



A background image featuring a globe on the left, a hand holding a smartphone displaying binary code on the right, and a grid of binary digits in the center.

Programming Practices and Techniques

Session 7- Structured Programming

Objectives

- Define structured programming
- Describe the benefits of structured programs
- Identify the modeling tool used for structured programming
- Explain the top-down structured technique used in program designing
- Explain the elements of structured programs

Introduction

- Structured programming:
 - Is also called as modular programming
 - Is a programming approach
 - Applies a logical structure on a program to make it efficient and easier to understand and modify
 - Regularly uses a top-down design model, in which developers plan the whole program structure, and then divide it into subsections

Benefits of Structured Programming 1-2

- The advantages of structured programming are described as follows:

Code reuse

- Modules can be used multiple times. This reduces complexity, saves time, and increases reliability

Modularity

- This equips programmers to confront problems logically. By splitting a large problem solution into smaller portions

Better flow

- Structured programming promotes better flow as each operation or task is properly segmented or separated

Increased productivity

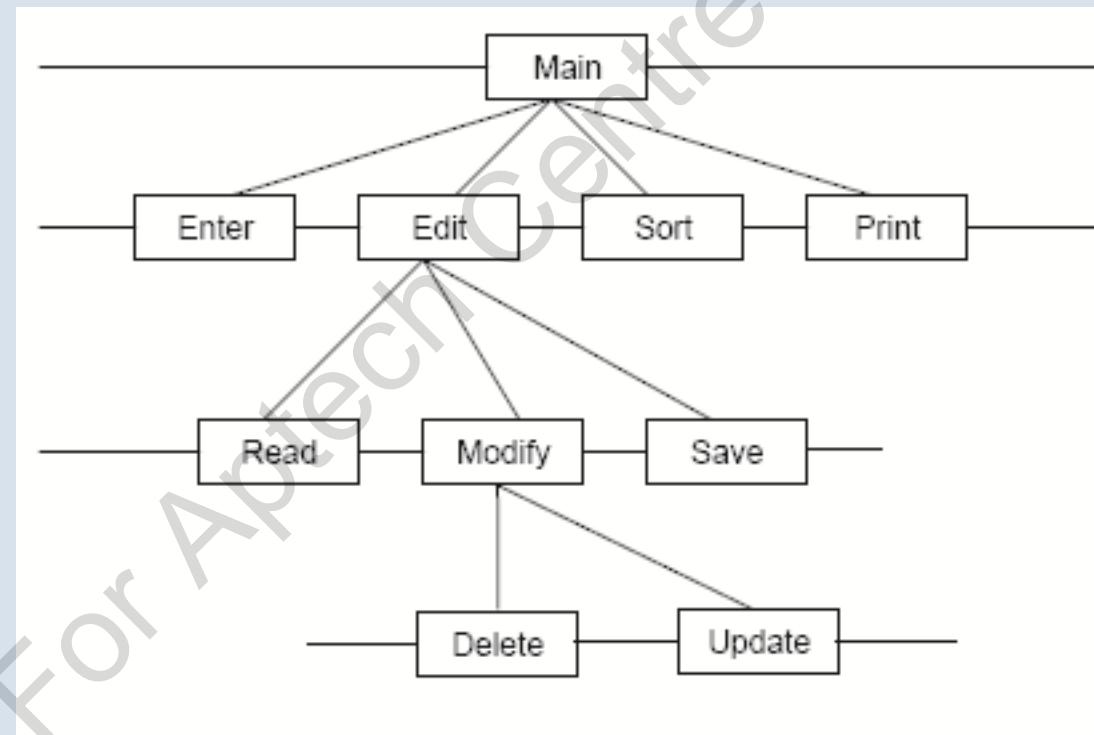
- Structured programming increases productivity as time taken for error detection and error handling is reduced

Easier debugging and maintenance

- It is also easier to update or fix issues in the program by replacing individual modules rather than modifying or fixing larger amounts of code

Benefits of Structured Programming 2-2

- Structured programming method results in a hierarchical or layered program structure



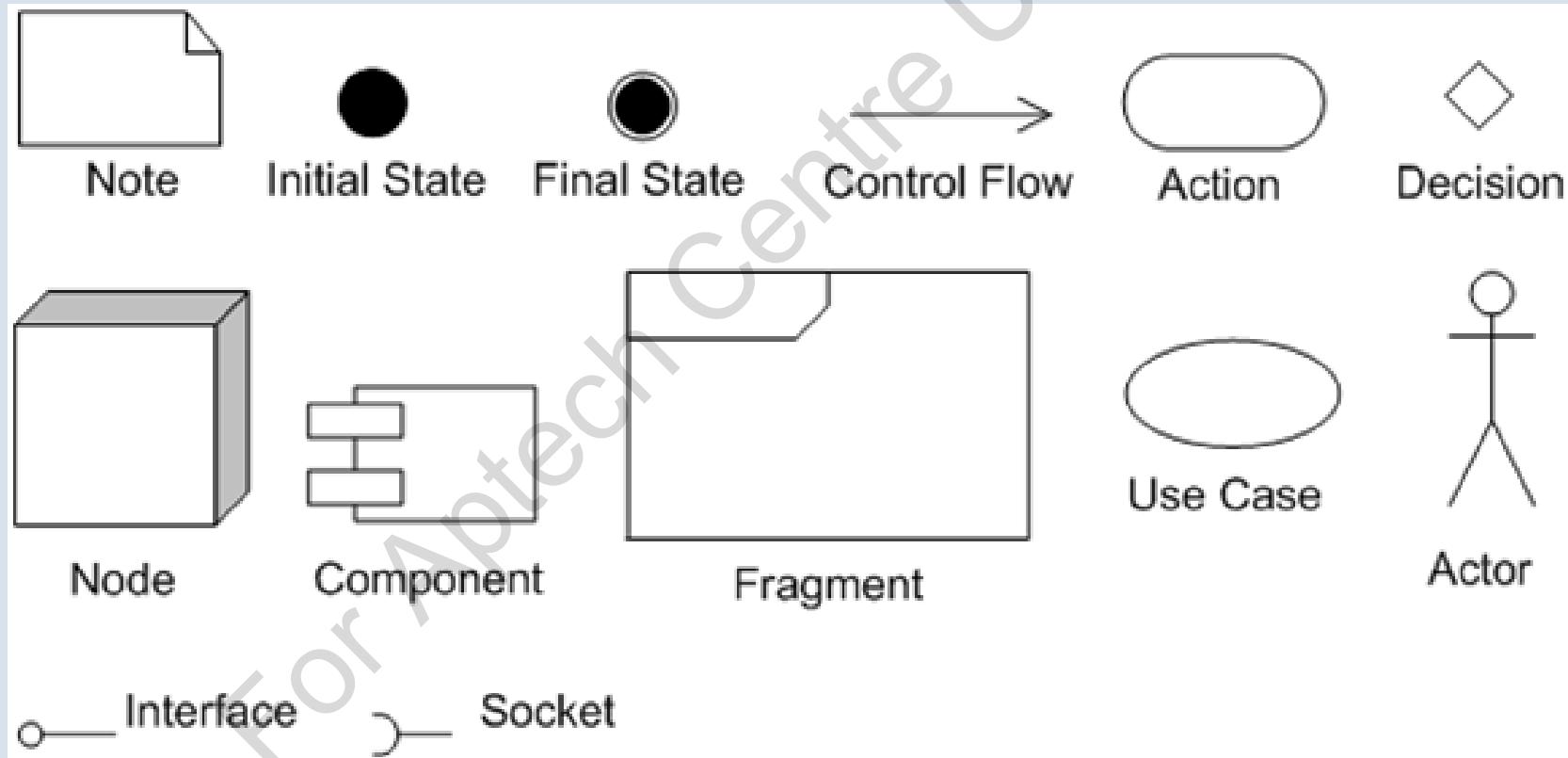
Unified Modeling Language (UML) 1-3

□ UML:

- Is a popular, standardized modeling tool used in structured programming and OOP systems
- Is used to specify, visualize, modify, construct, and document the requirements and specifications of a software system under development
- Helps designers and developers to read and circulate system structures
- Provides the formalization and visualization, which make the requirements clear and concise

Unified Modeling Language (UML) 2-3

- Basic UML legends that are used in different kinds of UML diagrams are as follows:



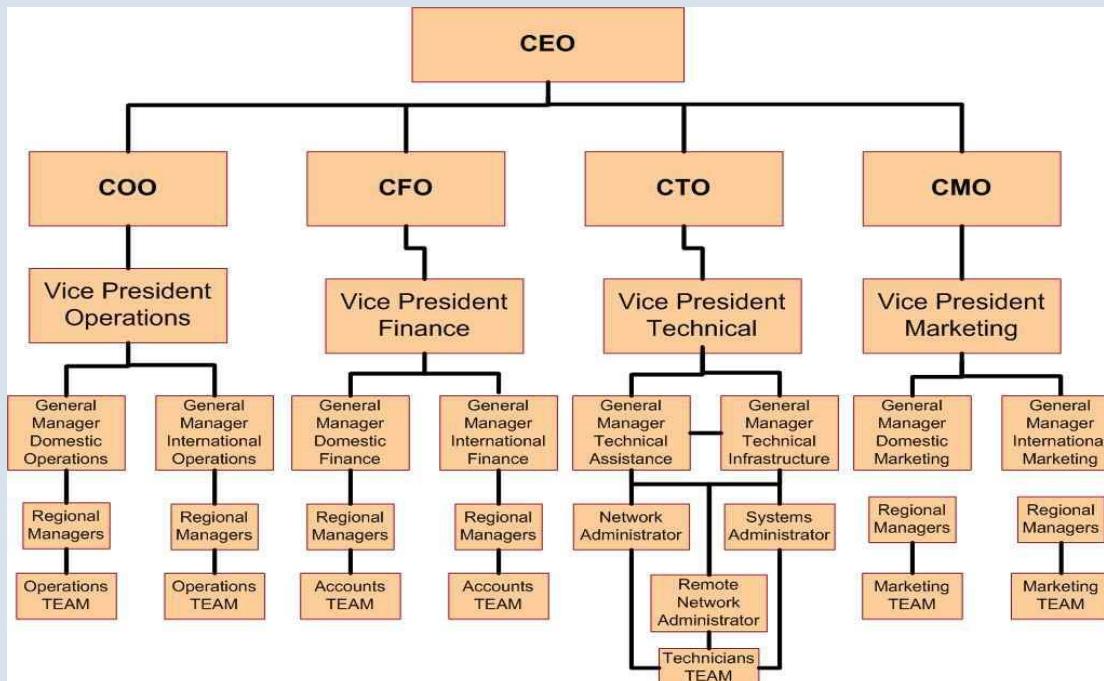
Unified Modeling Language (UML) 3-3

❑ Modeling views offered by UML are as follows:

- Sequence Diagrams
- Collaboration Diagrams
- Activity Diagrams
- State Chart Diagrams
- Class Diagrams
- Component Diagrams
- Deployment Diagrams

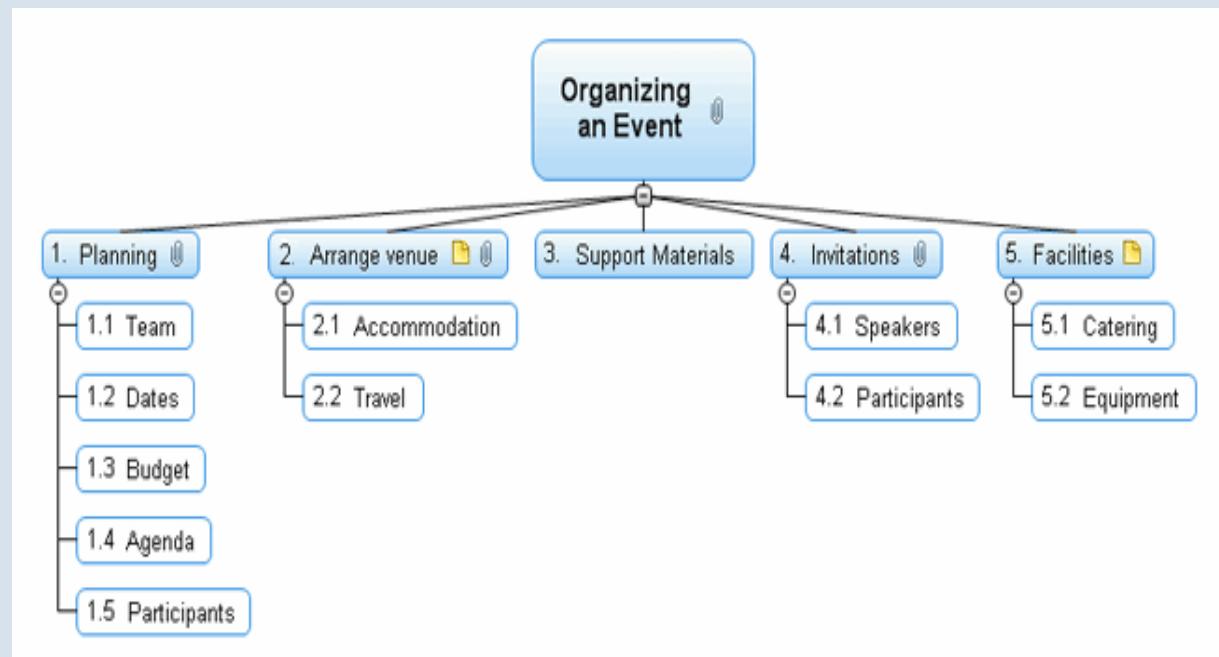
Structure Charts

- ❑ A structure chart is a graphic representation of the decomposition of a problem
- ❑ It is a tool to assist in software designing
- ❑ It is particularly helpful while solving large problems
- ❑ A structure chart is not a flowchart; it has no logical sequence of tasks



Top-Down Structured Technique

- ❑ Is the process of dividing the overall task into smaller components
- ❑ Signifies breaking a difficult task down and solving pieces independently until every step can easily be implemented
- ❑ Emphasizes planning and a complete understanding of the system
- ❑ Is implemented by attaching the stubs in place of the modules



Elements of Structured Programs 1-2

□ Five basic elements of programming present in most languages are as follows:

Variables

- Variables represent the data
- The data can range from something very simple, such as the age of a person, to something very complex

Loops

- Loops allow carrying out execution of a group of commands a certain number of times

Conditionals

- Conditionals specify execution of a group of statements depending on whether or not some condition is satisfied

Elements of Structured Programs 2-2

Input/output

- This will allow interaction of the program with external entities

Subroutines and functions

- This will allow putting frequently used snippets of code into one location, which can then be used repeatedly

Summary

- ❑ Structured programming is a programming approach that implements a logical structure on a program to make it competent and easier to comprehend and modify
- ❑ UML is a popular modeling language used to specify, visualize, modify, construct, and document the requirements and specification of an object-oriented software system
- ❑ A structure chart is a graphical representation of the decomposition of a problem. It is a tool to assist in software designing
- ❑ Top-down structured technique is the process of dividing the overall task into smaller components