

Analysis Modeling

Topics to be discussed

- Outlines

- What is Analysis Modeling?
- Who does it?
- why is Analysis modeling important
- What are the steps?
- What are the work products
- How to make sure the rightness of Analysis Modeling
- Goals of Analysis Modeling
- Analysis Modeling Rules of Thumb
- Analysis Modeling Element

References

- Software Engineering: A Practitioners approach chapter : 11 and 12

Objectives and outcomes

- **Objectives**

- **The Objectives of this chapter is to understand the importance of Analysis modeling and various techniques as well as diagrams used in Analysis Modeling activity of the Requirement engineering process**

- **Outcomes**

- **After taking this lecture students should be able to:**
- **Understand** Analysis Modeling and it's importance
- **Analyze** various elements of the Analysis modeling

Analysis

What is it?

- *What is Analysis Modeling?*
- Analysis modeling is a crucial step in software engineering that helps **define and structure** the system before moving into design and development.
- It serves as a **technical representation** of the system, acting as a **bridge** between the **system description and the design model**

What are the steps?

- **Steps in Analysis Modeling?**

- Data, functional, and behavioral requirements are modeled using a number of different diagrammatic formats.
- **Data** modeling defines **data objects, attributes, and relationships**.
- **Functional** modeling indicates how data are **transformed within a system**.
- **Behavioral** modeling depicts the impact of events, ex: **state transition diagram**
- A **specification containing model** is created and then validated by both software engineers and customers/users.

How to make sure about its rightness?

- *How to make sure?*

- All the created work products must be reviewed for **correctness ,completeness and consistency**.
- It must reflect the **needs of all stakeholders** to establish the **foundations** for the design.

System Description

שהובילה אליו. במאה ה-9 או ה-8 החליף אותה מפעל טים מתוחכם יותר. מפעל זה המשיך לשמש את העיר האשורית במאה ה-7 לפסה"ג.

The problem of supplying water to large cities, a serious issue even in times of peace, could become acute in times of siege. Megiddo's main water source was located at the foot of the mound, beyond the city's fortifications. In order to ensure access to the spring from within the city, a hidden gallery was built on the slope of the mound in the 10th or 9th c. B.C. This gallery was later blocked and replaced by an elaborate water system, which remained in use in the Assyrian city of the 7th c. B.C.

Analyses Model



Design Model



Goals of Analysis Modeling

- *What are the goals of Analysis Modeling?*
 - Provides the **first technical view/representation** of the system
 - It uses **graphics**
 - Provides tools other than **narrative text to describe software logic**

Elements of an Analysis Model:

- **Data Dictionary:** A repository of all data objects used in the software.
- **Entity Relationship Diagram (ERD):** Shows relationships between data objects.
- **Data Flow Diagram (DFD):** Illustrates how data moves through the system.
- **State Transition Diagram:** Represents different states of the system and transitions between them.

1. What is an Analysis Model?

- An analysis model is a **structured way of understanding** the system requirements before starting the actual design or development.
- It acts like a **plan or map** that shows how the system should work.
- This model helps both **developers and clients** to understand the expected system behavior clearly.

2. Importance of Analysis Models

- Analysis models are important because they help in **understanding the full requirements of a system**. Without them, developers may miss key features or misunderstand the needs of the users.
- These models make **communication easier between technical and non-technical team members**. They also reduce the chances of making mistakes during the development process.

3. When Do We Use Analysis Models?

- We use analysis models in the **early stages of the software development process**. They are most helpful during the **requirement analysis phase**.
- This helps to prepare a **strong base for design and coding**.
- Once we understand the user's needs clearly, we can plan the system better and **avoid rework later**.

4. Types of Analysis Models

- There are many types of analysis models like **DFD (Data Flow Diagram), ER Diagram, Use Case Diagram,** and more. Each one helps explain a different part of the system.
- Some models focus on the **flow of data**, while others show **how users interact** with the system or **how data is stored**.
- Together, they give a complete picture of the system.

5. Benefits of Using Analysis Models

- Using analysis models **saves time** and **reduces cost** because **we plan everything in advance**. It becomes easier to detect problems early.
- They also help create better-quality software because the **team can understand the system well before starting the development**.

6. How Analysis Models Help Developers

- For developers, analysis models are like roadmaps. They show exactly **what features need to be built** and **how they should behave**.
- This makes the **development work faster** and more accurate. Developers can **avoid confusion** and focus on writing the correct code.

7. How Analysis Models Help Clients

- Clients often do not understand **technical terms**. Analysis models help **them see and approve what they need in a simple way.**
- They can suggest changes early, which saves time and money.
- This leads to a system that **meets their actual needs.**

8. Use in Requirement Gathering

- During requirement gathering, we talk to users and write down what they need. **Analysis models help turn these needs into visuals.**
- This makes **it easier to explain** to other team members and helps in making sure we don't miss any important point.

9. Common Symbols in Models

- Different analysis models use different shapes like **circles, arrows, rectangles**, and lines. Each has a meaning.
- Learning these symbols helps **understand the models better and read them correctly**.

10. Easy Communication Tool

- Analysis models help in communicating with the full team, including those who are not developers.
- They are simple, visual tools that help explain difficult ideas in a very easy way.

11. Supports Project Planning

- By knowing all system parts in advance, we can plan project tasks better using these models.
- This includes deciding what needs to be done first and how long it may take.

12. Reduces Rework

- If we understand everything from the beginning, we avoid repeating work or fixing problems later.
- Analysis models help in catching mistakes early before development starts.

13. Helps in System Testing

- After development, we test the system. Models help check if everything is working as planned.
- We can compare the system to the models to see if it is doing what it should.

14. Easy to Update

- If there is any change in requirements, we can update the models easily.
- This keeps everyone on the same page without changing the full system plan.

15. Reusable for Future Projects

- Many parts of the analysis models can be reused in future projects, saving time.
- This is helpful especially when building similar types of systems.

16. Part of Documentation

- Analysis models are also used as part of the official system documents.
- These documents help future teams understand how the system was planned and why decisions were made.

17. Learning Made Easy

- For students, analysis models make learning about systems easier because they are visual and simple.
- They help in understanding complex systems step by step.

18. Real-Life Example Use

- In real companies, analysis models are used daily to design and build systems like banking software or school systems.
- Understanding these models helps students become ready for professional work.

19. Summary of Key Points

- Analysis models help in planning, designing, and communicating system ideas clearly.
- They are used by developers, managers, and clients to ensure the system meets all needs.

20. What's Next After Analysis Models?

- Once the analysis models are ready, we move to the design phase where we start creating system architecture.
- Later, the system will be developed and tested based on what was decided in the analysis model.

Thank You