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Elaborate the three levels of data abstraction using suitable diagram.

Data Abstraction

Data Abstraction refers to the process of hiding irrelevant details from the user.

View Level or External Schema

This level tells the application about how the data should be shown to the user. **Example:** If we have a login-id and password in a university system, then as a student, we can view our marks, attendance, fee structure, etc. But the faculty of the university will have a different view. He will have options like salary, edit marks of a student, enter attendance of the students, etc. So, both the student and the faculty have a different view. By doing so, the security of the system also increases. In this example, the student can't edit his marks but the faculty who is authorized to edit the marks can edit the student's marks. Similarly, the dean of the college or university will have some more authorization and accordingly, he will has his view. So, different users will have a different view according to the authorization they have.
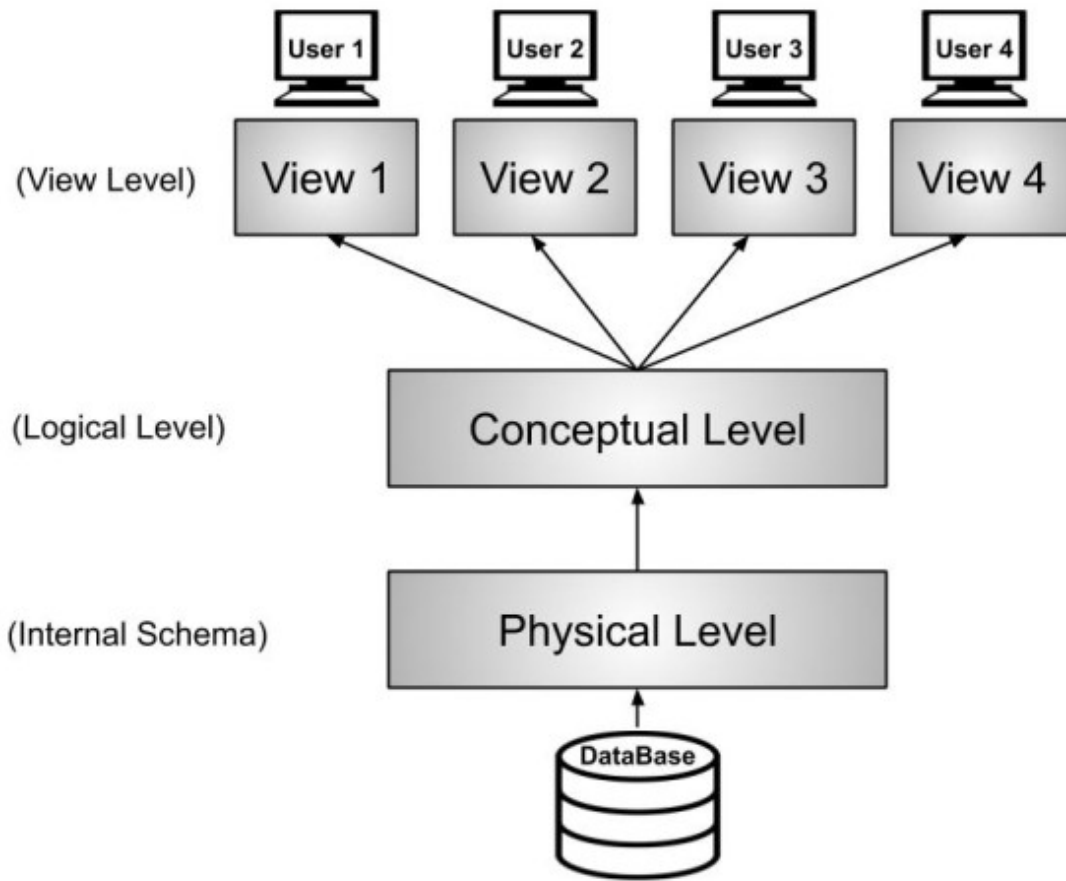
Conceptual Level or Logical Level

This level tells how the data is actually stored and structured. We have different data models by which we can store the dataLet us take an example where we use the relational model for storing the data. We have to store the data of a student, the columns in the student table will be student_name, age, mail_id, roll_no etc. We have to define all these at this level while we are creating the database. Though the data is stored in the database but the structure of the tables like the student table, teacher table, books table, etc are defined here in the conceptual level or logical level. Also, how the tables are related to each other are defined here. Overall, we can say that we are creating a blueprint of the data at the conceptual level.

Physical Level or Internal Schema

As the name suggests, the Physical level tells us that where the data is actually stored i.e. it tells the actual location of the data that is being stored by the user. The Database Administrators(DBA) decide that which data should be kept at which particular disk drive, how the data has to be fragmented, where it has to be stored etc. They decide if the data has to be centralized or distributed. Though we see the data in the form of tables at view level the data here is actually stored in the form of files only. It totally depends on the DBA, how he/she manages the database at the physical level.

So, the Data Abstraction provides us with a different view and help in achieving Data Independence.

Levels of Data Abstraction