



# PYTHON FOR COMPUTATIONAL PROBLEM SOLVING

## Process of CPS

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**Prof. Sindhu R Pai**

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Department of Computer Science and Engineering

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## Process of Computation Problem Solving

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- This does not simply involve the act of computer programming.
- It is a process, with programming being only one of the steps.
- Before a program is written, a design for the program must be developed.
- And before a design can be developed, the problem to be solved must be well understood.
- Once written, the program must be thoroughly tested.

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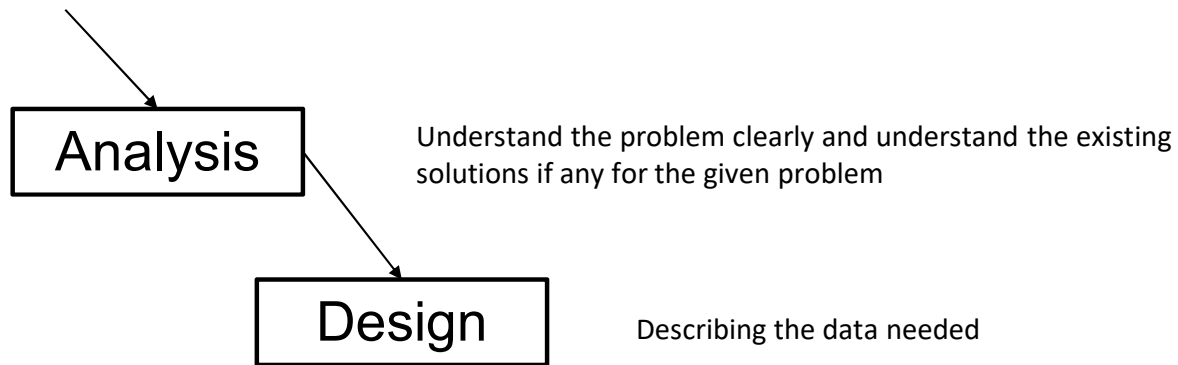
### Analysis

Understand the problem clearly and understand the existing solutions if any for the given problem

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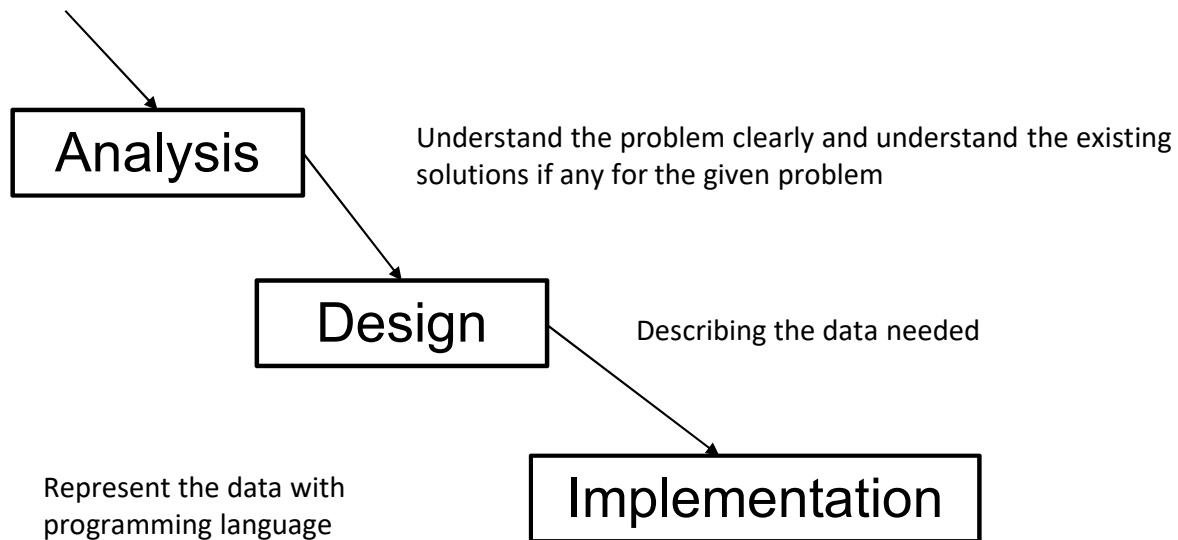
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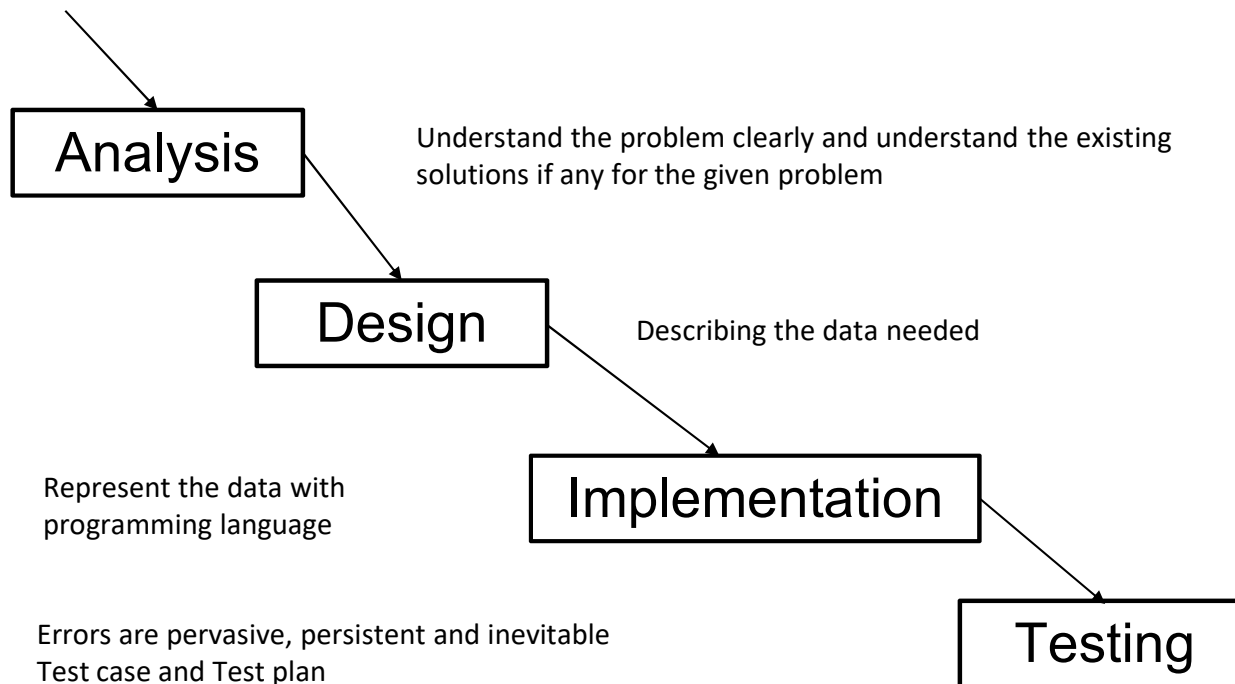
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### Problem Analysis:

- Must understand the fundamental computational issues involved.
- Example:
  - For **MCGW problem**, can use brute-force approach of trying all of the possible rowing actions that may be taken.

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### Knowing what constitutes a solution.

For some problems, there is only one solution. For others, there may be a number (or infinite number) of solutions. Thus, a problem may be stated as finding,

- **A solution**
- **An approximate solution**
- **A best solution**
- **All solutions**



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### Describe Data and Algorithms

- For the **MCGW problem**, need to store the current state of the problem.
- When solving a computational problem, either suitable existing algorithms may be found, or new algorithms must be developed.

### Program Implementation

- Design decisions provide general details of the data representation and the algorithmic approaches for solving a problem.
- The details, however, do not specify which programming language to use, or how to implement the program.
- Since we are programming in Python, the implementation needs to be expressed in a syntactically correct and appropriate way, using the instructions and features available in Python.

### Program Testing

Writing computer programs is difficult and challenging. As a result, **programming errors are pervasive, persistent and inevitable.**

Given this fact, **software testing is a crucial part of software development.** Testing is done incrementally as a program is being developed, when the program is complete, and when the program needs to be updated.



## THANK YOU

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Introduction to Computer Science Using Python – Dierbach  
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Department of Computer Science and Engineering  
Dr. Shylaja S S, Director, CCBD & CDSAML, PESU  
Prof. Sindhu R Pai – [sindhurpai@pes.edu](mailto:sindhurpai@pes.edu)