Divide and Conquer
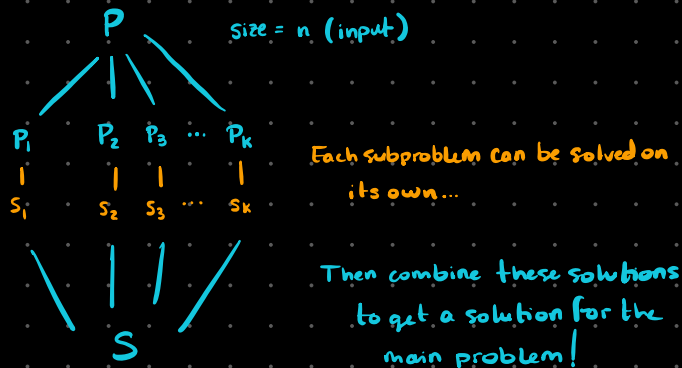
- Strategy for solving a problem

* If our problem is large, we can break it into subproblems

P   size = n (input)

P_1 P_2 P_3 ... P_k

S_1 S_2 S_3 ... S_k

S

Each subproblem can be solved on its own...

Then combine these solutions to get a solution for the main problem!

Idea: Break down problems (& subproblems) until they're small enough to solve so we can later combine these results

Note: all subproblems should be solved in same manner as main problem ✗✗✗

- Divide and Conquer problems are implemented <u>recursively</u>!

- DaC Guidelines

```
DaC(P)
{
  if (small(P))
    Solve(P);

  else
    divide P into P₁, P₂, P₃, ..., Pₖ
    Apply DaC(P₁), Dac(P₂), ...
    Combine (DaC(P₁), DaC(P₂), ...)
}
```

<u>Problems we can solve w/ Divide and Conquer</u>

1. Binary Search
2. Finding Max / Min
3. Merge Sort
4. Quick Sort