Software Design Concepts

The Johns Hopkins University
773.707 Section 81

Dr. Vignarajah - Lecture I

Introduction

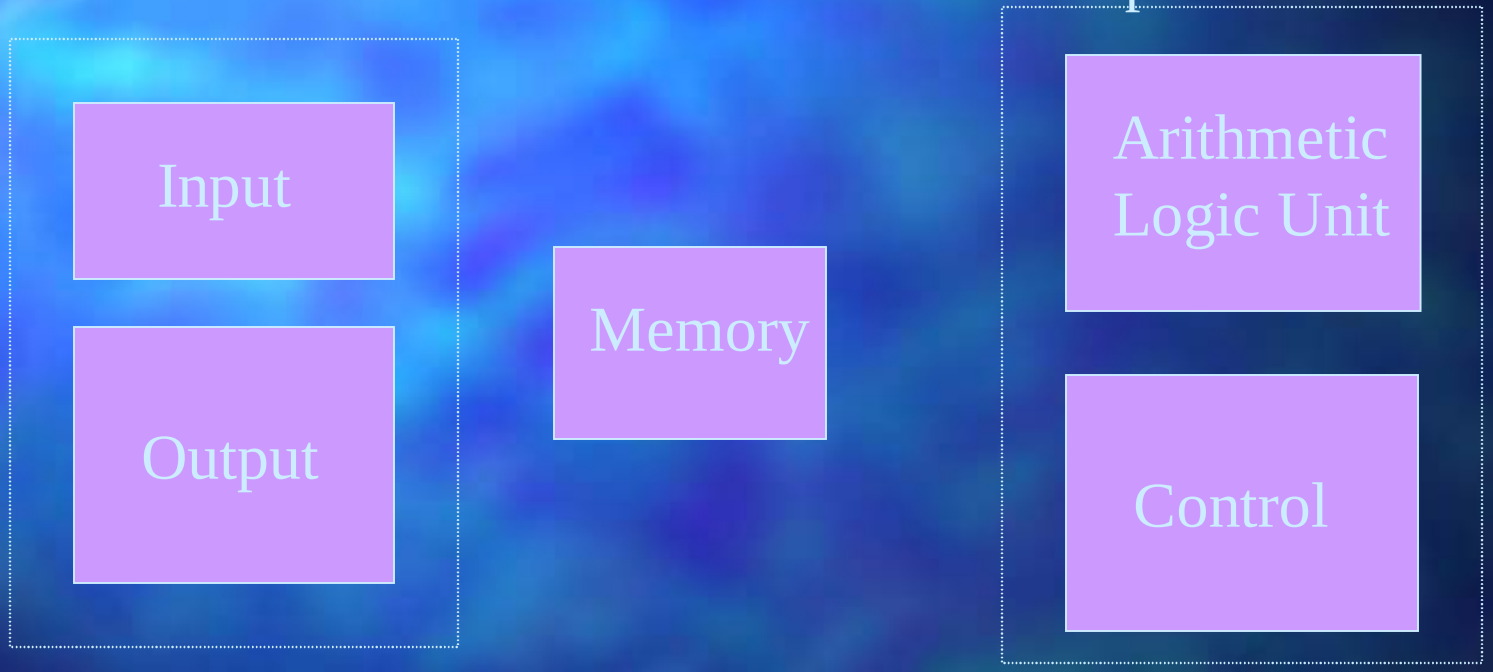
- Course and Syllabus Overview
- Computer Terminology and Architecture
- Programming and Programming Languages
- Problem Solving and Decision Making
- Software Development Life Cycle (SDLC)

Overview of Syllabus

- Computer Basics
- Problem Solving Concepts
- Programming Concepts
- To develop models
- Programming Structure Overview
- Fundamentals of Methodology
- Object Oriented Programming - Java

Basic Computer Architecture/Terminology

- Basic functional unit of a computer



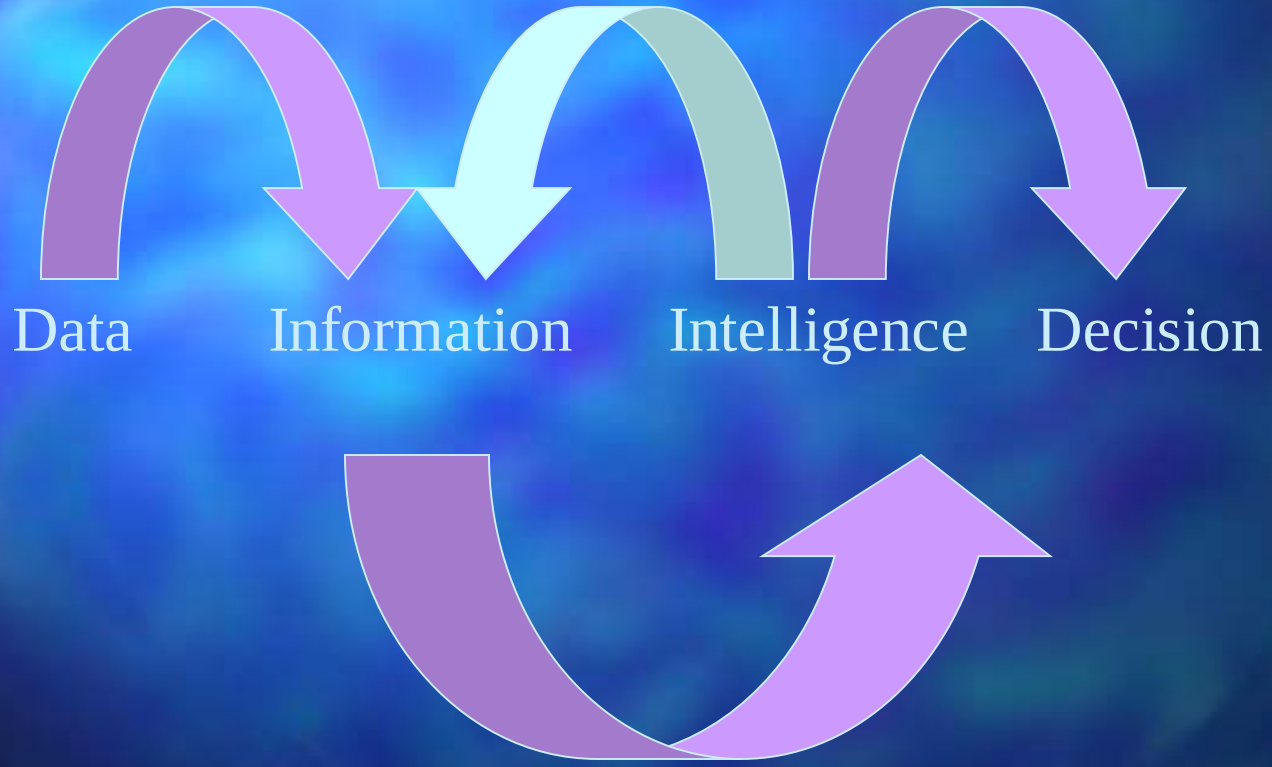
Programming Language Models

- Imperative or Procedural Model - C, FORTRAN
- Logic-Oriented Model - Prolog
- Functional Model – Lisp
- Object-oriented Model - C++, Java

Problem Solving and Decision Making

- Identify the problem
- Design the model
- Build the model
- Validate
- Test
- Maintain

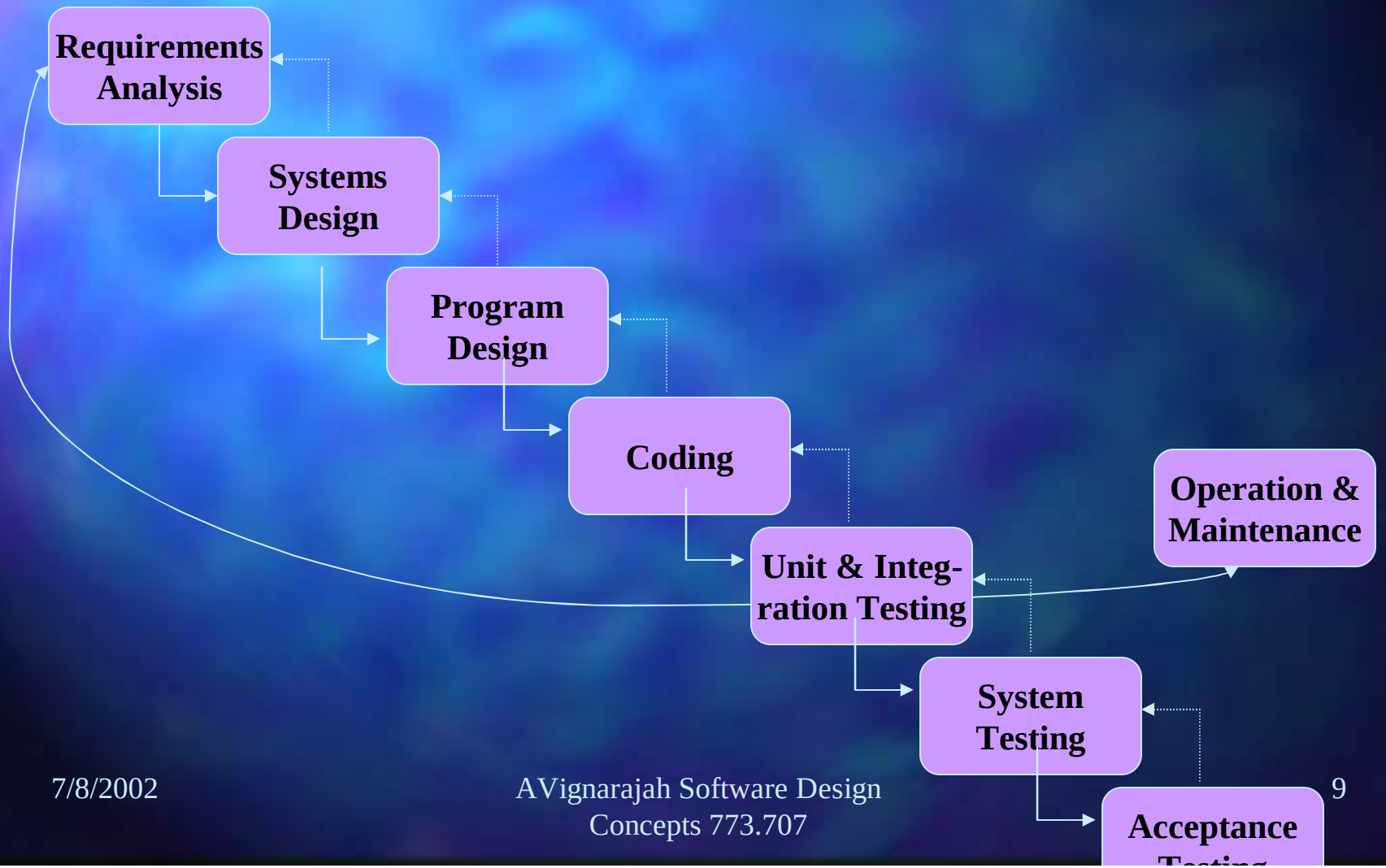
Problem Solving and Decision Making cont'd.



Advantages in using Computer Programs

- Increases efficiency and speed
- Reduces error
- Reduces repetitive work
- Minimizes training
- Lower cost
- Standardization

Software Development Life Cycle (SDLC)



Problem Solving Concepts

- Problem Types
- Problem Solving in daily life
- Obstacles to Problem Solving
- Terminology used in computer problem solving
- Computer program types

Steps in Problem Solving

- Analyze the problem
- Understand the problem - identify inputs, - desired outcomes - outputs, processing to be done, constraints
- Identify solutions with alternatives
- Select appropriate solution
- Evaluate the correctness of the solution

Problem Types

- Heuristic - solutions to some problems require reasoning based on knowledge, experience in addition to trial and error methods - Examples artificial intelligence related problems
- Algorithms - step-wise refinement leading to the pseudo-code for the program. Could be a combination of both methods in most problems.

Problem Solving Contd.

- Obstacles:
- (1) Incomplete analysis of the problem
- (2) Incomplete understanding
- (3) Incorrect logical sequence to the solution
- (4) Focus on too much detail before building the system

Terms

- Solution - the algorithm
- Results - the output
- Program - the coded version of the algorithm