COL 362
Assignment 1

(1) Does three level architecture solves all the problems?

Earlier applications worked at the level of Physical View. These applications explicitly dealt with details which were very specific to the application itself. Problems like implementations of new features, changing of data structures were very difficult to deal with.

Three level architecture solves all these problems. Here I will discuss the advantages and disadvantages of the three level architecture :-

Advantages :

(a) Data Integrity is maintained.
(b) Security restrictions are easy to handle with.
(c) Redundancies and thus inconsistencies among the data can be avoided.
(d) Data Independence.

Disadvantages:

We get all this at the expense of complexity. Complexity is increased so as to facilitate all these mentioned advantages. More specifically, we can say that the total point of communications are doubled.

So besides complexity, three level architecture solves all the problems.

(2) How can 3 level architecture be implemented? What transformations and data structures are needed?

There are three views in the three level architecture, which are as,

(a) Physical Data Level
(b) Conceptual Data Level
(c) External Data Level

The data is stored at the physical level. Data structures used to store the data at physical level include B-trees, B+ trees, Hash-tables, flat structures(files) etc.

Then there are programs like file manager, buffer management etc for efficiently accessing and managing data.

At the conceptual level, also known as the Logical level, the details of the physical level are hidden. The procedures at this level maintains constraints on the data as well as security and integrity information of the data.

At the external level, user's view of the databas is presented. It maintains different external views of the database. Implementation of procedures at External Level provides us tools for flexible security methods by the way of hidding parts of the database from different external views of the database.

(3) Does 3 level architecture support more than 1 programming language?

For the process of interaction with the database, we use Database Language(DBL). DBL consists of,
(a) Data Definition Language(DDL)
: Defines schema

(b) Data Manipulation Language(DML)
: Allows manipulation of data(insertion, deletion etc)

A typical user generally works in an environment of “Host Language + DBL”. This Host language is a general purpose programming language. It can be C, Java, Python etc. Because of this we can have several programming languages on top of DBL. Hence we can conclude that a three level architecture supports more than one programming language.

(4) How is data independence achieved?

Data Independence is a very important advantage of three level architecture i.e. by using three level architecture, data independence is achieved automatically. Data Independence consists of,

(a) Physical Data Independence : Physical Data Independence is achieved by the conceptual-internal schemas mappings. The changes are absorbed in the mappings.

(b) Logical Data Independence : Logical Data Independence is the ability to make changes in the logical schema without having to make changes in the application program.Again, the mappings between the external view and the logical view absorbs the effects of the changes to logical view.

If we change the external view, there is no need of independence because we do not have any view above the external view.

--------END OF FILE-------