01.04.2020 II. Greedy Method

- A greedy algorithm always makes the choice that looks best at the moment. ie, it makes a locally optimal choice in the hope that this choice will lead to a globally optimal solution.
- Greedy algorithms do not always yield optimal solutions, but for many problems they do.

- The greedy method suggests that one can devise an algorithm which works in stages, considering 1 input at a time.
  At each stage, a decision is made regarding whether or not a particular input is in an optimal solution.
- If the inclusion of the next input into the partially constructed optimal solution will result in an infeasible solution, then this input is not added to the partial solution.
- The selection procedure itself is based on some optimization measure.

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- Control abstraction :

```
Function Greedy (A, n)  // A[1:n] contains the n inputs
{   solution = ϕ        // initialize the solution to be empty
    for i = 1 to n :
        x = SELECT(A)
        if FEASIBLE (solution, x) :
            solution = UNION (solution, x)
    return solution
}
```

- The function SELECT selects an input from A, removes it & assigns its value to x.
- FEASIBLE is a boolean valued function which determines if x can be included into the solution vector.
- UNION actually combines x with solution.