Module 1a: Introduction to Problem Solving and Python Fundamentals

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July 21, 2025

Professional Coding

Efficiency in solving problems depends on how correctly & precisely we define the problem, design the solution (algorithm), and implement the solution (code) using the programming language

[Unknown]

How our syllabus are framed?

- Pre-Programming Phase
- Coding Phase

Module 1: Introduction to Problem Solving and Python Fundamentals

- Concepts 1: Why Programming?
- Concepts 2: Understanding Programming Terminologies
- Concepts 3: Problem-Solving Approach
- Concepts 4: Python fundamentals

Objectives of Module 1

- Understand the fundamentals of programming
- Familiarize with essential programming concepts and terminologies
- Develop a structured approach to problem-solving

Concept 1: Why Programming Languages?

What Are Languages?

- A language is a system of communication used to express thoughts, ideas, or instructions — either between humans or between humans and machines.
- Human languages, Tamil, English, Hindi...
- Programming languages, Python, Java, C...

Language Comparison Table

Feature	Human Language	Programming Language
Syntax	Grammar rules	Code structure
Vocabulary	Words	Keywords/commands
Purpose	Communicate ideas	Give instructions to machines
Interpretation	Understood by humans	Interpreted or compiled for comp

What Are Programming Languages?

- A programming language is a formal way to give instructions to a computer.
- Just like humans use English, Tamil, or Hindi to communicate with each other, we use programming languages to communicate with computers.
- **Simple Analogy:** Think of programming as writing a recipe. Just like a recipe tells a cook how to make a dish, a program tells a computer how to solve a problem or perform an action.

Purpose of Programming Languages

- To write software or applications.
- To control hardware.
- To automate tasks.
- To solve problems logically and systematically.

Importance of Programming in Today's World

- Programming is no longer just for software engineers — it's the backbone of the modern digital world.
- From smartphones to smart homes, from e-commerce to artificial intelligence — programming is everywhere.

Key Reasons Why Programming is Important

- Automation of Repetitive Tasks
- Powering Modern Technology
- Driving Innovation
- High Demand in Careers
- Empowering Individuals
- Essential for Data Analysis and AI
- Problem-Solving Mindset

Real-Life Example

- When you book a cab on Uber, multiple programs run:
  - Maps locate your position
  - Pricing is calculated
  - Driver is assigned
  - Notification is sent

Applications of Programming

- Web Development
- Data Science & Analytics
- Artificial Intelligence (AI) & Machine Learning (ML)
- Automation
- App Development
- Game Development
- Scientific Research & Simulation
- Banking and many more...

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Don't just code — think, plan, and solve