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알고리즘

## ***5. Greedy algorithm***

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# Contents

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**1. STL**

**2. Prologue**

**3. Divide & conquer**

**4. Graph**

**5. Greedy algorithm**

**6. Dynamic programming**

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# 5. Greedy algorithm

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5.0 Basics

5.1 Minimum spanning trees

5.2 Knapsack problem

5.3 Job sequencing with deadline

5.4 Optimal merge patterns

5.5 Huffman encoding

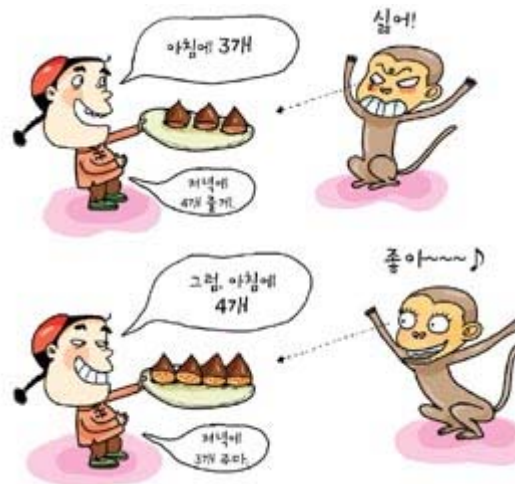
# 5.0 Basics

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- Greedy algorithm
  - The most straightforward design technique to solve a problem
  - Find an optimum solution through a sequence of decisions
  - The difference between algorithms
    - divide & conquer
    - graph search
    - greedy algorithm

## 5.0 Basics

- Greedy algorithm
  - 朝四暮三 algorithm
- 朝三暮四의 현대적 해석
  - 朝四暮三 > 朝三暮四



출처: <http://www.kbiznews.co.kr/news/articleView.html?idxno=16976>

# 5.0 Basics

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- Terminologies
  - Solution
    - All imaginable ways to solve a problem
  - Feasible solution
    - Any subset that satisfies the constraints
  - Objective function
    - We are required to find a feasible solution that either maximizes or minimizes a given objective function.
  - Optimal solution
    - A feasible solution that maximizes or minimizes an objective function.

# 5.0 Basics

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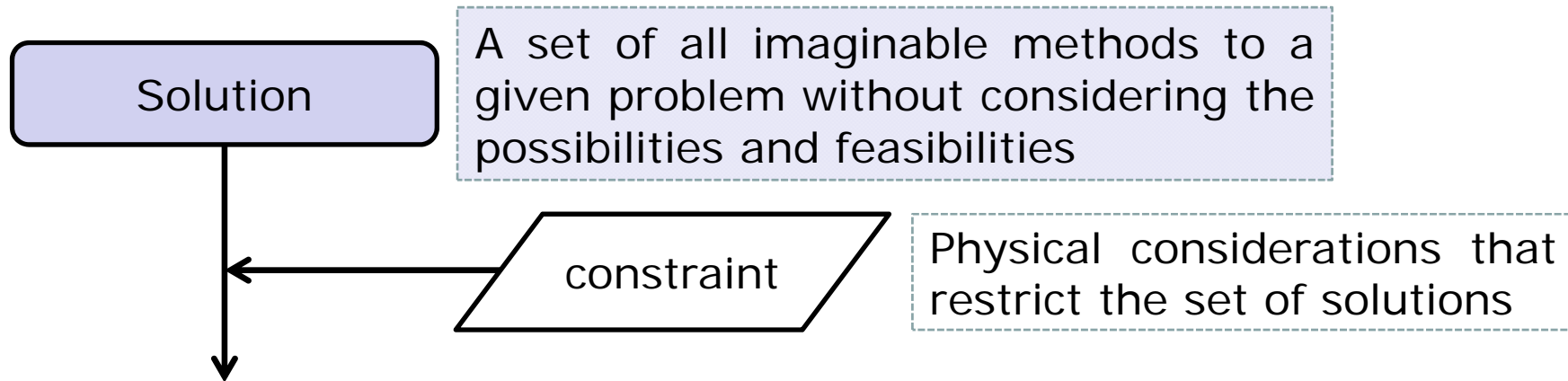
Solution

A set of all imaginable methods to a given problem without considering the possibilities and feasibilities



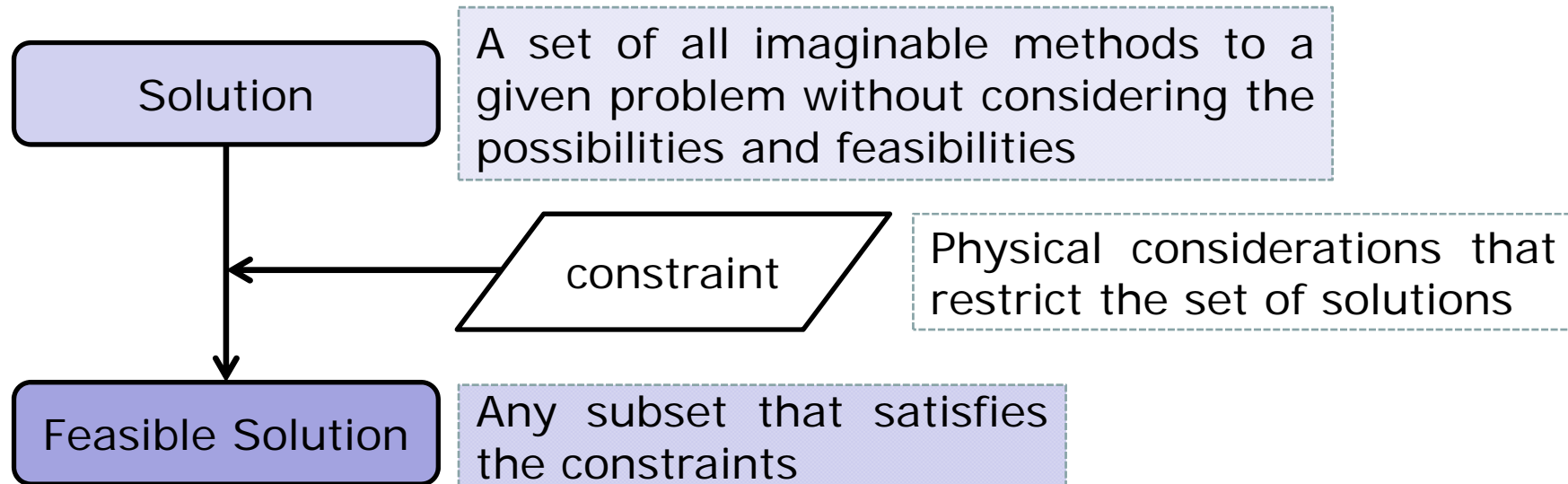
# 5.0 Basics

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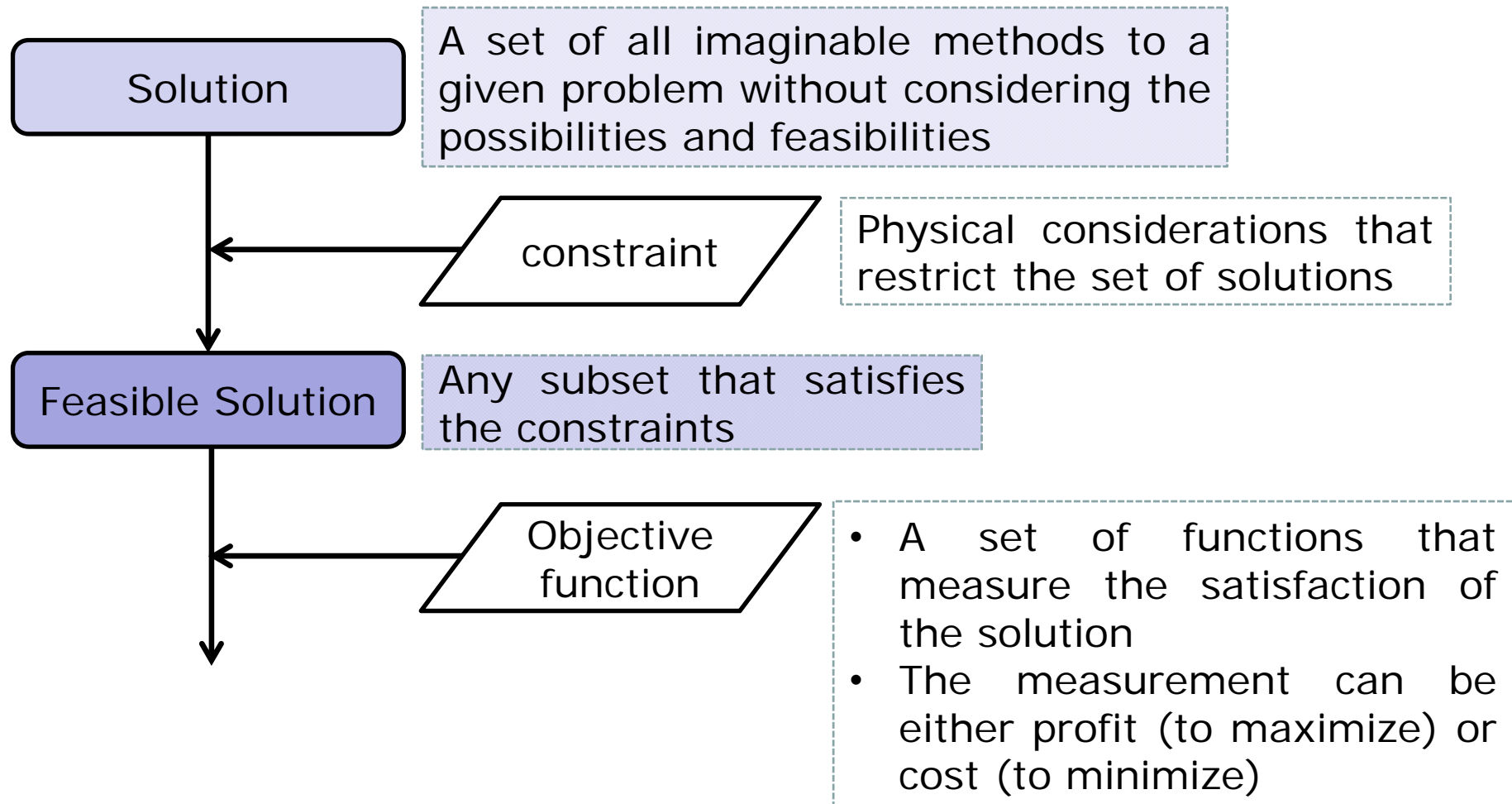
# 5.0 Basics

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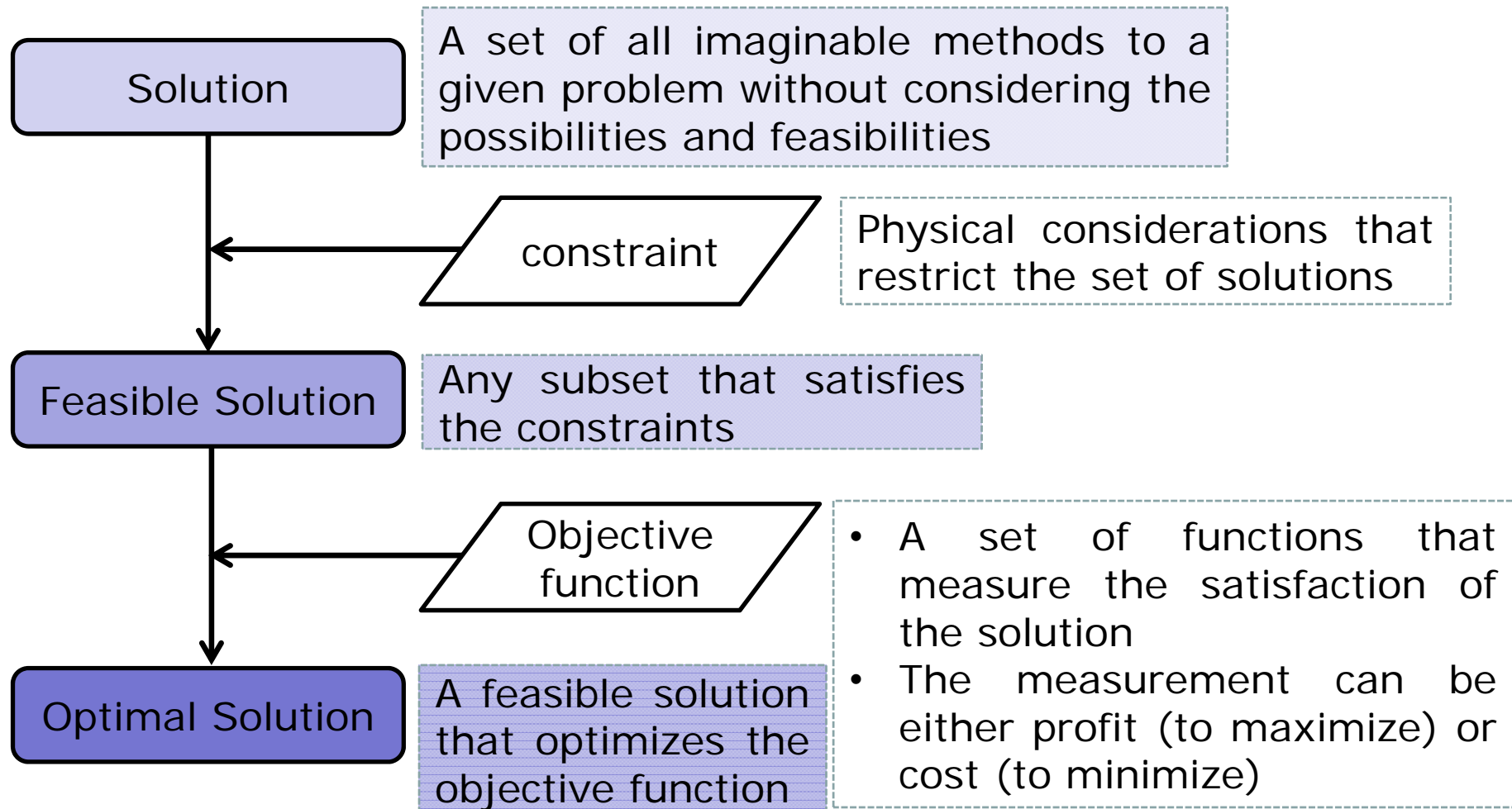


# 5.0 Basics

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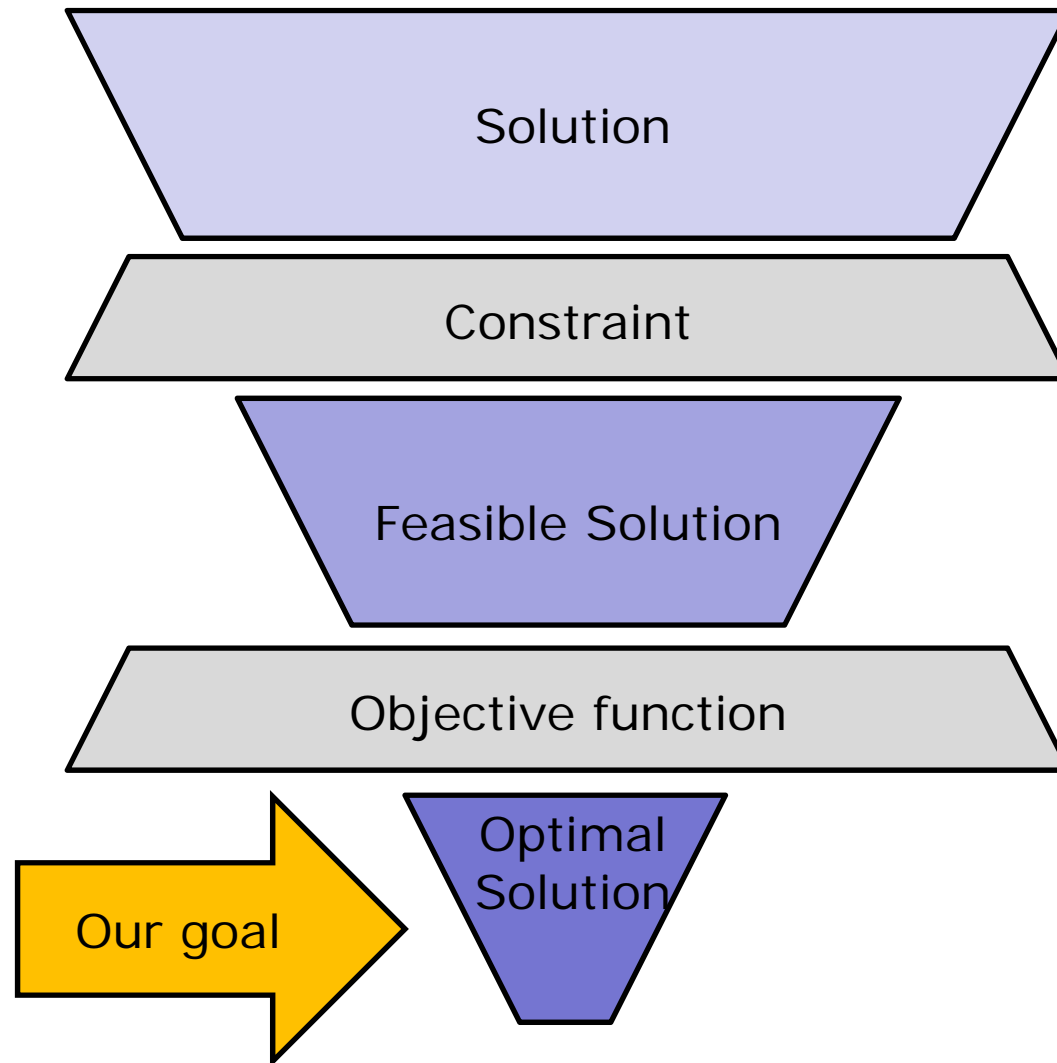


# 5.0 Basics



# 5.0 Basics

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# 5.0 Basics

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- Greedy algorithm
  - An algorithm that works in stages, considering one input at a time.
  - Selection
    - At each stage, a decision is made regarding whether or not a particular input is in an optimal solution.
    - Selection criteria is based on optimization measure.

## 5.0 Basics

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- Greedy algorithm

```
Greedy( int n, int A[] )
{
    solution  $\leftarrow$   $\Phi$ ;
    for ( i = 1 to n )
        x  $\leftarrow$  SELECT (A);
        if ( FEASIBLE ( solution, x ) )
            solution  $\leftarrow$  UNION (solution, x);

    return solution;
}
```

# 5.0 Basics

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다음 설명 중 옳지 않은 것을 모두 고르시오.

- (a) greedy algorithm은 optimal solution을 찾기 위한 방법이다
- (b) greedy algorithm은 항상 optimal solution을 찾는다
- (c) feasible solution의 집합은 optimal solution의 집합보다 작다
- (d) objective function은 항상 최소화를 추구한다