

### Two Levels of Design

#### Architectural Design

Broad design of the overall system structure  
Also called General Design and Conceptual Design

#### Detailed Design

Low level design that includes the design of the specific program details  
Design of each use case  
Design of the database  
Design of user and system interfaces  
Design of controls and security

### Abstract Three Layer Architecture

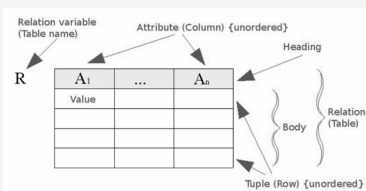


### Design the system interfaces

So other systems can talk to each other.  
System interfaces connect with other systems in many different ways:

- Save data another system uses
- Read data another system saved
- Real time request for information
- Software services

### Relational Table Labelled



### Components of design

Environment      Network and deployment architecture

### Components of design (cont)

Application software      Server based apps, mobile devices, PCs. All components must integrate as a functioning whole

User interface      Screens and reports o devices connected to the system

System interface      Comm interfaces between other automated systems

Database      Data structures, deployment methods.

Security and controls      Firewalls, Access, data protection in transit between devices. External, internal checks and measures.

### Logical design

abstract representation of the data flows, inputs and outputs of the system. This is often conducted via modelling. ER Modelling is commonly used.

### Design Activities

Environment      have we spc in detail environment and options in which software will execute?

App architecture and software      Detail spec elements of software and how each use case is executed

System interfaces      Spec how system will comm with all other systems inside and outside the org

### Design Activities (cont)

User interface      Spec how users will interact with system to carry out all their tasks? (Use Cases)

Database      Spec in detail all info storage reqs

System controls and security      Spec elements to ensure system and data are secure and protected

### Design the user interfaces

Dialog design begins with requirements, so use Use case flow of activities, etc  
Considerations:

- Workflow
- Dialogs
- Form Layout
- Look and feel
- Multiple interfaces (s/w, web, mobile)
- Multiple devices (laptop, touch, phone)

To the user, the interface is the system!

### Systems Design

Process of defining and developing systems to satisfy specified requirements of the user. Object-oriented analysis and design methods are becoming most widely used. UML standard language in object-oriented analysis and design. Widely used for modeling software systems & increasingly used for high designing non-software systems and organizations.



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### Physical design

Relates to the actual input and output processes of the system. How data is input into a system, how it is verified/authenticated, how it is processed, and how it is displayed as In Physical design, the following reqs about the system are decided:

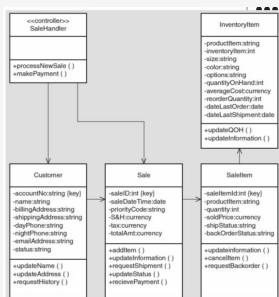
1. Input requirement
2. Output requirements
3. Storage requirements
4. Processing Requirements
5. System control and backup or recovery.

Physical portion of systems design can generally be broken down into three sub-tasks: User Interface Design, Data Design, Process Design

### Design the application architecture and software

1. Partition system into subsystems.
2. Define software architecture. Three layer or model-view-controller
3. Detailed design of each use case: Design class diagrams, Sequence diagrams, State machine diagrams

### Design Class Diagram



### Issues when considering hosting

Reliability, security, physical facilities, staff, potential for growth

### Design the Database

Architecture: distributed or central  
 Schema: Tables and columns in relational  
 Referential integrity constraints: Foreign key references – for linking tables

Uses domain model class diagram (or ERD)

### Design the security and system controls

User interface controls      User Authorization

Application controls      Transactions are "atomic"

Database controls      No database anomalies

Network controls      Firewalls, access

### Architectural design

The architectural design of a system emphasizes on the design of the systems architecture which describes the structure, behavior, and more views of that system and analysis.

### Design models (primary)

Package diagrams  
 Nodes and locations diagrams  
 Design class diagrams  
 Sequence Diagrams  
 Database Schema  
 User interface screens and reports  
 System and security controls  
 Communication diagrams



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