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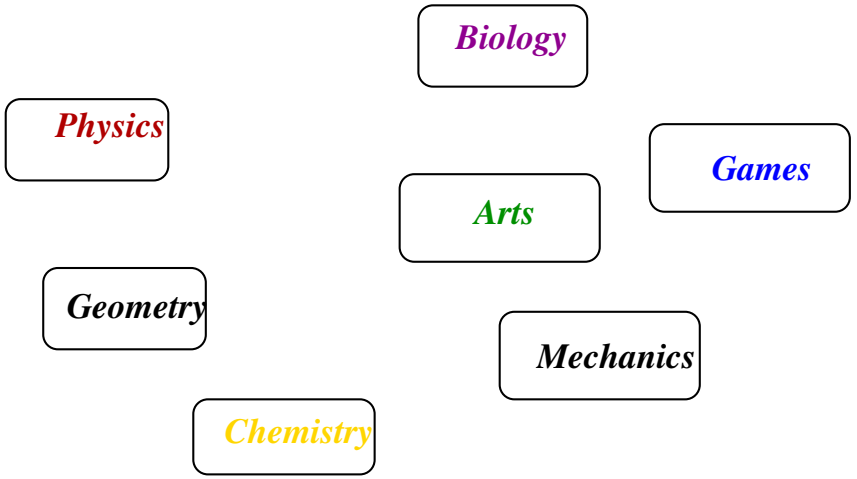

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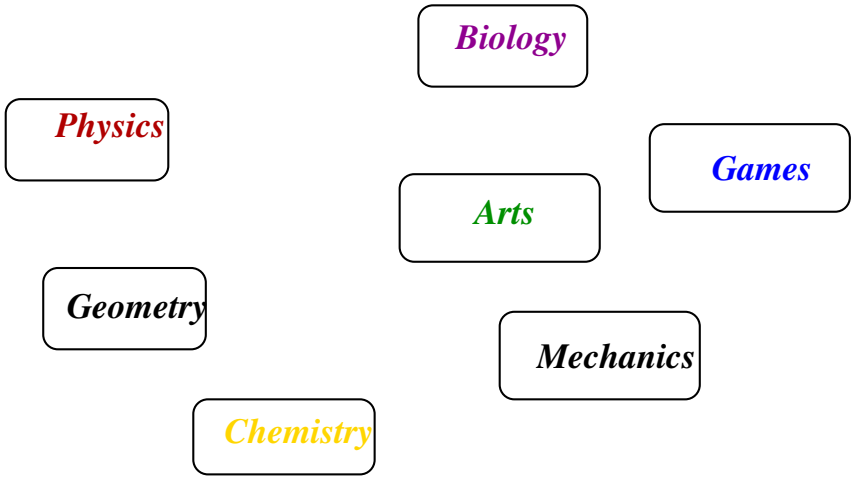

Our goal: Understand the problem, formulate a solution and ask the computer to do it!

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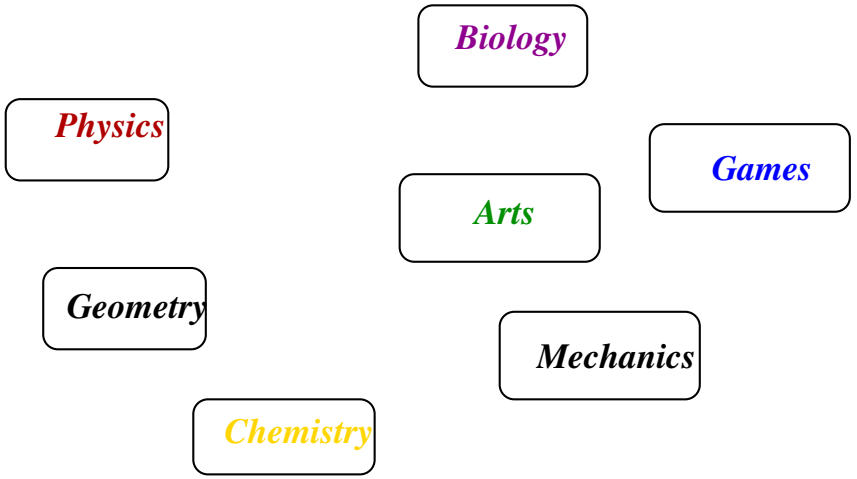

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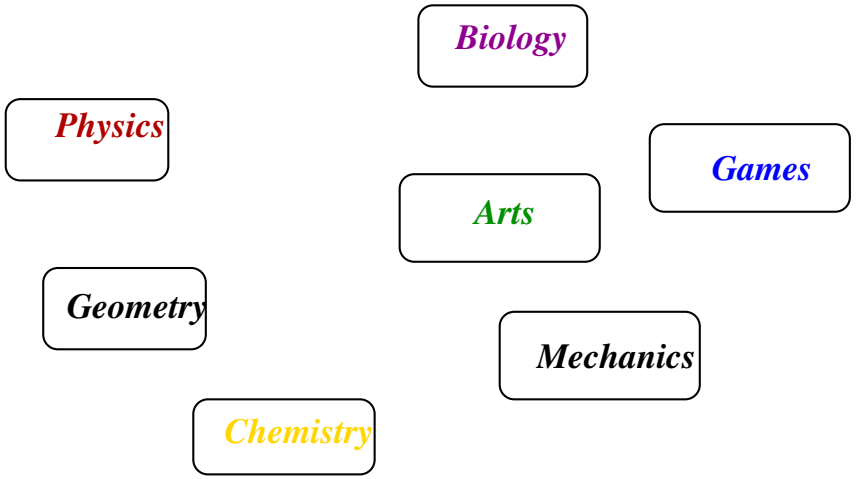

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Example #1 : Drawing Patterns

Learnings:

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

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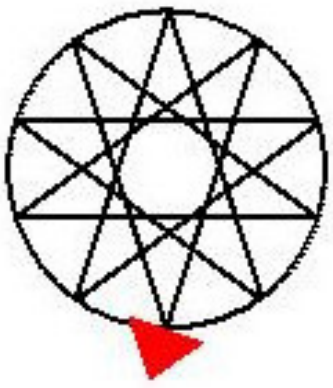
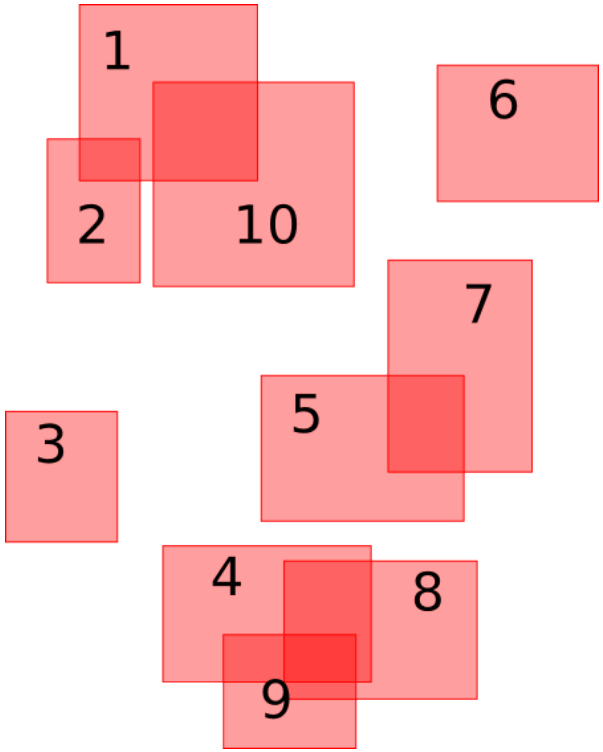


Learnings:

- 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



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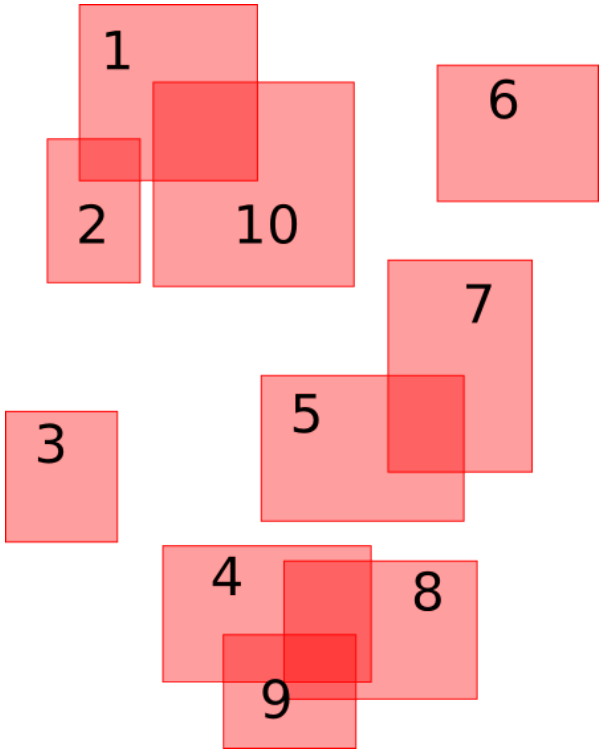

Some questions:

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

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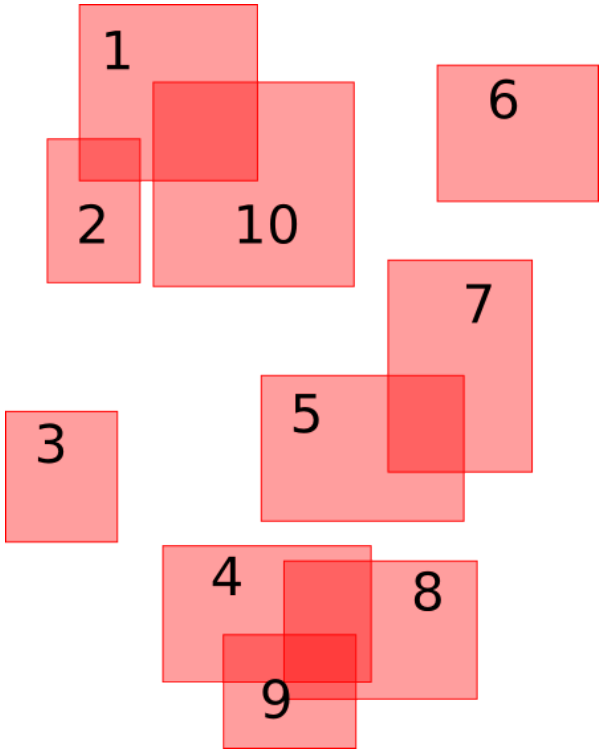


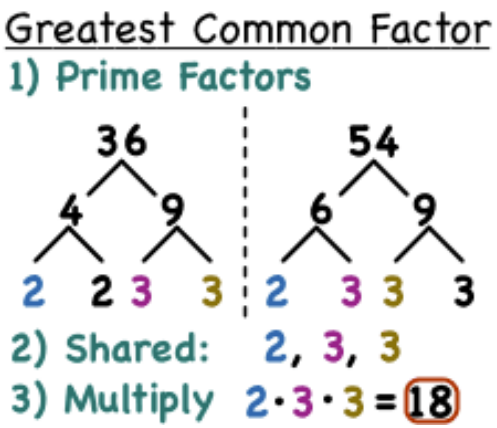
Some questions:

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

Learnings:

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

Example #3 : Number theoretic questions



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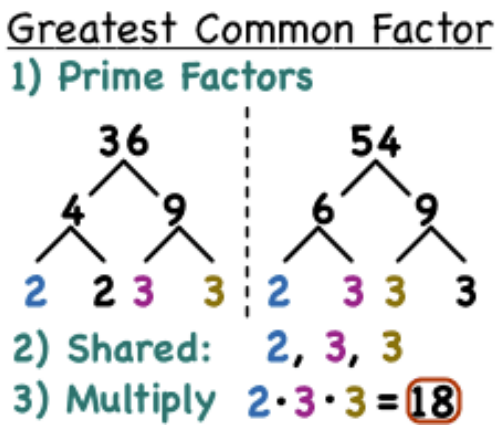

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- Is a number prime? Output prime factors.
- Compute GCD / LCM of two numbers.

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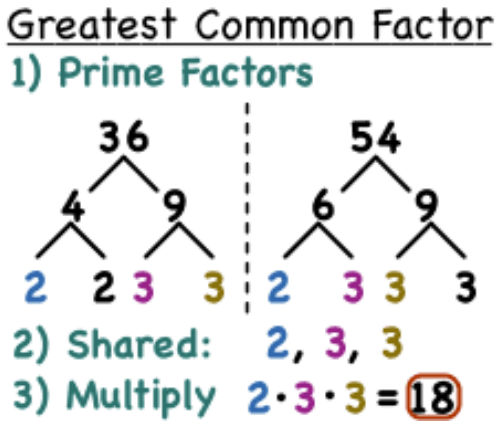


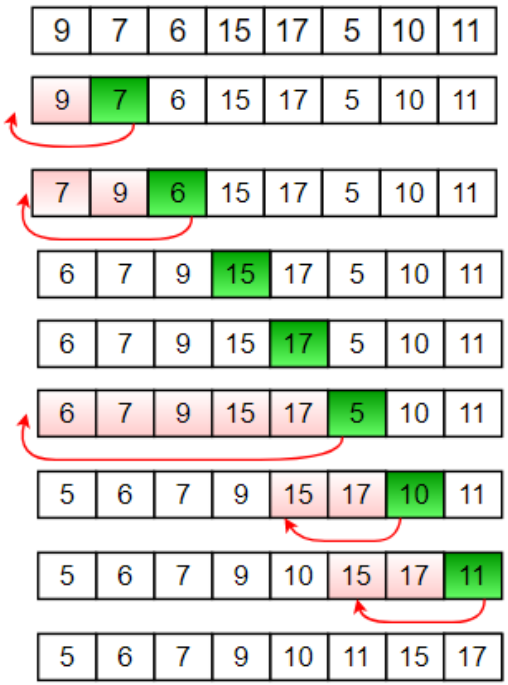
Some questions:

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

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



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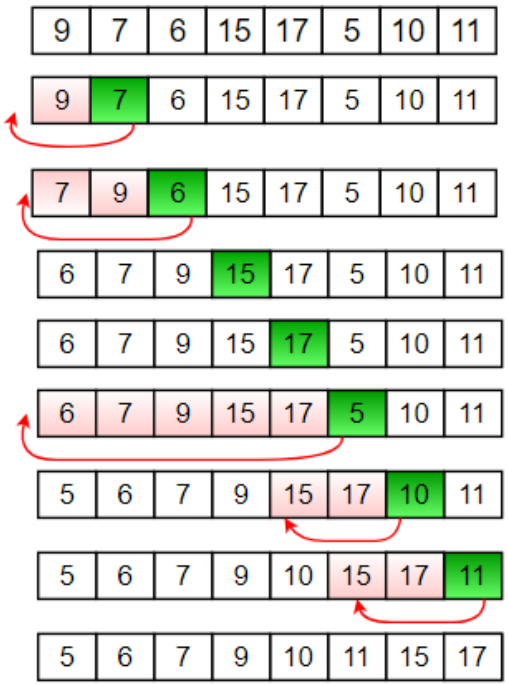

Some questions:

- How to search when list is sorted?
- Sort a list of elements.

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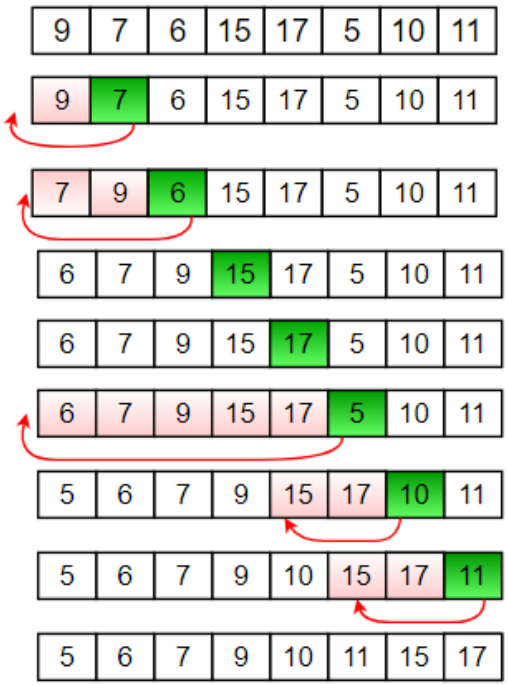


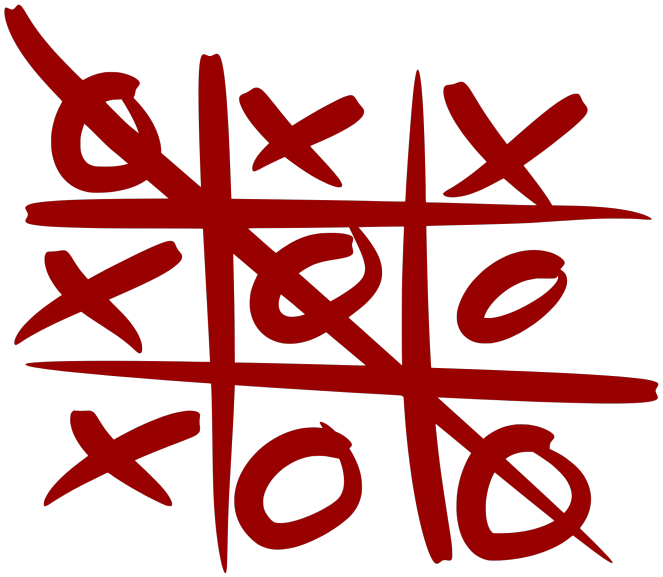
Some questions:

- How to search when list is sorted?
- Sort a list of elements.

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



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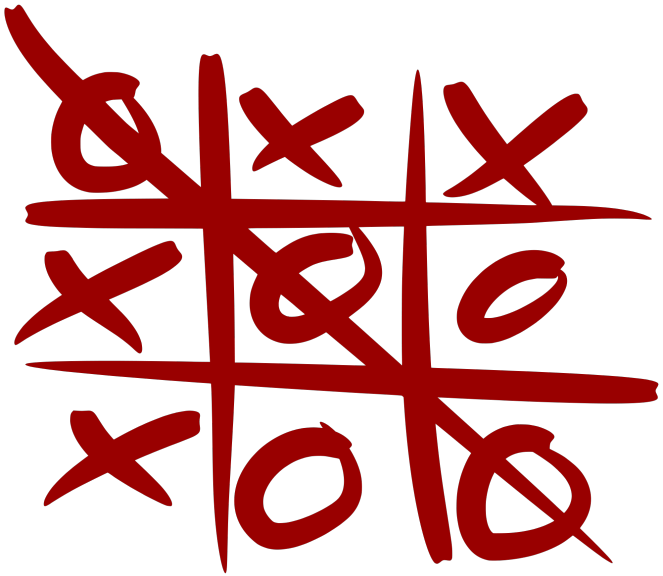

Some questions:

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

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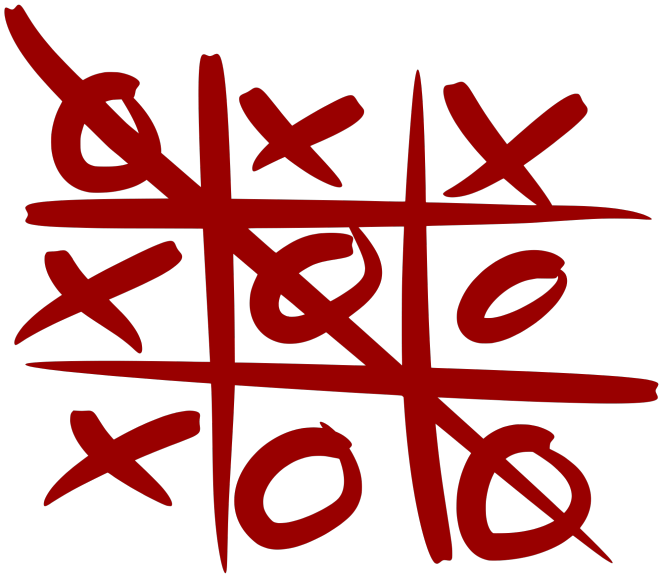

Some questions:

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Learnings:

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

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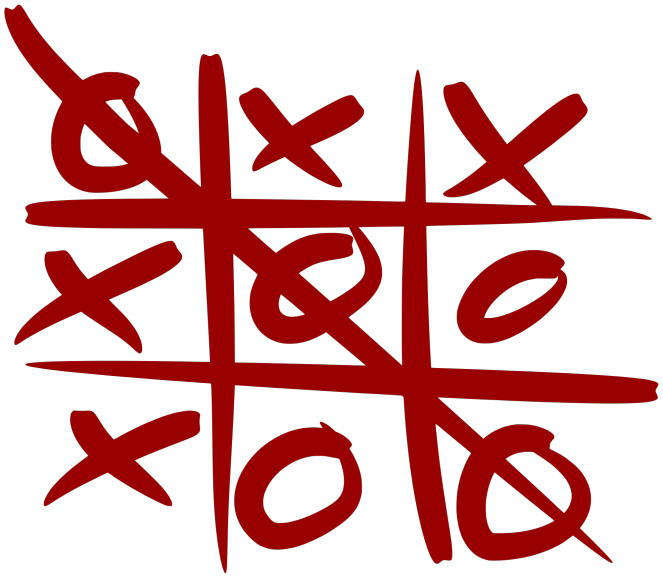

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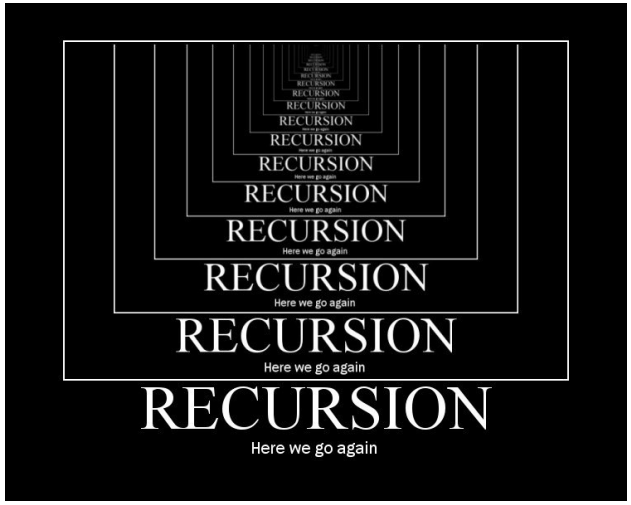
Did not consider strategy games!

Concept #6 : Recursion



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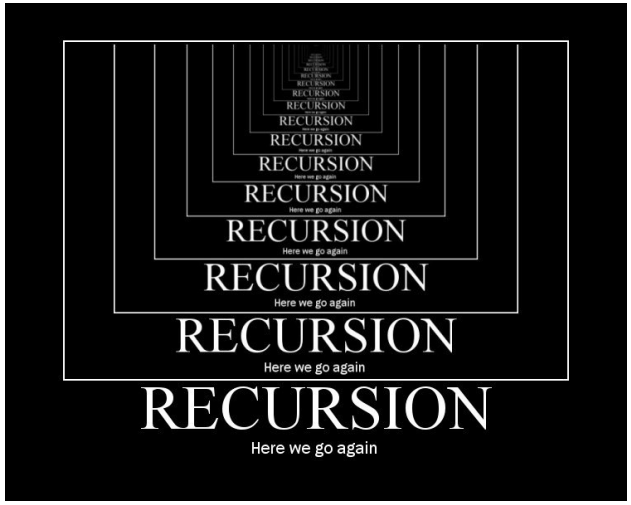

Some questions:

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

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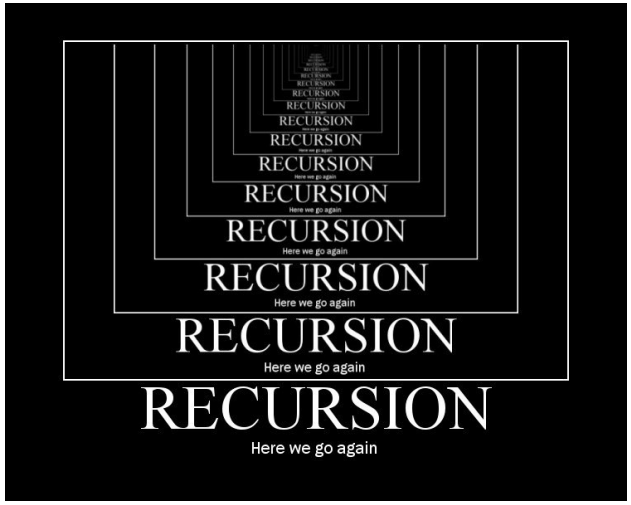

Some questions:

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

Learnings:

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

CS1100 – 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.

Week 1-15

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Week 1-15

The 3 Ds: Design, Debug, Detect

Final Take Away