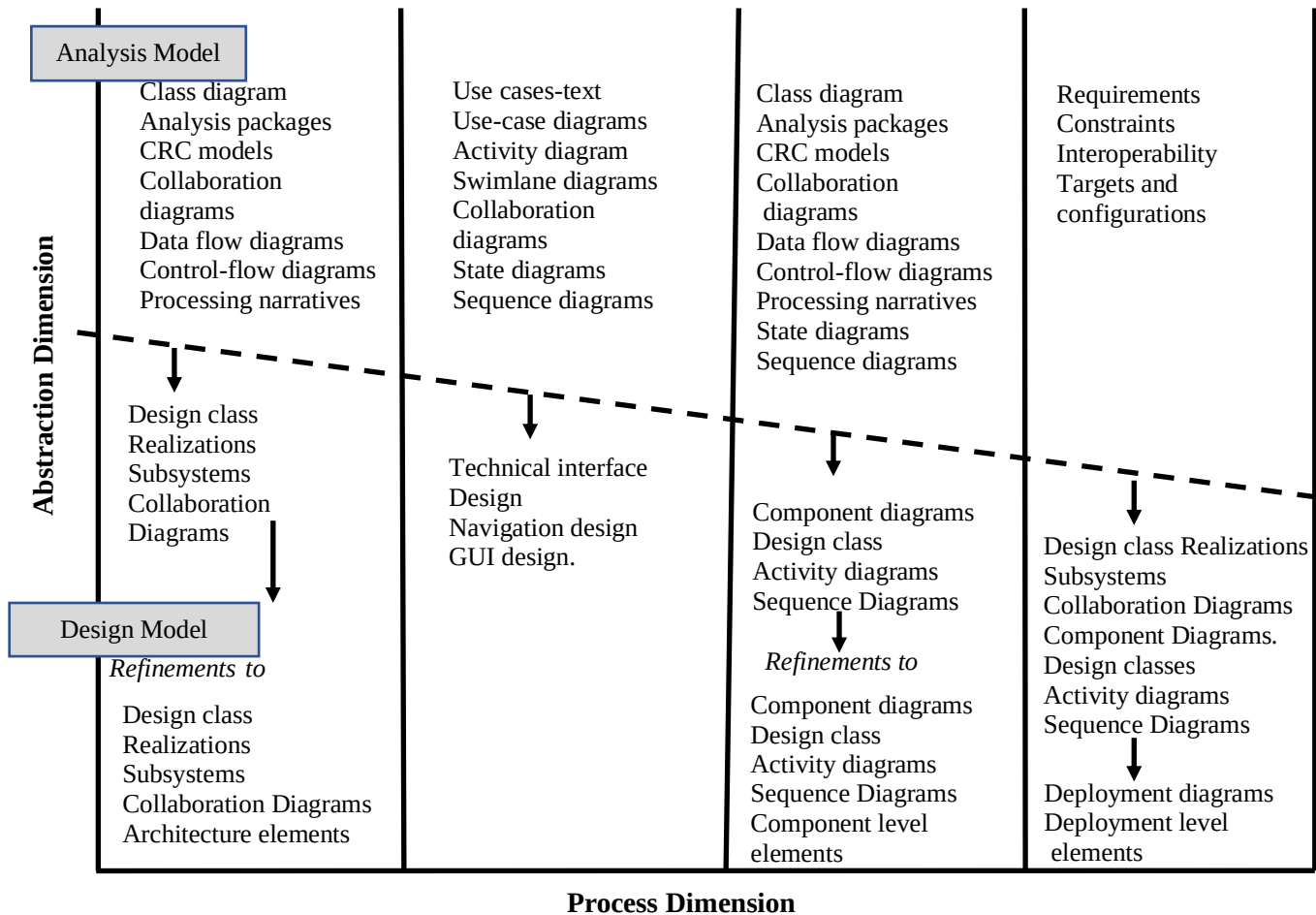


# Design Model

The design model can be viewed in two different dimensions as shown in the following figure.



**Figure: Dimensions of Design model**

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. The dashed line indicates the boundary between the analysis and design models.

## Data design elements

- The data design element creates a model of data that represent a high level of abstraction.
- This model is then more refined into more implementation specific representation which is processed by the computer-based system.
- 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 give us overall view of the system.
- The architectural design element is generally represented as a set of interconnected subsystems that are derived from analysis packages in the requirement model.
- The architecture model is derived from following sources
  1. The information about the application domain to build 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 represent 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.
- User interface is a unique subsystem within the overall application architecture.
- External interface focuses on information sent and receive about an entity.
- An interface is modelled similar to UML class, and it is set of operations that describe the part of behaviour of that class that provide access to those operations. The following figure describes the relationship between class and interface.

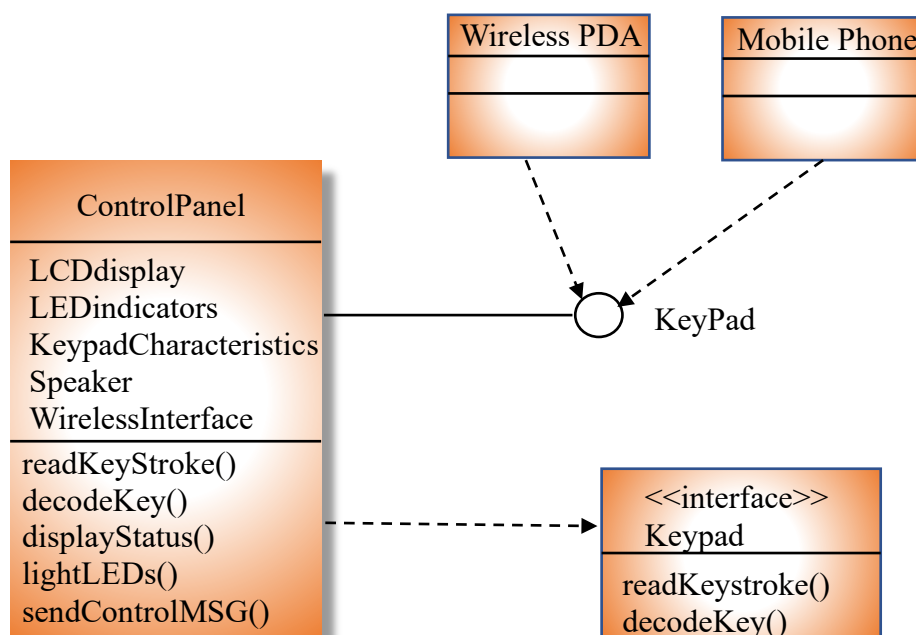
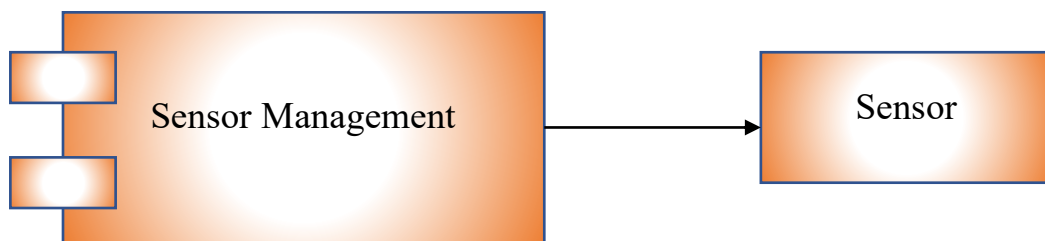


Figure: Interface representation of control panel

## Component level design elements

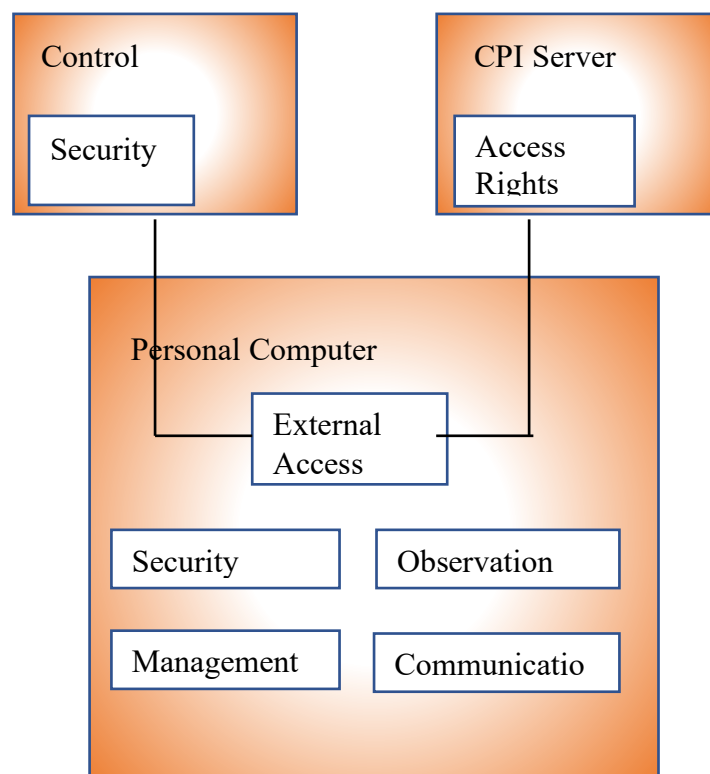
- The component level design for software is similar to the set of detailed specification of each room in a house.
- The component level design for the software completely describes the internal details of each software component.
- The processing of data structure occurs in a component and an interface 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 that will support software.
- The following figure shows three primary computing environments (personal computer, the CPI server and the Control panel), that are used to configure safehome product.



**Figure: Deployment level diagram**

- The above deployment diagram shows the computing environment not the configuration details. For example. The personnel computer configuration could be MacOS or Windows etc.

## **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**

1.  
[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)