There cannot be a second product with the same ProductID in the product table. This table is for keeping the data of different products.



Sample Database

The products purchased by the customers are kept in the order table. In this table, the same person may have ordered more than one different product. For this, the primary key is determined as the OrderID field. When there is any order, this field will increase by one and form the order order. While establishing a relationship between the tables, the e-mail in the Customer table and the CustomerID in the Order table, the Product Code in the Product table and the ProductID in the Order table are associated.



Operations

- Database management is a process that requires expertise. A bank database system contains hundreds of tables that are associated with each other as in the example above. The management of these tables is carried out by Database Management Experts. These experts are responsible not only for keeping the data in the database, but also for the consistent, efficient and reliable storage and protection of the data.
- These operations are carried out in cooperation with a team working in coordination. Authorizations can be made for different operations on the database within the team. For example, some users are allowed to add data, while others are only allowed to read data. You can think of this as the simplest authorization. However, separate authorizations can also be made in order to perform transactions related to only one table. For example; only the company's sales department can enter data into the Product table. Or, only the customer service department can see the customer's phone number.