Software Design

2021-’22 Winter SWE B.Tech

Already

Importance and Need for “Engineering” software

SDLC

Different steps involved - Milestones and Deliverables

Already

- Feasibility and Problem Definition
- Requirements Specification [SRS]
- Design - High Level and _____
- Development or Implementation [code with documentation]
- Testing
- Deployment
- Maintenance

Already

Waterfall Model

V Model

Boehm Spiral Model

Agile [sprint, scrum]

The Y2K Problem

A common design decision - Everywhere

SENATE - SAC

SGPA - CGPA

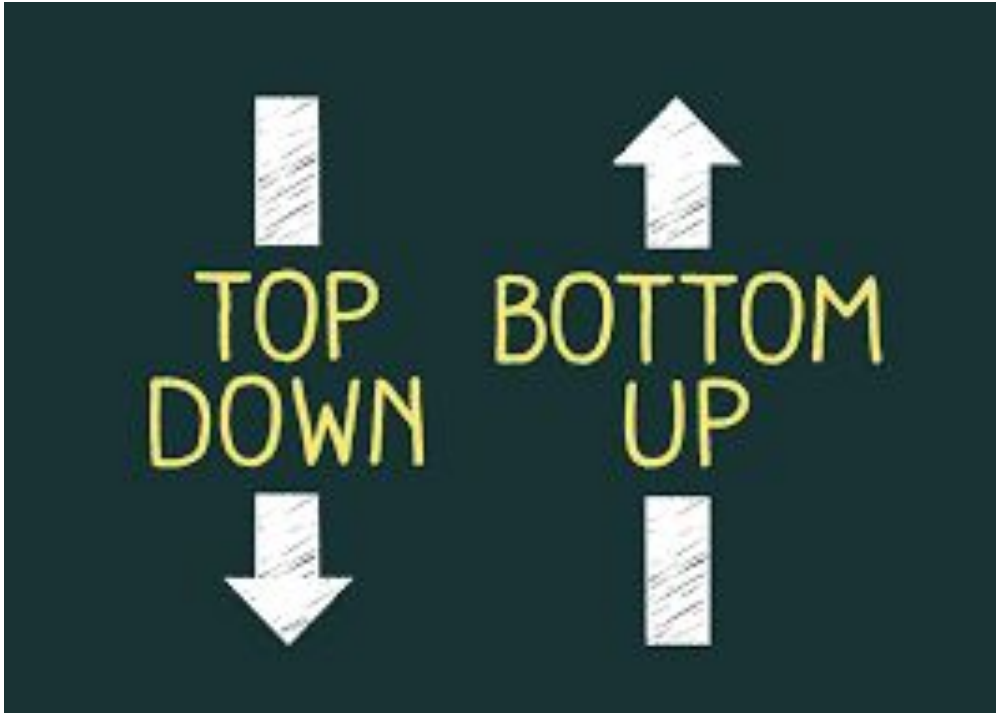
A common design decision - As you start college

CGPA → consistency in efforts [SGPA]

Projects → initiative & skills [assgts]

Organizational posts → soft/mgmt skills

A common design decision



How they differ?

Trying to complete a puzzle from experience ‘knowing’ what it will be. [TD]

Following rules/clues to complete the puzzle and get the solution in the end. [BU]

Why is this important in Software Design?

Got the SRS - Good!

Where to proceed now?

How do we communicate with others?

Do we learn something to carry forward?

The Text Book Approach

Object Oriented Design [OOD] predominantly bottom up approach.

Object Orientation

Identify the classes

- Their instances are Objects
- They interact to capture the functionalities

Simple to Complex

The Bottom Up Approach

Object Orientation - Learn About

Abstraction - Procedural and Data

Encapsulation

Inheritance - is-a / has-a relationships

Polymorphism - overloading / overriding

Importance of INTERFACEs

Object Orientation

Many terms which can be confusing

Java or C++

One example for each with practical code snippet

Unified Modeling Language

Agree on OOD

Different ways of going about - Different notational systems

Booch - Rumbaugh - Jacobson

Object Management Group (OMG) adopted UML in 1997, ISO in 2005

A standard representation of the Object Oriented Design [meaningful skills]

Unified Modeling Language

A standard representation of the Object Oriented Design including

- Activities
- Components
- Interfaces
- Interactions

Tools to draw these, and these days moving towards

Automatic Code Generation

UML Diagrams

Structure Diagrams

Behavior Diagrams

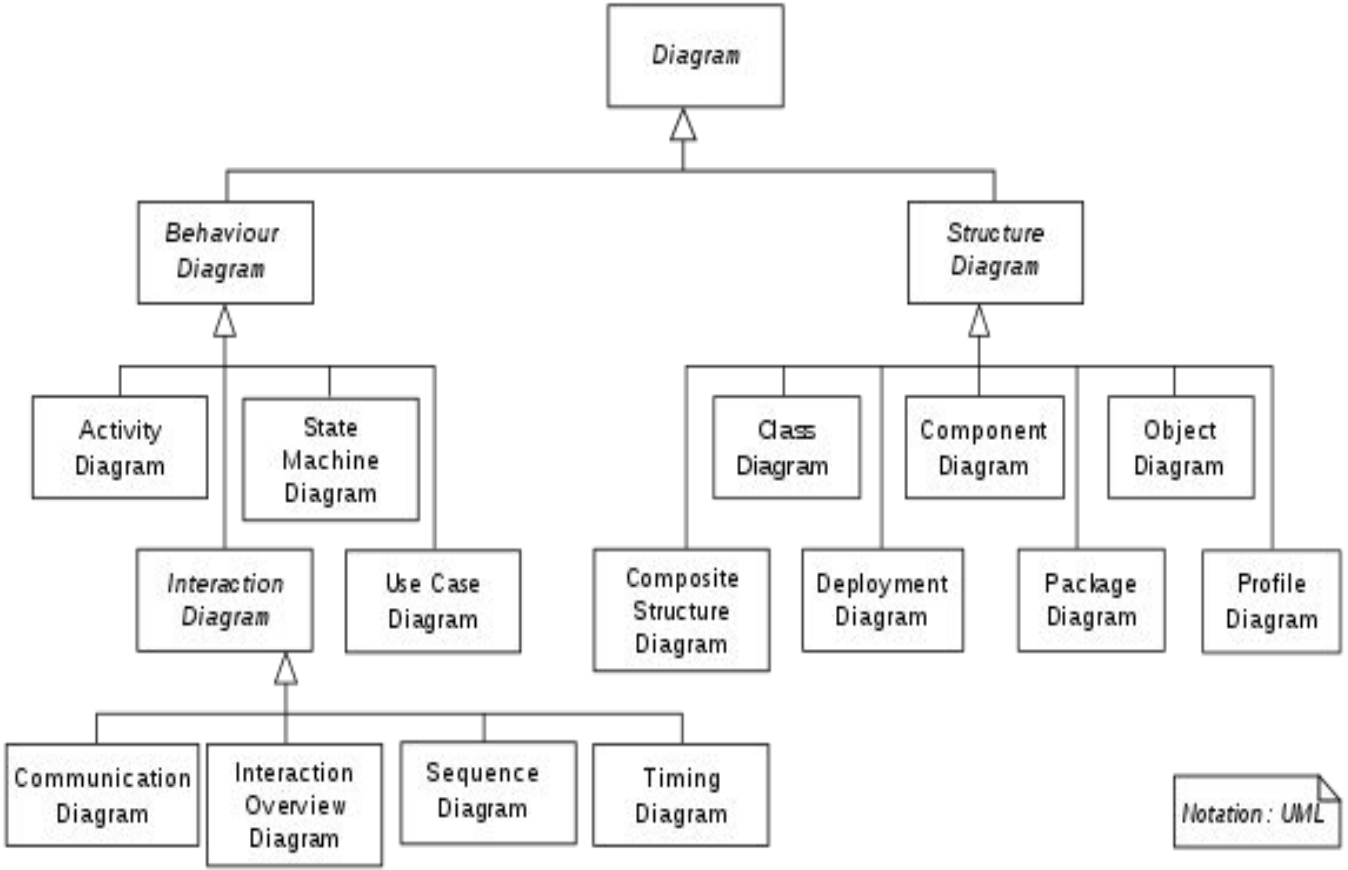
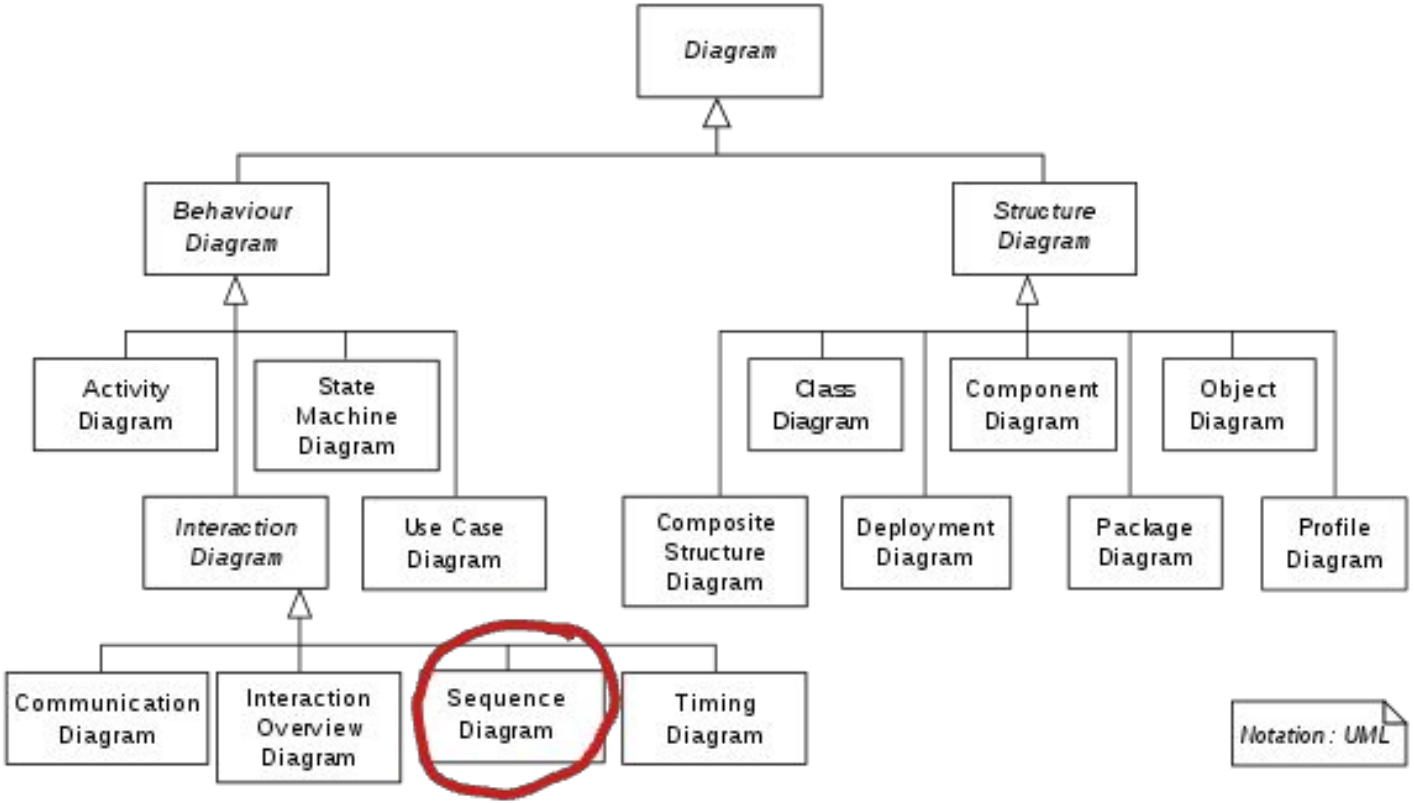


Diagram
Behaviour Diagram
Structure Diagram
Activity Diagram
State Machine Diagram
Interaction Diagram
Use Case Diagram
Class Diagram
Component Diagram
Object Diagram
Composite Structure Diagram
Deployment Diagram
Package Diagram
Profile Diagram
Communication Diagram
Interaction Overview Diagram
Sequence Diagram
Timing Diagram
Notation : UML

In the next class …



To conclude, where are we?

After SRS, over to Design

Top Down vs Bottom Up

Object Oriented Design

A common way of representing, understanding the OOD

Unified Modeling Language

Structure and Behavior Diagrams

We will start with “Sequence Diagrams” in the next class