

# Dynamic Programming

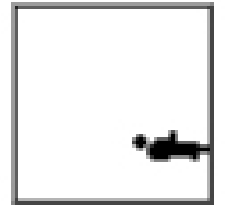


- Sequence of decisions.
- Problem state.
- Principle of optimality.
- Dynamic Programming Recurrence Equations.
- Solution of recurrence equations.

# Sequence Of Decisions

- As in the greedy method, the solution to a problem is viewed as the result of a sequence of decisions.
- Unlike the greedy method, decisions are not made in a greedy and binding manner.

# 0/1 Knapsack Problem



Let  $x_i = 1$  when item  $i$  is selected and let  $x_i = 0$  when item  $i$  is not selected.

$$\begin{aligned} &\text{maximize } \sum_{i=1}^n p_i x_i \\ &\text{subject to } \sum_{i=1}^n w_i x_i \leq c \end{aligned}$$

and  $x_i = 0$  or  $1$  for all  $i$

All profits and weights are positive.