Cheatography

System Design Cheat Sheet

by Natalie Moore (NatalieMoore) via cheatography.com/19119/cs/2166/

Two Levels of Design

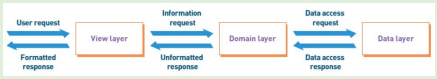
Architectural Design

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

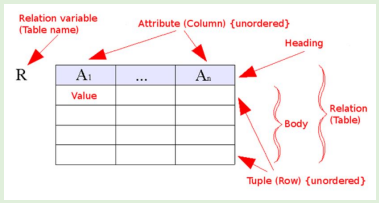
Abstract Three Layer Architecture



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
Application software	Server based apps, mobile devices, PCs. All components must itegrate as a functioning whole
User interface	Screens and reports o devices connected to the system

Components of design (cont)

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
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.

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

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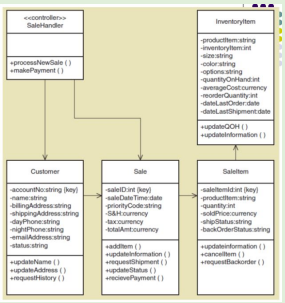
Design the application architecture and software

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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