

What is CS1100 all about?

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Problems and how to solve them

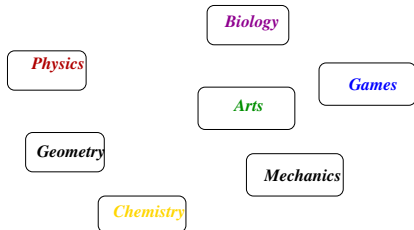
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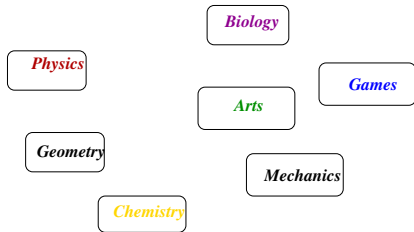
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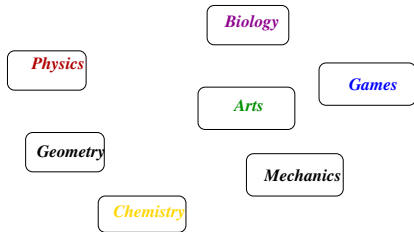


Our goal: Understand the problem, formulate a solution and ask the computer to do it!

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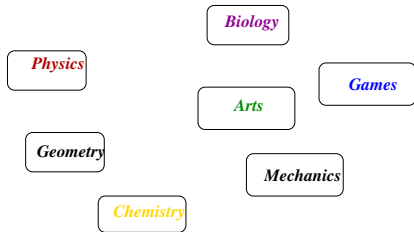
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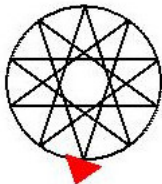
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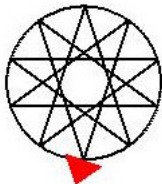
Example #1 : Drawing Patterns



Learnings:

- A simple but useful language – turtle graphics.
- Using “repeat” to achieve complicated but repetitive tasks.

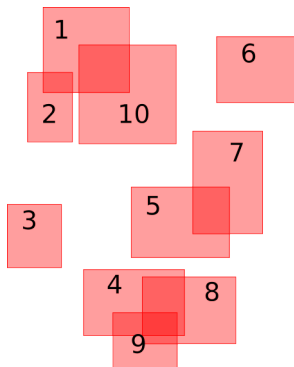
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Learnings:

- A simple but useful language – turtle graphics.
- Using “repeat” to achieve complicated but repetitive tasks.
- The power of control modification – via loops.

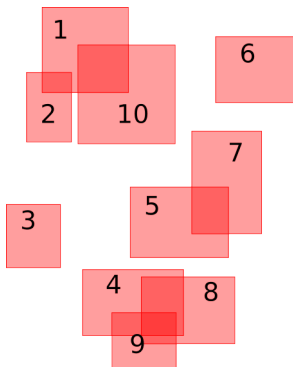
Example #2 : Geometric Problems



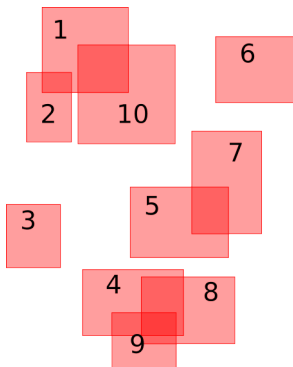
Example #2 : Geometric Problems

Some questions:

- Are two rectangles intersecting?
- Drawing triangles of given dimensions.
- Computing areas using alternate formulas.



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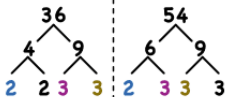
Learnings:

- Logical approach to the problems.
- Formalizing known concepts as precise statements in a prog. language.

Example #3 : Number theoretic questions

Greatest Common Factor

1) Prime Factors



2) Shared: 2, 3, 3

3) Multiply $2 \cdot 3 \cdot 3 = 18$

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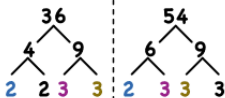
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- Is a number prime? Output prime factors.
- Compute GCD / LCM of two numbers.

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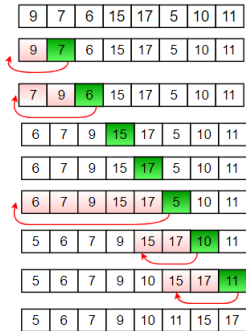
Learnings:

- Again power of being able to repeat.
- Reducing the problem to smaller size.
- A efficient algorithm can make a significant difference!

Example #4 : Searching and Sorting



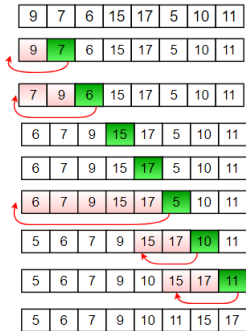
Example #4 : Searching and Sorting



Some questions:

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- Sort a list of elements.

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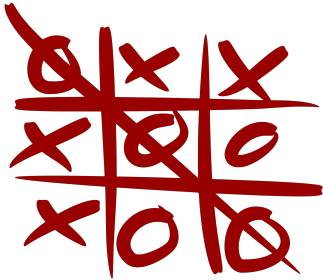
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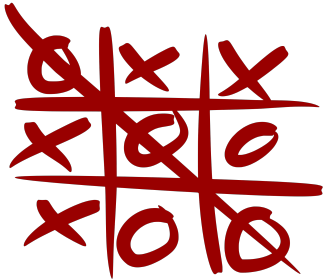
Learnings:

- Binary versus Linear search.
- Different ways to sort – again converting known ideas to precise statements.
- A efficient algorithm can make a significant difference!

Example #5 : Tic-Tac-Toe



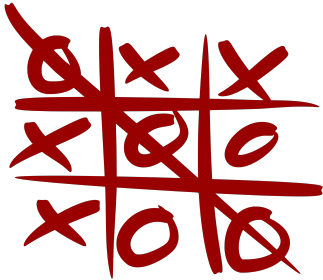
Example #5 : Tic-Tac-Toe



Some questions:

- Tic-Tac-Toe.
- Word Grids – finding strings.

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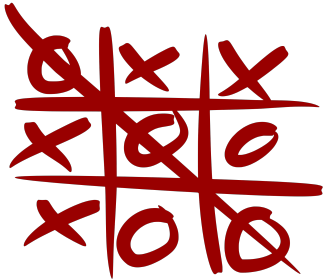
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Learnings:

- Breaking problems into subtasks.
- Modular way of thinking.

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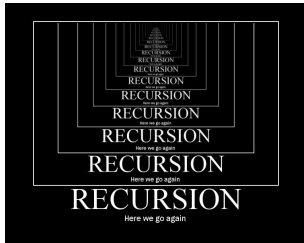
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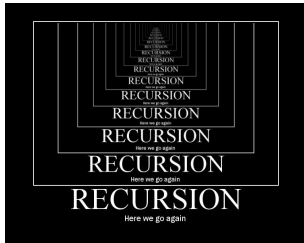
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Did not consider strategy games!

Concept #6 : Recursion



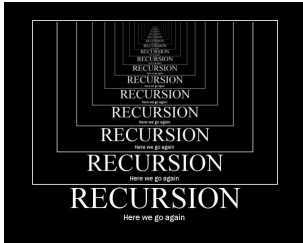
Concept #6 : Recursion



Some questions:

- Strings – palindromes, reversals.
- Useful data structures – queues, stacks.

Concept #6 : Recursion



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- Strings – palindromes, reversals.
- Useful data structures – queues, stacks.

Learnings:

- Thinking recursively.
- Breaking down tasks into sub-tasks of the same type!

CS1111 – Problem Solving Using Computers

- Data Types in C, Operators. Input and the Output.
- Modifying the control flow in programs if-else, switch, while, do-while, for.
- Arrays and Strings in C.
- Functions & Modular programming, Recursion.
- Pointers, Pass by reference, Pointer arithmetic.
- Structures in C.
- Structures and Pointers.
- Linked Lists.



This
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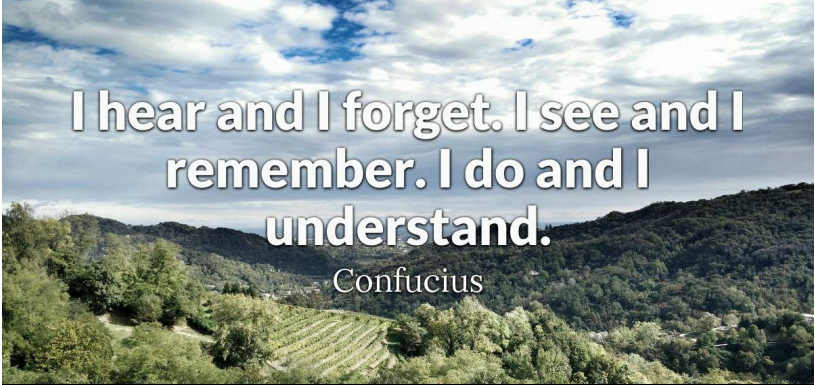
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The 3 Ds: Design, Debug, Detect

Final Take Away



**I hear and I forget. I see and I
remember. I do and I
understand.**

Confucius