國立臺北大學自然資源與環境管理研究所
## 103 學年度第二學期『環境系統分析專題』

課程講義(04)：動態規劃與目標規劃
Dynamic Programming and Goal Programming

Chapter 6: Dynamic Programming (http://www.cs.berkeley.edu/~vazirani/algorithms/chap6.pdf)
4.2 動態規劃法 (http://chern.ie.nthu.edu.tw/alg2003/Suppl_8_multi-stage.PDF)
Goal Programming (http://www.ams.jhu.edu/~castello/625.414/Handouts/GoalProg.pdf)

- INTRODUCTION TO DYNAMIC PROGRAMMING
  - □ Formulation of Dynamic Programming? => No Specific Forms
  - □ Principle of Optimality
  - □ Terminology: Stage, State, Decision, Return, Recursive Equation
  - □ Dynamic programming is a technique for solving problems with a recursive structure with the following characteristics:
    - ⇨ Optimal substructure (principle of optimality): An optimal solution to a problem can be decomposed into optimal solutions for sub-problems.
    - ⇨ A small number of sub-problems: The total number of sub-instances to be solved is small.
    - ⇨ Overlapping sub-problems: During the computation same instances are referred to over and over again.
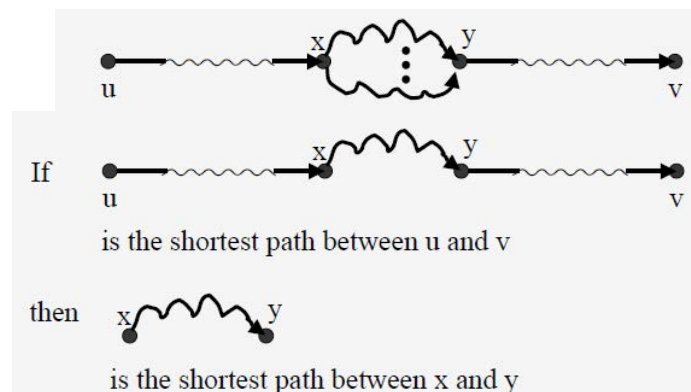
- GOAL PROGRAMMING
  - □ Criteria for Decision-Making: Attribute, Objective, Target, and Goal
  - □ Multiple Criteria Decision Making: Multiple Attribute and Multiobjective
  - □ Classification of Goal Programming: Non-Preemptive vs. Preemptive
  - □ Non-Preemptive Goal Programming
    - ⇨ Complementary relationship
    - ⇨ One-sided vs. Two-sided
  - □ Preemptive Goal Programming or Lexicographic GP
  - □ Graphical Solution Procedure
  - □ Drawbacks: Normalization and Weighting; Pareto Optimality?

- HOMEWORK #3 (2015/03/24 Due)：*Solve* the Shortest Path Problem illustrated in http://chern.ie.nthu.edu.tw/alg2003/Suppl_8_multi-stage.PDF by constructing a spreadsheet.