

PROGRAMMING METHODOLOGY

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- **Programming began as an art** and even today most people learn only by watching others perform and through habit, with little direction as to the principles involved.
- Programming requires conscious application of principles.

- Students are not being taught how to program; they are only being taught a programming language.
- Programming Languages may come and go, but programming is here to stay.

- Teaching programming means
 - explaining problem solving ideas,
 - teaching orderly thinking,
 - getting across a sense of simplicity, elegance, and style.

- **Separation of concerns** is the only available technique for effectively ordering one's thoughts.
 - We know that a program must be correct and we can study it from that view point only;
 - We also know that it should be efficient and we can study its efficiency on another day.

- One may view **Computing Science** as the discipline concerned with the interplay between mechanized and human symbol manipulation usually referred to as **Computing** and **Programming** respectively.
- Places programming in the right perspective - programming is a human activity.

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- The Programmer only needs to consider intellectually manageable programs.
- There are many **guiding principles** to deal with complex problems:
 - step-wise refinement
 - modular programming
 - structured programming

- There is only one way to deal complex problems:
 - divide it into **smaller independent pieces.**

- Before attempting to solve a problem make absolutely sure you know what the problem is.
- If the specification is **absolutely ambiguous**, any program will satisfy it.

- A Program and its proof should go hand-in-hand, with proof usually leading the way.
 - Example: Proof of termination of loops.

- Program testing can be a very effective way to show the **presence** of bugs but it is hopelessly inadequate for showing their **absence**.

- The tools we are trying to use and the language or notation we are trying to express or record our thoughts are the major factors determining what we can think or express at all.
 - Program **into** a programming language, not **in** it.

- A cluttered programming language can hinder us from thinking clearly; a restricted language can hide the best algorithm from us.
 - Clutter: Use of Roman numerals for large numbers
 - Restricted Language: Absence of recursion

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- It is a severe mistake to think that the programmer's product is the program he writes; the programmer has to produce and present it with convincing arguments.
- These arguments - that **the program meets its specification** - constitute the hard core of his product and the written program text is only the accompanying material to which his arguments are applicable.

- **So what we do?**

- Settle to the order of the day?

OR

- Identify more and more guiding principles for programming?
- **The Choice is Ours.**

References

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THANK YOU