Algorithms

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Introduction to Algorithms

Key Goals :

- Simplify concepts for easy understanding and practice.
- Cover from basic to advanced for theoretical exams, competitive exams, programming contests, job interviews and GATE.

Course Structure :

- Topics numbered for proper sequence (major topics broken into small ones).
- In-Depth coverage to recognize question types instantly.

What is Algorithm ?

→ Algorithm is a step-by-step procedure for solving computational problem.

> It’s a common definition everybody knows that it’s a step by step procedure for solving a computational problem.

Algorithm vs Program : Key Differences

Aspect	Algorithm	Program
Phase	Design Phase before implementation.	Implementation phase.
Language	Simple English Language or mathematical notation.	Programming Languages.
Dependency	Hardware / OS independent.	Hardware/ OS dependent.
Analysis	Analyze for time / space efficiency.	Test by running.
Syntax	No strict syntax, understandable by team.	Strict programming syntax.

Mnemonic : Design first (Algorithm on paper) then code (program).

Software Development Lifecycle Context :

1. Design Phase : Create algorithm.
2. Implementation Phase : Write program from algorithm.

> You can’t develop anything on trial and error basis... first you design and then you write the program

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Who Writes the Algorithms ?

- Domain experts with problem knowledge like accountant for accounting software, Doctor for hospital app).
- Programmers if they have domain knowledge.
- **Designer role** : Understands problem / Solution.
- **Key** : Domain knowledge > programming skills for design

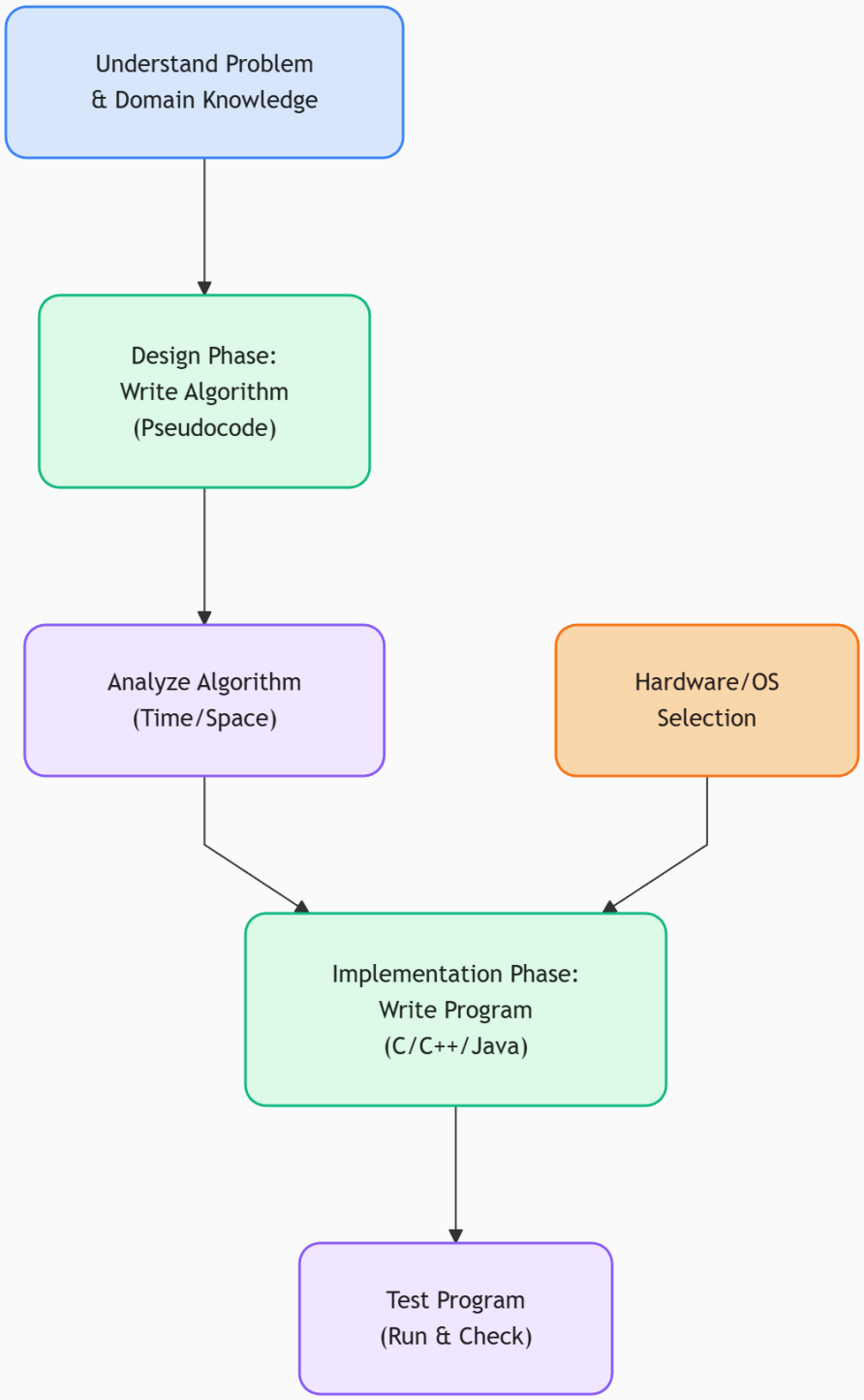
Algorithm Writing Practices :

Preferred Languages : C-Like pseudocode

- **Benefits** : Universal understanding, no new syntax learning.
- taught at school level.

Algorithm Development Process :

Algorithm to Program Flow



Process builds logical strategy development skills.

Key Takeaways for Revision :

Core Definition : step-by-step procedure for computational problems.
Critical Distinction : Algorithm = Design (independent), program = Implementation (dependent).
Tip : Use C pseudocode for algorithms— team-friendly.
Focus : Differences table + who writes algorithms + design vs implementation.