

IIIT Lucknow



Computational Thinking Through Programming Aug'24-Dec'24

Mr Bibek Singh

<https://iiitl.ac.in/index.php/personnel/mr-bibek-singh/>

PART - 1

- What is Computational Thinking?
- Basics of Software Development Life Cycle (SDLC) Model
- Types of Requirements
- Request - Response Model :-
 - Request (Input) - Response (Output)
 - Client - Server
 - Client - Web/Application/Database Server

Learning Objective

What?

To solve problems using
Computational Thinking

Why?

Before computers can solve a problem,
the problem and how it can be
resolved must be understood.

How?

Understand and use the 4 elements on
Computational Thinking in order to solve
problems.

Success Criteria



Systems



Development



Programming



Modelling



Analysis

Good:

Be able to take solutions to one problem and adapt them for similar problems.

Great:

Demonstrate an understanding of Decomposition and Pattern Recognition to solve problems

Even Better If:

Demonstrate an understanding of Decomposition, Pattern Recognition and Abstraction to solve problems

Success Criteria



Systems



Development



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Analysis

Good:

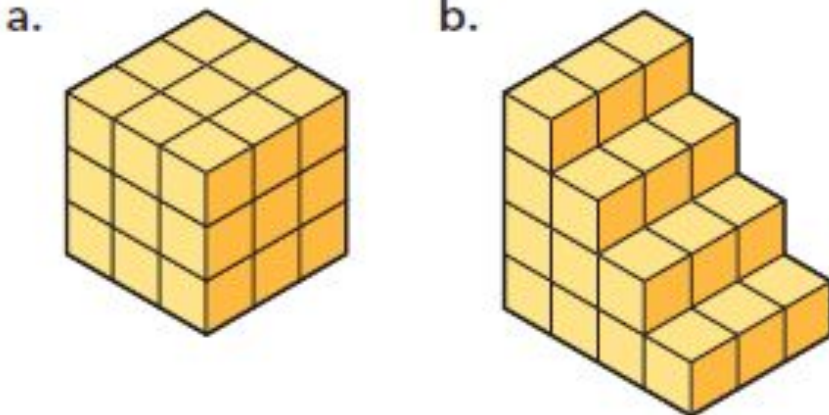
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Great:

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Even Better If:

Demonstrate an understanding of Decomposition, Pattern Recognition and Abstraction to solve problems



Starter Activity:

How many single squares faces in diagrams **a** and **b**

COMPUTATIONAL THINKING



What is computational thinking?

Computational thinking allows us to take a complex problem, understand what the problem is and develop possible solutions.

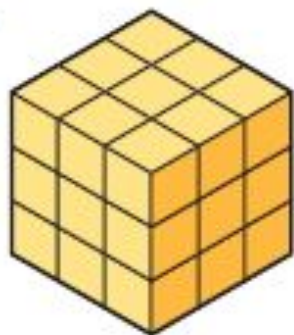
We can then present these solutions in a way that a computer, a human, or both, can understand.

OUR COMPLEX PROBLEM STARTER

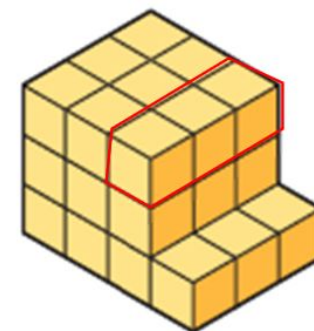
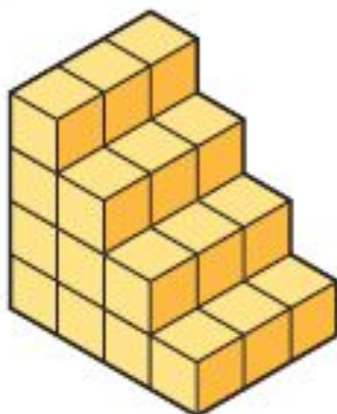
Starter Activity:

How many single square faces in diagrams **a** and **b**

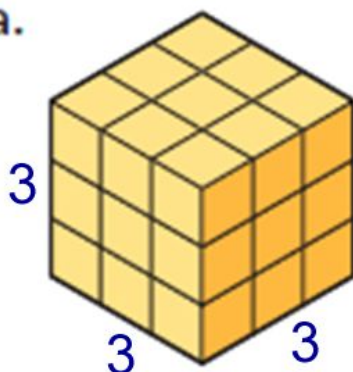
a.



b.

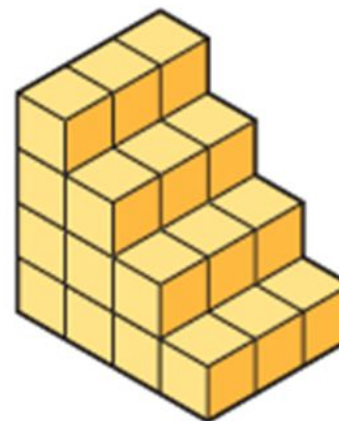


a.



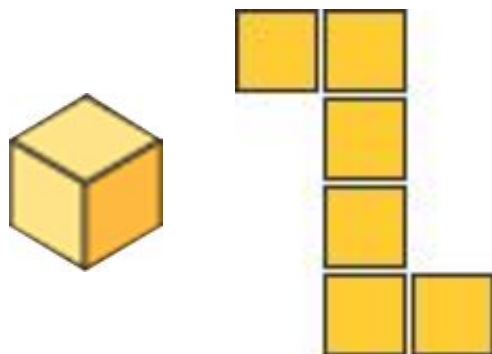
$$3 \times 3 \times 3 = 27 \text{ cubes}$$

b.



$$4 \times 4 \times 3 = 48 \text{ cubes}$$

minus ?



Challenge?

Sample Question 1

What is computational thinking?

- a. Giving instructions to a computer
- b. Thinking like a computer - in binary
- c. Using a set of techniques and approaches to help to solve problems

Challenge?

Sample Question 2

Why do we need to think computationally?

- a. To help us to program
- b. To help us solve complex problems more easily
- c. To help us to think like a computer

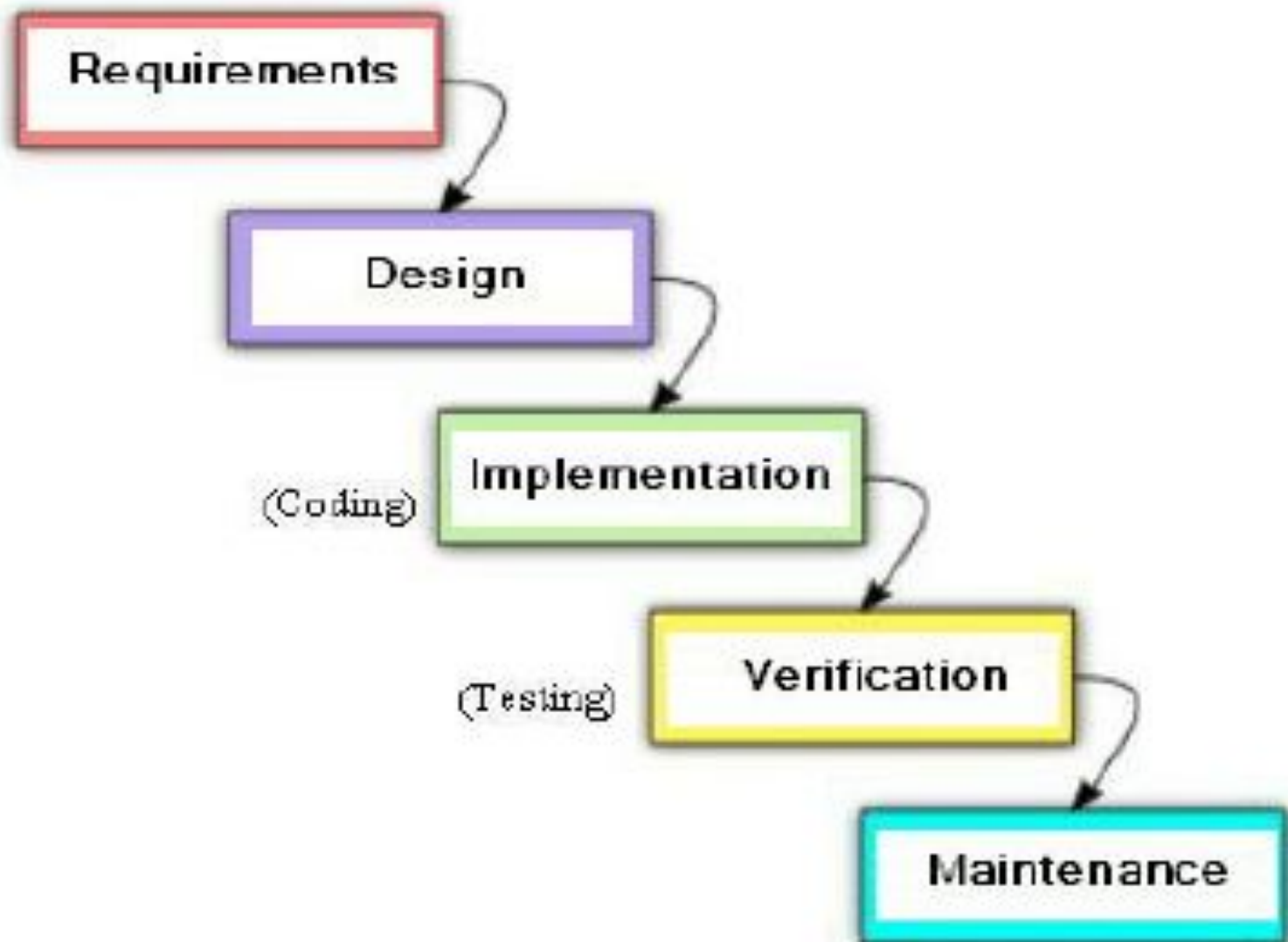
Challenge?

Sample Question 3

Which of the following is an example of thinking computationally?

- a. Planning out your route when going to meet a friend
- b. When going to meet a friend, wandering around until you find them
- c. When going to meet a friend, asking a parent to plan your route for you

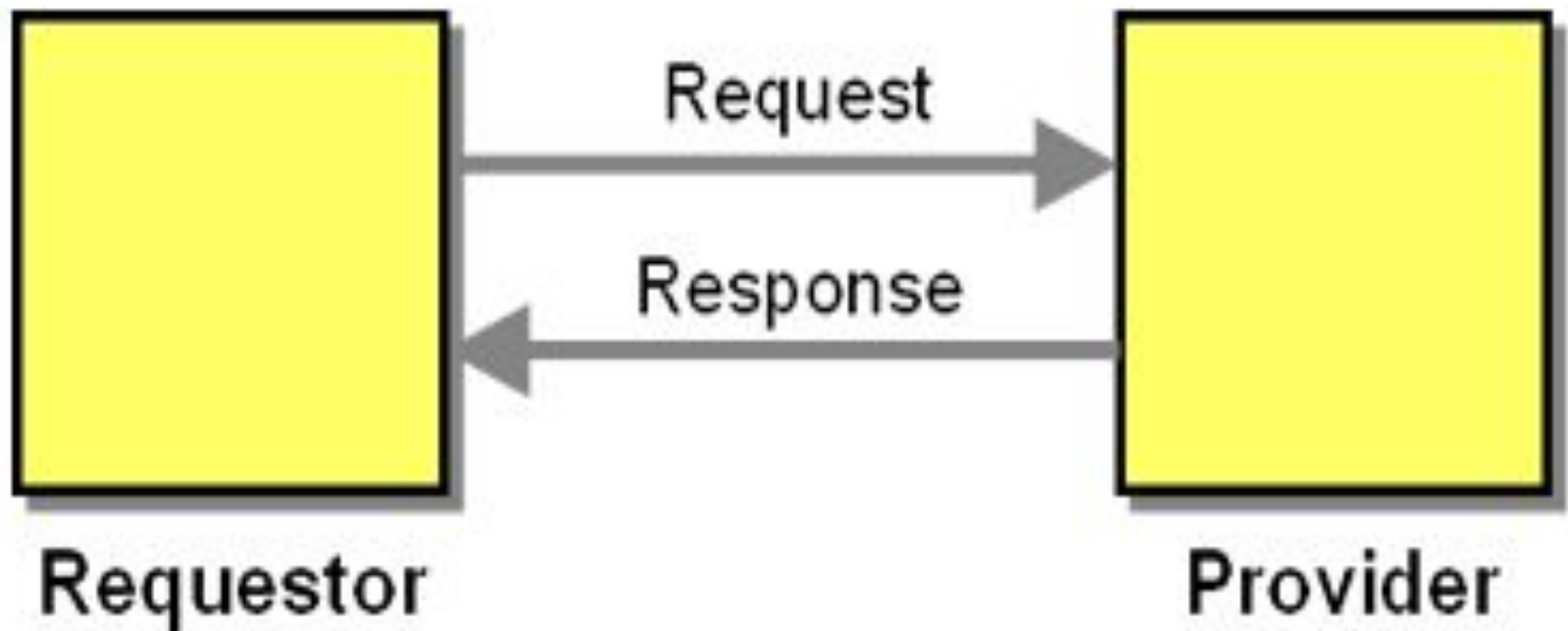
SDLC Model



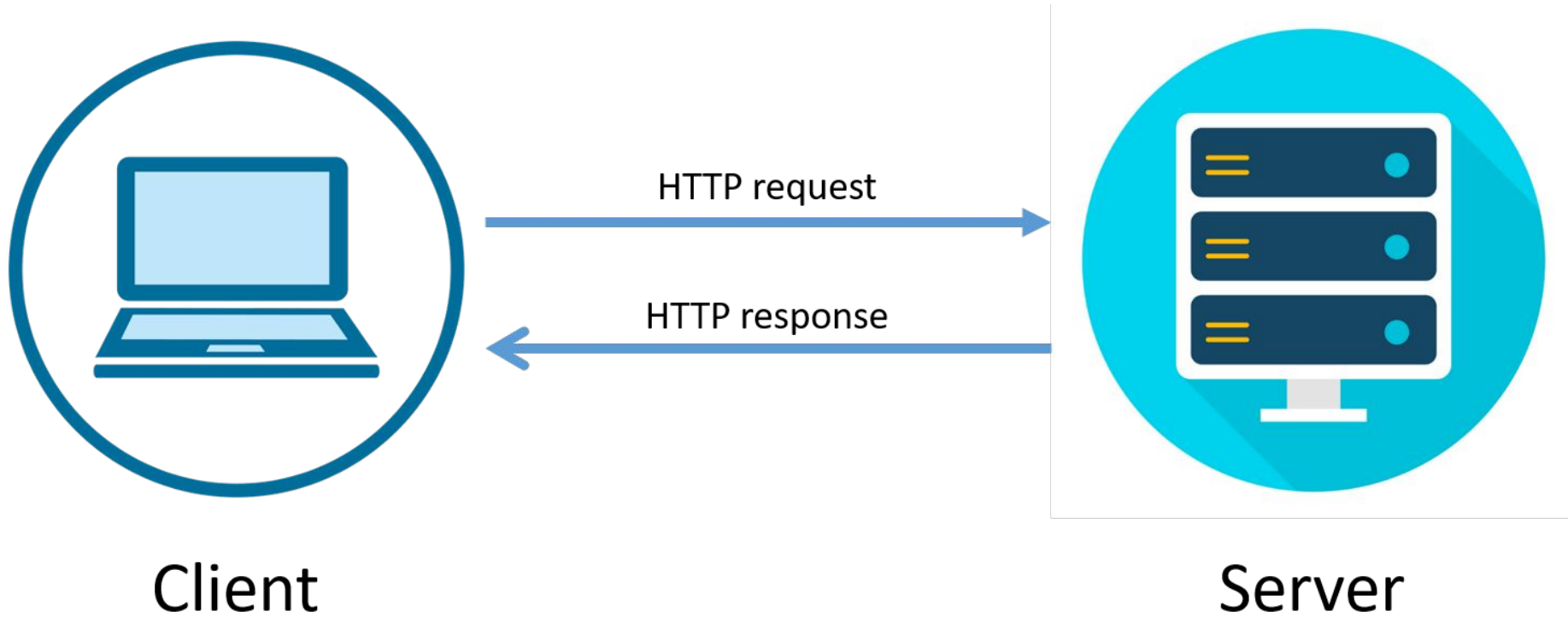
Types of Requirements

- Functional Requirements -
 - How the software should be used by the users
 - Eg: User Interface Screens
 - Given to the software development team by the software/product owner
- Non-functional Requirements -
 - Performance
 - Scalability
 - Security
 - Software development team must take care of them while designing & developing the software

Request-Response Model



Client - Server



Client - Web / App / DB Server

