

SOFTWARE ENGINEERING-I

BY

SAID UL ABRAR

LECTURER IN ICS/IT

THE UNIVERSITY OF AGRICULTURE PESHAWAR.

Week 8 Design Concepts

S/W Design Concepts

-Data Design.

Introduction of Software Design process

- Software Design is the process to transform the user requirements into some suitable form, which helps the programmer in software coding and implementation.
- During the software design phase, the design document is produced, based on the customer requirements as documented in the SRS document.
- Hence the aim of this phase is to transform the SRS document into the design document.

Continue...

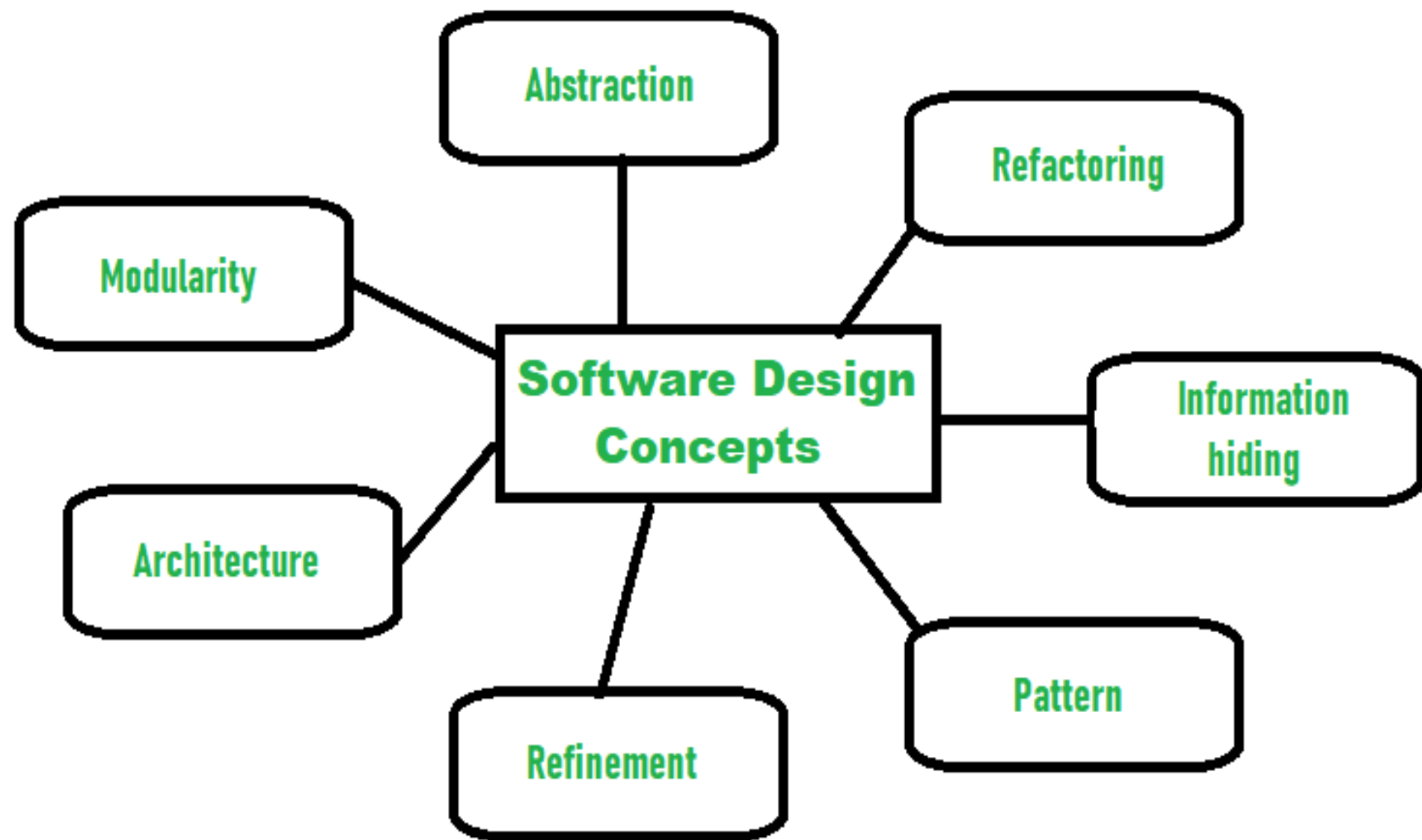
- The following items are designed and documented during the design phase:
- Different modules required.
- Control relationships among modules.
- Interface among different modules.
- Data structure among the different modules.
- Algorithms required to implement among the individual modules.

Objectives of Software Design:

- **Correctness:**
A good design should be correct i.e. it should correctly implement all the functionalities of the system.
- **Efficiency:**
A good software design should address the resources, time, and cost optimization issues.
- **Understandability:**
A good design should be easily understandable, for which it should be modular and all the modules are arranged in layers.
- **Completeness:**
The design should have all the components like data structures, modules, and external interfaces, etc.
- **Maintainability:**
A good software design should be easily amenable to change whenever a change request is made from the customer side.

Software Design Concepts:

- Concepts are defined as a principal idea or invention that comes into our mind or in thought to understand something.
- The **software design concept** simply means the idea or principle behind the design.
- It describes how you plan to solve the problem of designing software, the logic, or thinking behind how you will design software.
- It allows the software engineer to create the model of the system or software or product that is to be developed or built.



Abstraction- hide Irrelevant data

- A solution is stated in large terms using the language of the problem environment at the highest level abstraction.
- The lower level of abstraction provides a more detail description of the solution.
- A sequence of instruction that contain a specific and limited function refers in a procedural abstraction.
- A collection of data that describes a data object is a data abstraction.

Modularity- subdivide the system

- A software is separately divided into name and addressable components. Sometime they are called as modules which integrate to satisfy the problem requirements.
- Modularity is the single attribute of a software that permits a program to be managed easily.

Architecture- design a structure of something

- The complete structure of the software is known as software architecture.
- Structure provides conceptual integrity for a system in a number of ways.
- The architecture is the structure of program modules where they interact with each other in a specialized way.
- The components use the structure of data.
- The aim of the software design is to obtain an architectural framework of a system.
- The more detailed design activities are conducted from the framework.

Refinement- removes impurities

- Refinement is a top-down design approach.
- It is a process of elaboration.
- A program is established for refining levels of procedural details.
- A hierarchy is established by decomposing a statement of function in a stepwise manner till the programming language statement are reached.

Pattern- a repeated form

- The pattern simply means a repeated form or design in which the same shape is repeated several times to form a pattern.
- The pattern in the design process means the repetition of a solution to a common recurring problem within a certain context.

Information Hiding- hide the information

- Information hiding simply means to hide the information so that it cannot be accessed by an unwanted party.
- In software design, information hiding is achieved by designing the modules in a manner that the information gathered or contained in one module is hidden and can't be accessed by any other modules.

Refactoring- reconstruct something

- Refactoring simply means reconstructing something in such a way that it does not affect the behavior of any other features.
- Refactoring in software design means reconstructing the design to reduce complexity and simplify it without affecting the behavior or its functions.
- Fowler has defined refactoring as “the process of changing a software system in a way that it won’t affect the behavior of the design and improves the internal structure”.