Classification

Classification by purpose:

- each algorithm has a goal
- kind of purposes
  - Sorting a list

Classification by implementation:

- Recursive or iterative
  - a recursive algorithm calls itself repeatedly until a certain condition matches
  - a iterative algorithm uses looping statements such as for loop, while loop or do-while loop
  - every recursive version has an iterative equivalent iterative, and vice versa
- Logical or procedural
  - an algorithm may be viewed as controlled logical deduction
  - a logic component expresses the axioms which may be used in the computation
  - a control component determines the way in which deduction is applied to the axioms
- Serial or parallel
  - in serial algorithms, computers execute one instruction of an algorithm at a time
  - parallel algorithms take advantage of computer architectures to process several instructions at once
- Deterministic or non-deterministic
  - deterministic algorithms solve the problem with a predefined process
  - non-deterministic algorithm must perform guesses of best solution at each step through the use of heuristics

Classification by design paradigm:

- Divide and conquer
- Contraction (Reduction/transform and conquer)

Classification Notes

- Dynamic programming
- Greedy method
  - similar to dynamic programming but solutions to subproblems do not have to be known at each stage
  - a "greedy" choice can be made of what looks the best solution for the moment
  - Kruskal
- Linear programming
- Graphs
- The probabilistic and heuristic paradigm
  - Probabilistic
    - Those that make some choices randomly
  - Genetic
    - Attempt to find solutions to problems by mimicking biological evolutionary processes
    - a cycle of random mutations yielding successive generations of "solutions"
    - thus, they emulate reproduction and "survival of the fittest"
  - Heuristic
    - whose general purpose is not to find an optimal solution, but an approximate solution where the time or resources to find a perfect solution are not practical

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Sources:

- `https://www.quora.com/Which-are-the-10-algorithms-every-computer-science-student-must-imp`