Definition of COP; $P = (S, f)$

- S: Solution Space or Search Space
- f: Objective Function or Cost Function

P is defined by

- A set of variables $X = \{x_1, x_2, \ldots, x_n\}$
- Variable domains $D_1, D_2, \ldots, D_n$
- Constraints among variables
- An objective function f to be optimized, ie., minimized (or maximized)

Find a solutions $s^* \in S$ with minimum objective function value, i.e., $f(s^*) \leq f(s)$ for all $s \in S$. s^* is globally optimal in (S, f), and the set S^* is called the set of globally optimal solutions (there may be mutiple such optimal solutions in S).

Algorithms used to solve COP

- **Complete algorithms**
  i.e., guaranteed to find an optimal solution in finite sized solution spaces in bounded – but not for NP-hrad COPs.
- **Approximate solutions**
  i.e., no guarantee for optimal solution, but will find good solution in bounded time.