



# GOVERNMENT OF ANDHRA PRADESH COMMISSIONERATE OF COLLEGIATE EDUCATION



## DESIGN MODEL

Software Engineering

Computer Science

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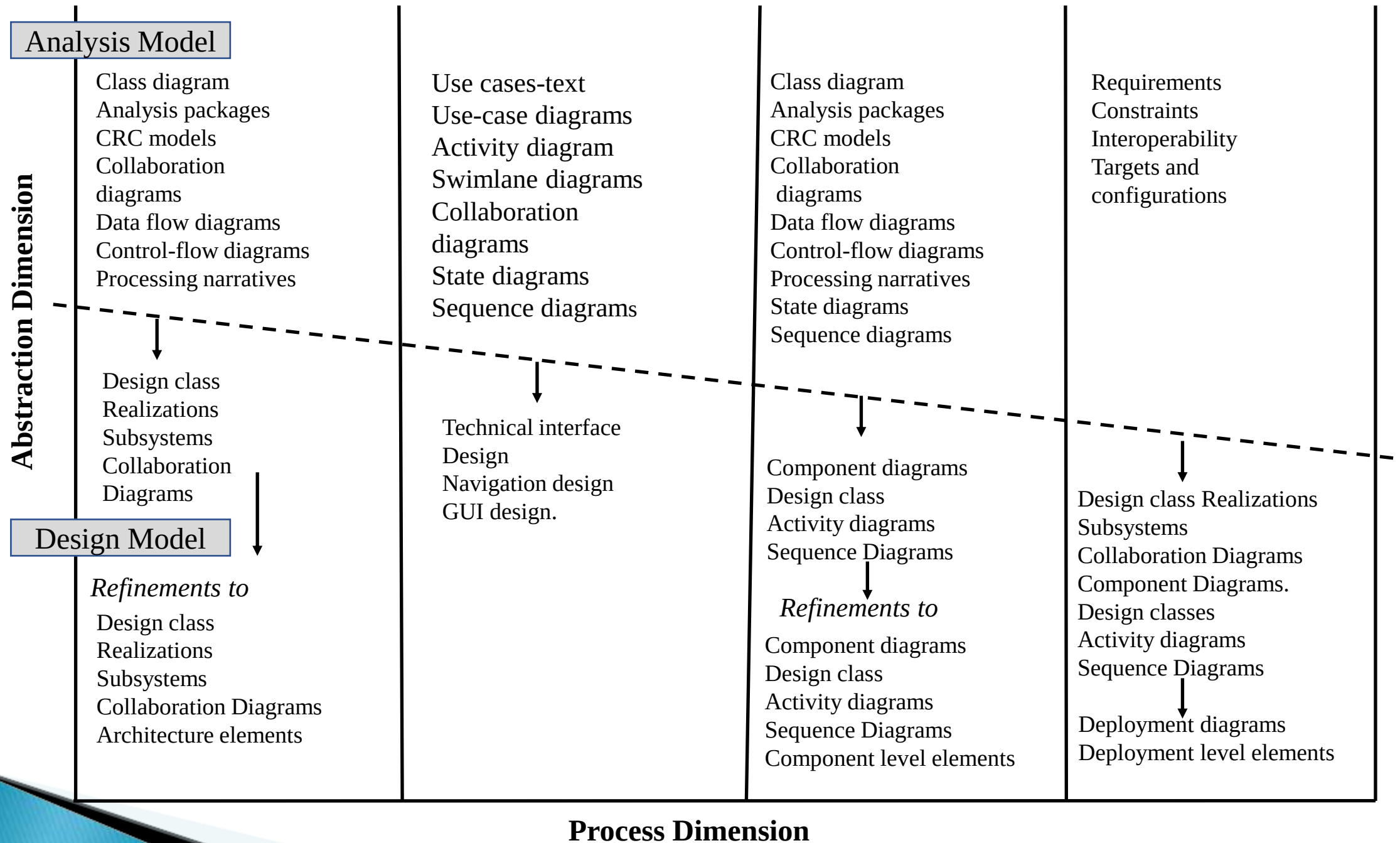
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# Objectives

- Describe the dimensions of design model.
- Describe data design elements.
- Explore Architectural design elements.
- Discuss interface design elements.
- Explain component level design elements.
- Explain deployment level design elements

# Design Model

- The design model can be viewed in two different dimensions
- The process dimension indicates the evolution of the design model as design tasks are progressed.
- The abstraction dimension represents the level of details added to elements of analysis model.



**Figure: Dimensions of Design model**

# Data Design Elements

- The data design element creates a model of data that represent a high level of abstraction.
- The model is then more refined into more implementation specific details.
- The structure of data is the most important part of the software design.
- At component level, the focus is on design of data structure and its associated algorithm.
- At application level, the data model is translated into a database to achieve business objectives of the system.
- At business level the database is translated into data warehouse that is used for data mining.

# Architectural Design Elements

- The architecture design elements gives us overall view of the system.
- The architectural design element is generally represented as a set of interconnected subsystem.
- The architecture model is derived from following sources
  1. The information about the application domain to built the software.
  2. Requirement model elements like data flow diagram or analysis classes, relationship and collaboration between them.
  3. The available architectural style and pattern.

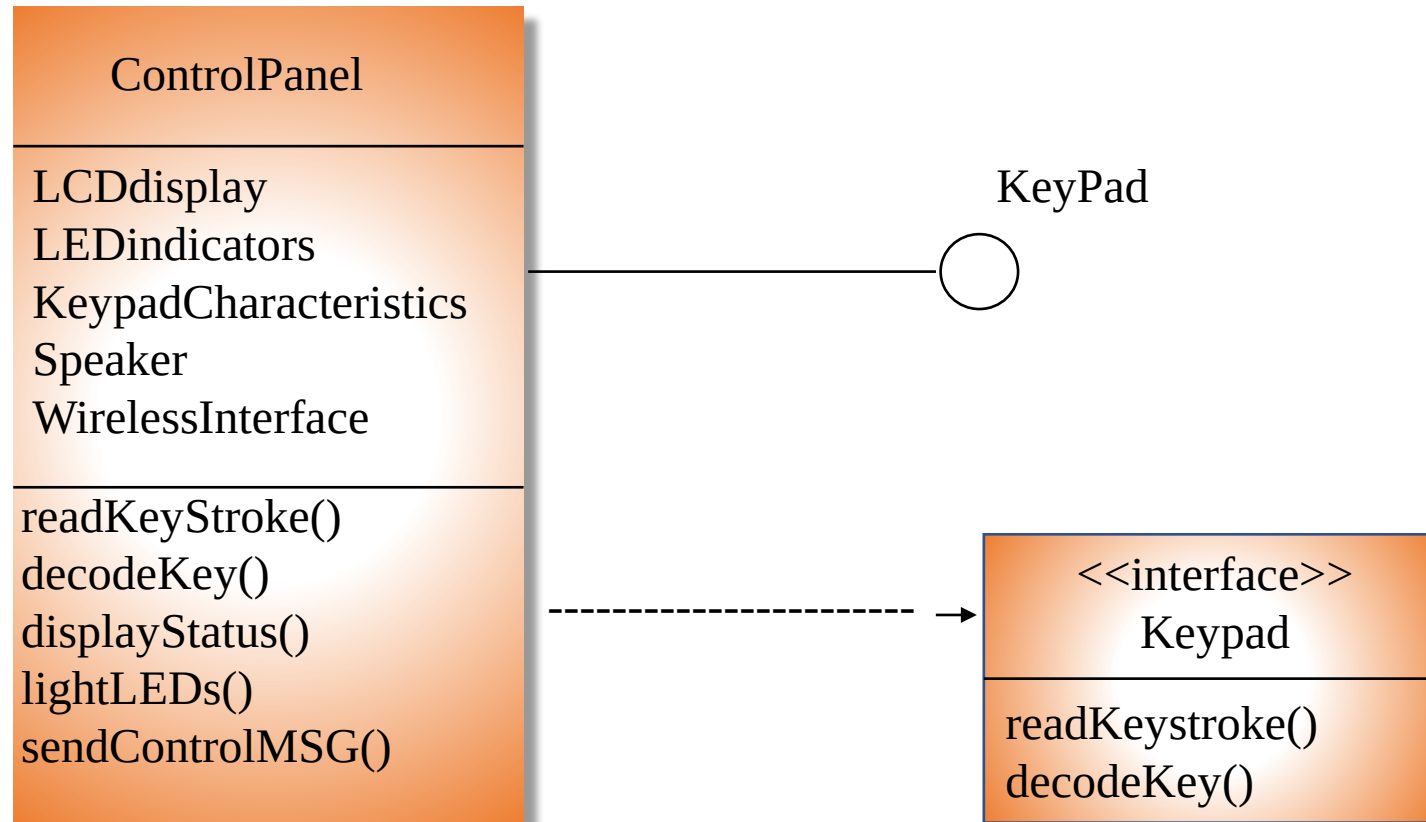
# Interface Design Elements

- The interface design elements represents the information flow in and out of the system.
- These elements are used to communicate between the components defined in architecture.
- Three important elements of the interface design are
  1. The user interface.
  2. The external interfaces to the other systems, networks, devices or other procedures etc.
  3. The internal interfaces between various components.

# Interface Design Elements

- User interface is a unique subsystem within the overall application architecture.
- External interface focus on information sent and receive about an entity.
- An interface is modelled similar to UML class.
- It is set of operations that describe the part of behaviour of that class that provide access to those operations.
- The following figure shows the UML class and interface relationship.

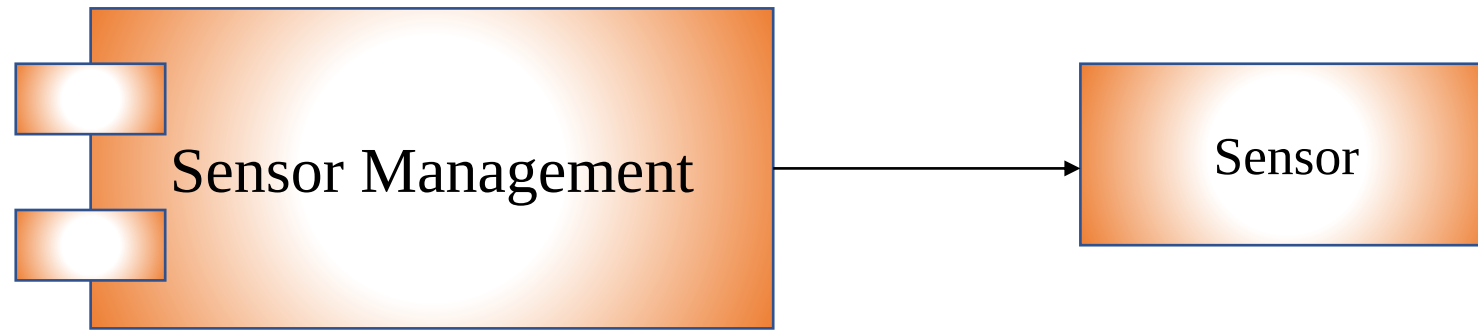




**Figure: Interface representation of control panel**

# Component Level Design Elements

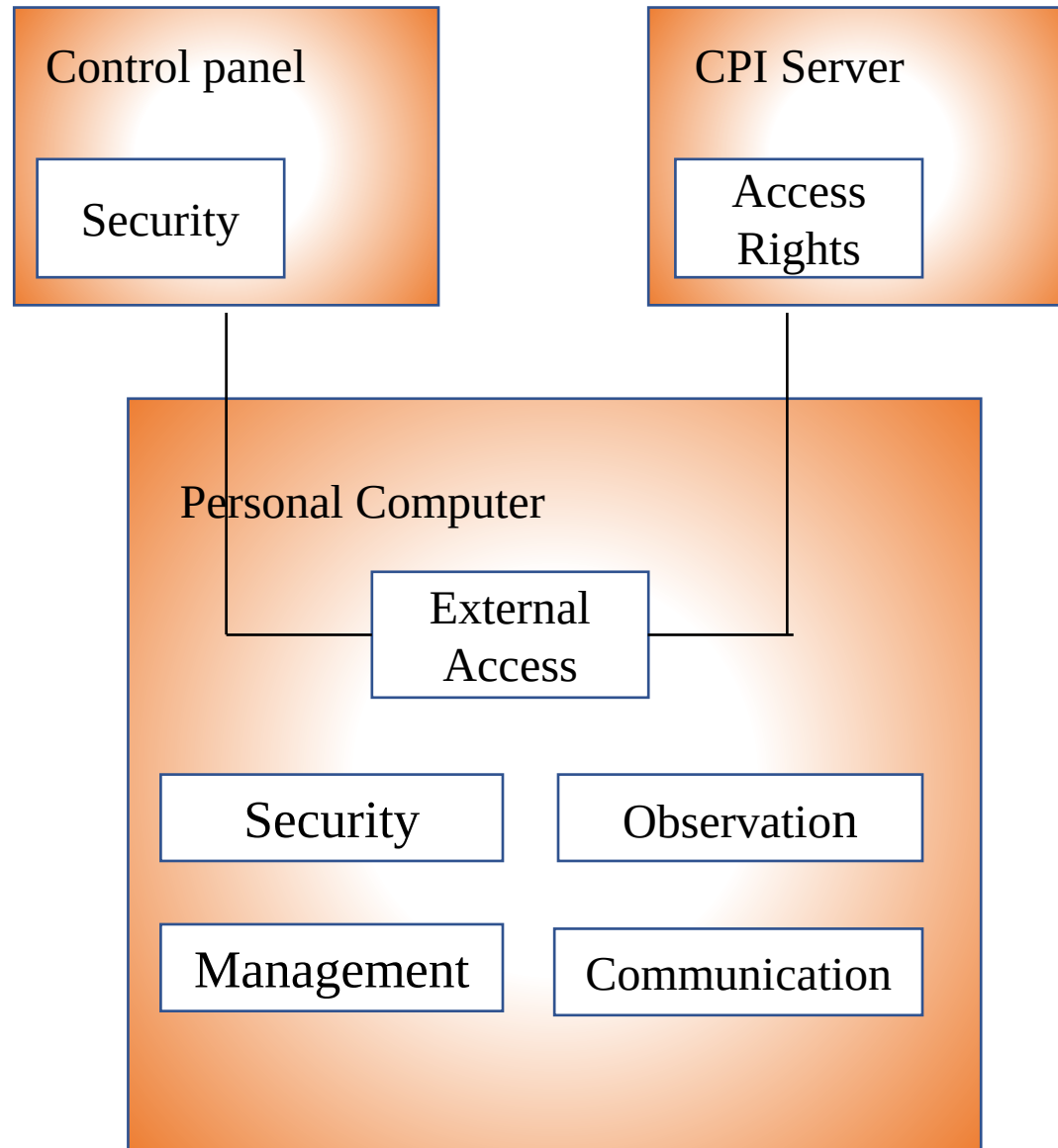
- The component level design for software is similar to the set of detailed specification of each room in a house
- It completely describes the internal details of the each software component.
- The processing of data structure occurs in a component and an interface which allows all the component operations.
- In a context of object-oriented software engineering, a component shown in a UML diagram as follows.



**Figure: Component Diagram for sensor management**

# Deployment Level Design Elements

- Deployment-level design elements indicate how software functionality and subsystems will be allocated within the physical computing environment.
- The following figure shows three primary computing environments used to configure safe home product
  - Personal computer
  - The CPI server
  - The Control panel.
- The above deployment diagram shows the computing environment not the configuration details.
- The personnel computer configuration could be MacOs or Windows etc.



**Figure: Deployment level diagram**

# Summary

- Design model addresses design tasks and level details added to each element.
- Data design element represents the data at different levels of abstraction.
- Architecture design element represented as set of interconnected subsystems.
- The interface design elements represents the information flow in and out of the system.
- Component level design elements describes the internal details of the each software component.
- Component level design elements shows how subsystems allocated in physical environment.

# References

## Text Books:

1. Roger Pressman S., “Software Engineering: A Practitioner's Approach”, 7th Edition, McGraw Hill, 2010.
2. Sommerville, “Software Engineering”, Eighth Edition, Pearson Education, 2007

## Web Links:

- [https://cdn.shopify.com/s/files/1/0457/4009/7694/files/software\\_engineering\\_pdf\\_pressman\\_7th\\_edition.pdf](https://cdn.shopify.com/s/files/1/0457/4009/7694/files/software_engineering_pdf_pressman_7th_edition.pdf)

# Thank You



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