

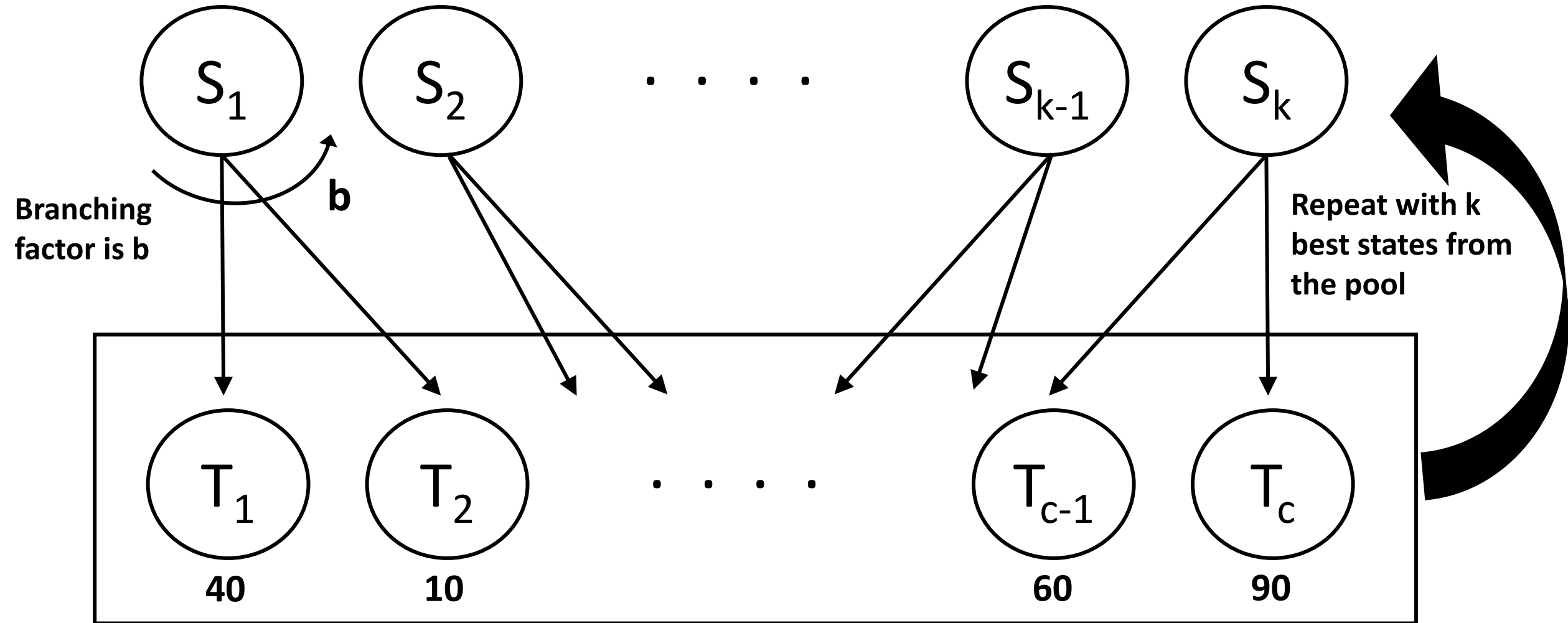
# Local Beam Search

# Local beam search (3)

- Keep track of  $k$  states instead of one
  - Initially:  $k$  randomly selected states
  - Next: determine all successors of  $k$  states
  - If any of successors is goal  $\rightarrow$  finished
  - Else select  $k$  best from ALL successors and repeat.
- Major difference with random-restart search
  - Information is shared among  $k$  search threads.
- Can suffer from lack of diversity.
  - Stochastic beam search
    - choose  $k$  successors at random proportional to state quality.

# Local Beam Search (Classical)

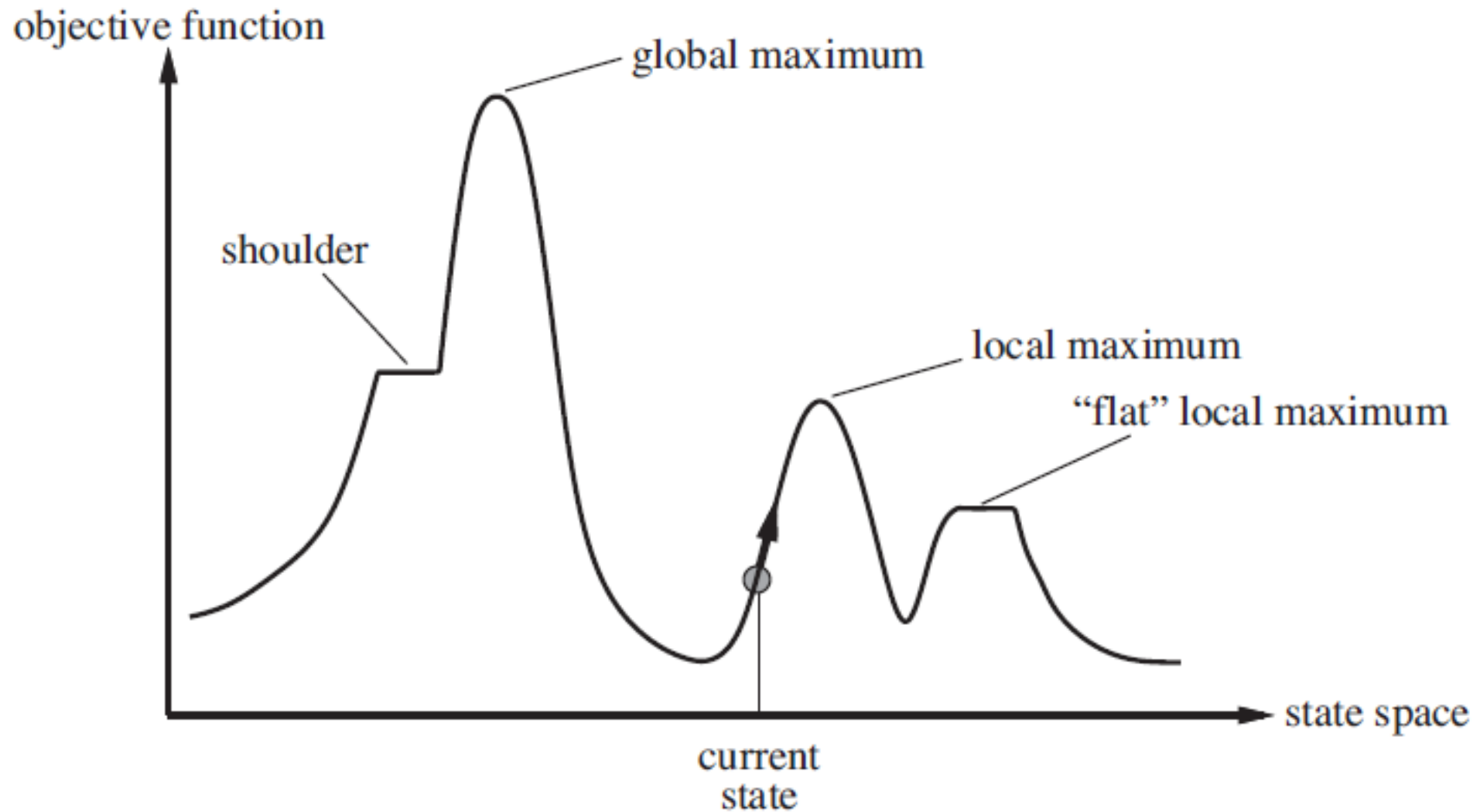
Start the search from K randomly selected states.



Pool of C states, generated from initial k states...

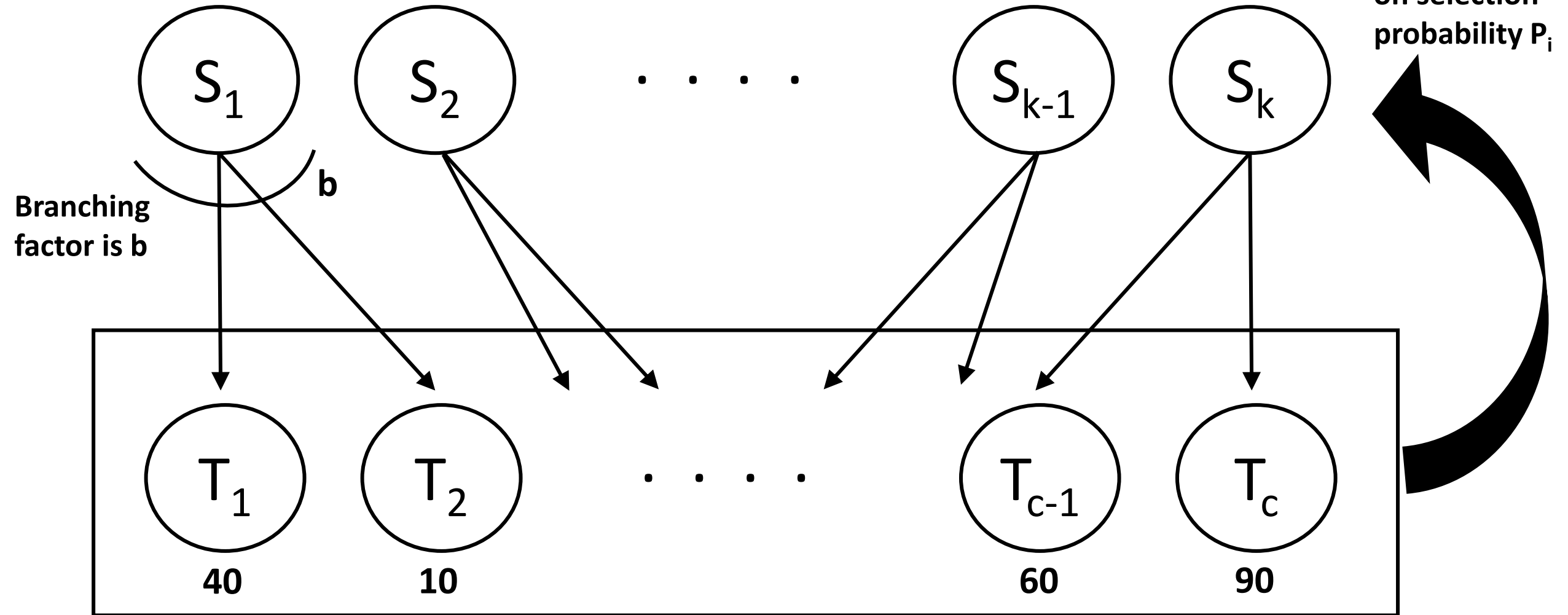
Where,  $c = b \times k$

# Search Landscape



# Stochastic Local Beam Search

Start the search from  $K$  randomly selected states.



Selection Probability of  $i$ th State:

$$P_i = \frac{\textit{Fitness}(T_i)}{\sum_{i=1}^c \textit{Fitness}(T_i)}$$



**Fitness of State  $T_i$**



**Fitness of the  
pool**