<Assignment Problem> Introduction to Linear Programming pp.325

min max

s.t. ⇔ s.t.

* Basic feasible solution  
  # 초기 작업  
  1) row에서 가장 작은 를 선택하여 row에 해당하는 모든 element를 만큼 빼기  
  2) column에 대해서도 같은 방법을 적용  
  3) 각 row를 쳐다 보면서 0가 있는 위치 *ij*에 대해 에 1값을 할당하기  
  row에 0인 element 값이 없어서 solution을 못 구할 때 (basic feasible solution X)?  
    
  # feasible solution 구하고 optimal solution 찾자!  
  (Determining the maximum No. assignments possible)  
  Step 1) Tick all unassigned rows  
  Step 2) If a ticked row has a zero, then tick the corresponding column.  
  Step 3) If a ticked row has an assignment, then tick the corresponding column.  
  Step 4) Repeat steps 2 and 3 till no more ticking is possible.  
  Step 5) Draw lines through unticked rows and ticked columns.  
    
  **dual feasible 유지하면서 다른 dual feasible 해 구하기!**   
  Add if two lines pass through  
  Subtract if no lines pass through   
    
  Repeat until optimal solution is found.
* Hungarian algorithm, duality, primal-dual algorithm
* Maximize 문제일 경우
* Job의 수Machine의 수 일 때, make dummy rows or columns such that

**참고! (primal, dual algorithm, primal-dual algorithm의 개념 짚기)**- primal algorithm: maintain primal feasibility (basic) and works towards dual feasibility  
 e.g. simplex  
- dual algorithm: maintain dual feasibility (basic) and works towards primal feasibility  
 e.g. dual simplex  
- **primal-dual algorithm**: using complementary slackness (dual feasibility 🡺 primal feasible)  
 e.g. Hungarian method 외 network 관련 문제에 대한 algorithm