

The data tier uses **SQL** statements (INSERT, DELETE, UPDATE, and SELECT) to retrieve and update information in a database. However, the actual request for the information to be changed comes from within the business rules tier. For example, a user requesting an address change in a web application would have to enter the requested change in the interface tier, format the update request in the business rules tier, and change the information in the database in the data tier.

Do	Don't
Save data on secondary device	Manipulate data
Update data on secondary device	Display error messages
Raise exceptions	Display information
Verify data	

Do It

1. Why must the data tier validate information again, before it is placed in a database?
2. What type of code, if any, can exist in the data tier?
3. What is SQL used for?

Putting It All Together

The Program Development Life Cycle (PDLC) leads us through the overall design and creation process for application development. The key to application development success is to properly plan the layout of your system before beginning the coding and development. By doing so, you reduce the amount of errors and problems that can occur. Many projects can run into a “corner” that the developer cannot get around because of poor planning up front. Different authors and instructors will vary on their estimates on the time to spend in the planning process because it is based on the individual. A more skilled, or more experienced individual may do less planning than someone who is not as confident. However, everyone plans out, at least, the required modules and the type of data flowing between the modules; even if it is done just on scratch paper. The key, also, is to revise your plan as you work through the coding and development process. As you start coding, you will discover “I did not think of that” scenarios. Go back, right then, and adjust your plan. The more you do so, the less likely that you will hit a “corner” that you cannot find a way to get around.

Always involve the user in your PDLC process, along with as strong a team of experts. Remember you are developing this project to make your customer happy. You may believe you have the ultimate design and solution. However, that does not matter if your user does not agree with you. Sometimes you do have to adjust your thinking to be more in line with the customer. Working in the industry I remember a major change-management system that was being created within my work group (I was so happy to not be involved in the project). The designers and coders created a very fancy and expensive, system that, once it was implemented in the data centers, was hardly used. Why? The data center personnel did not want a fancy system; they wanted a simple system that could quickly complete the tasks needed. Even though the original project took six months to complete, a data center employee spent a few weekends of his own time creating another system that accomplished what they wanted. That system was implemented and used for many years afterward.

Commonly the PDLC is defined with five steps; Planning and Information Gathering, Analysis, Design, Implementation, and Evaluation. In the planning and information gathering step, all requirements for the project and the project team are assembled. Initial documents are also created answering the questions “What are we trying to accomplish?”, “How are we going to accomplish it?”, and “What team are we going to use?” In