Object Oriented Analysis and Design

CS-291

Manoj Misra

Syllabus :-

- OO concepts, OO programming, OO analysis & modeling using UML

Goals of OOAD course

- Learn fundamental principles of object-oriented modeling, requirements analysis, and design.
- Learn various modeling concepts provided by Unified Modeling Language; identify use cases and expand them into full behavioral designs.

- Standard notation used in system and software development, the Unified Modeling Language (UML 2.0)
- Process of object-oriented analysis and design
- How OOAD can be applied across the system development lifecycle

Suggested Books:

1. Bennett, S., "Schuam's Outline of UML". New York; McGraw-Hill, 2004
2. S. Perdita. "Using UML: Software Engineering with Objects and Components." Addison-Wesley, 2000
3. R. Miles, "Learning UML 2.0", O'REILLY 2006
4. **G. Booch, "Object-Oriented Analysis and Design with Application", Willy. 2007**
5. E. Gamma., "Design Patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 1994

Suggested Books:

6. Balaha M R & RumBaugh J R, "Object Oriented Modeling and Design with UML", 2nd Ed., Pearson
7. G. Booch, J Rumbaugh & I Jacobson, "The Unified Modeling Language User Guide" Addison-Wesley.
8. M Fowler, "UML Distilled", 3rd Ed., Pearson
9. Herbert Schildt, "The Complete Reference C++", McGraw Hill

Marks :-

(CWS 15%; PRS 25%; MTE 20%; ETE 40%)

Lecture Classes :-

(65-70 % Lectures + 30-35 % Presentations)

Lab Classes (Lab Assignments / Projects)

1 / 2 Quizzes (15 %)

Lab / project / presentation (25 %)

Prerequisites (CSN - 103)

The oldest profession in the world

A physician, a civil engineer, and a computer scientist were arguing about what was the oldest profession in the world.

The physician said,

"Well, in the Bible, it says that God created Eve from a rib taken out of Adam. This clearly required surgery, and so I can rightly claim that mine is the oldest profession in the world."

The civil engineer interrupted, and said,

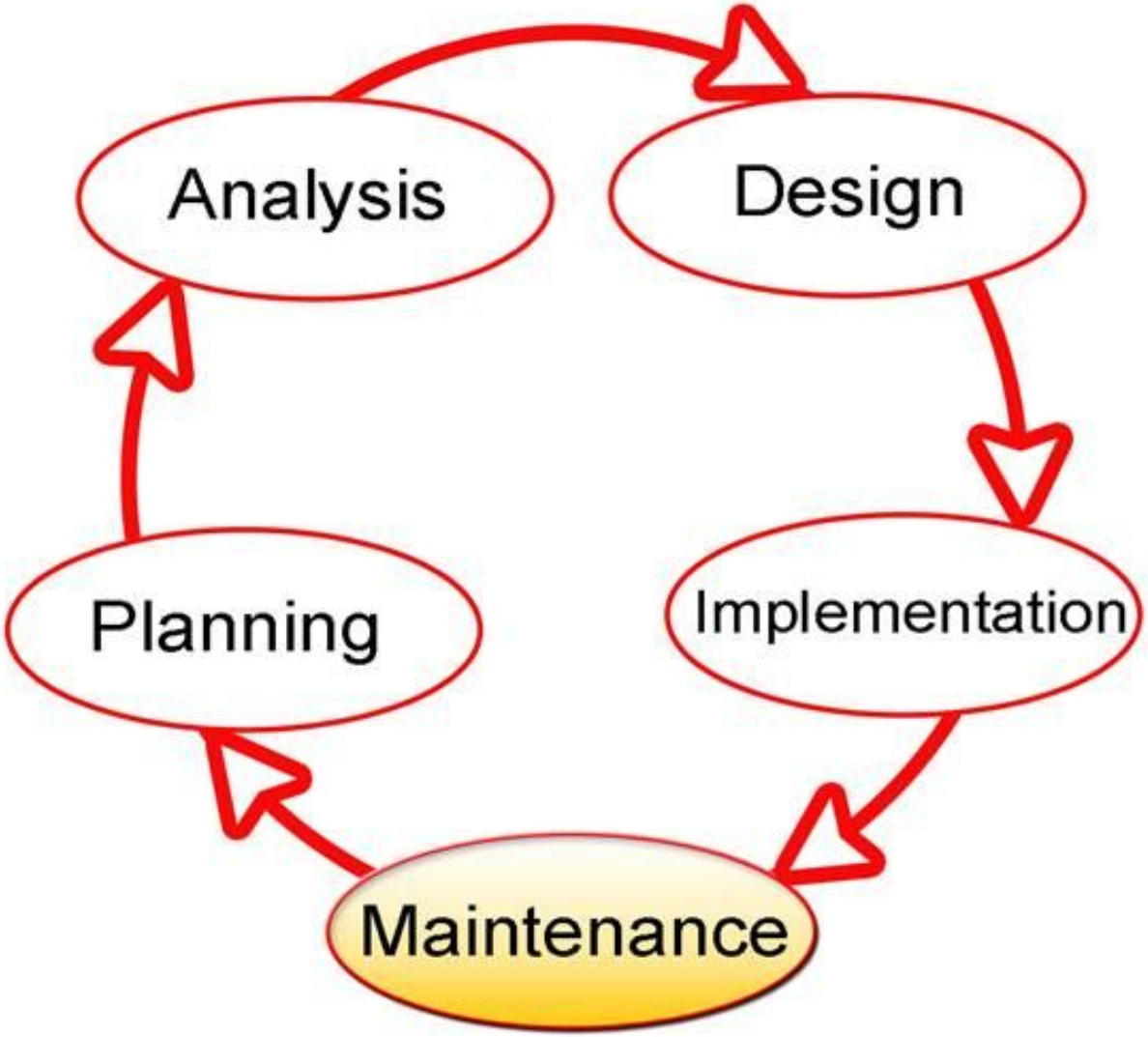
"But even earlier in the book of Genesis, it states that God created the order of the heavens and the earth from out of the chaos. This was the first and certainly the most spectacular application of civil engineering. Therefore, fair doctor, you are wrong: mine is the oldest profession in the world."

The **computer scientist** leaned back in her chair, smiled, and then said confidently,

"Ah, but who do you think created the chaos?"

OOAD : Bringing order to chaos

Systems Development lifecycle (SDLC)



Process for planning, creating, testing, and deploying an information system.

Applies to a range of hardware and software configurations

- ✓ **Object-oriented analysis & design** is about building good models.
- ✓ Importance of Modeling
- ✓ Building

  A Dog House

  Your own house

  High rise office building

- ✓ We build models of **complex systems**

- ✓ We build models of complex systems because we cannot comprehend such a system in its entirety
- ✓ There are limits to the human ability to understand complexity
- ✓ Through modeling we narrow down the problem we are studying by only focusing on only one aspect at a time – **divide-and-conquer**
- ✓ **A model is a simplification of reality**

- ✓ We build models so that we can better understand the complex system we are developing

1. Model is **an abstraction of something** for the purpose of understanding it before building it
2. Models help us to **visualize a system** as it is or as we want it to be
3. Models permit us to **specify the structure and behavior** of the system
4. Models enable us to **test a physical entity before building it**

5. To expose **opportunities for** simplification and **reuse**
6. We build models **to manage risk.**
7. Models **document the decisions** we have made

✓ Modeling requires two significant pieces: a modeling language and a process?