

What are Anomalies?

According to the dictionary meaning anomalies means an abnormality. In regard to DBMS, here we will discuss the abnormalities that might be present in the database due to data redundancy.

Basically there are three types of Anomalies:

- Insertion anomaly
- Updation anomaly
- Deletion anomaly

These anomalies are the problems that we will solve using Normalisation. The occurrence of these data anomalies in the database is natural.

Let's understand the three operation which cause anomaly using an example:

Roll_no	Name	Department	HOD	Dept_contact
22	Sonam	Prosthodontics	Dr. Neeta	98674534
39	Rohan	Prosthodontics	Dr. Neeta	98674534
07	Ajay	Prosthodontics	Dr. Neeta	98674534
21	Priya	Prosthodontics	Dr. Neeta	98674534

In the table above we have a database of 4 Students of final year pursuing BDS. They have been given an opportunity to choose a department for their monthly posting and they chose "Prosthodontics".

Now we can observe that the attributes like department, HOD are repeated for all the students that opted for it in the University.

This is called Data Redundancy.

1. **Insertion Anomaly:** Suppose that a new student signs up for the posting but hasn't chosen his/her department of practice yet. Now, until or unless that student makes up his/her mind about which department they need to work for, we can't insert the data or if we do we need to set the Department Attribute to NULL.

Secondly, now if we had to insert data of like 50 students signing up this department (i.e. Prosthodontics), then the department information will be repeated for all those entries.

This is known as Insertion Anomalies.

2. **Updation Anomaly:** Suppose Dr. Neeta got an offer from abroad and she decided to leave the university. That means she won't be the HOD of the Prosthodontics department anymore for the university.
Now if that is to happen, the DBA (Database Administrator) of the university has to update the student database and in that too he needs to update each record present in the database, which contains Dr. Neeta as HOD of Prosthodontics.
Now if due to human error or by any means any of the records is missed, it will lead to Data Inconsistency.
This is Known as Updation Anomaly.
3. **Deletion Anomaly:** In our table, two different pieces of information are kept together, Student information and Department information. Therefore, at the end of the posting of students when they shift to another department, if student records are deleted, we will also lose the Department information.
This is Deletion anomaly.

Hence, to deal with these anomalies or abnormalities in the database, we use normalisation.