AS I

CHAPTER IV
HEURISTIC SEARCH METHODS

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Outline

- Heuristic
- Hill Climbing

Heuristic?

- Designing a heuristic function that can satisfy all requirements for surgery scheduling is a complex task (Blazewicz, Lenstra, & Kan, 1981).
- As a simple example, consider what a heuristic function might look like for just one of our rules.
- How could we use a number to reflect the quality of a schedule with respect to the requirement of maximizing room usage?

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- For instance, assume the heuristic function's result for the current partial schedule is 360.
- If the next slot assignment results in a value of 270, we are going away from the goal. On the other hand, if the slot assignment results in a value of 400, we are getting closer to the goal.
- Having a heuristic function does not make finding a goal state trivial.

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- We can refine our state space searching technique to perform a more intelligent search (Kanal & Kumar, 1988; Nilsson N. J., Problem solving methods in Artificial Intelligence, 1971; Pearl, 1984; Simon & Newell, 1958; Slagle, 1971).
- Instead of systematically searching each branch of a tree as in depth-first search, we'll choose where to search next based on heuristic knowledge of the schedules in the tree.

Hill Climbing?

- **Hill climbing** →a search algorithm that makes use of heuristic values.
- It involves following a path in the tree that is based on how the current heuristic value changes relative to the value associated with the next node in the path.
- **Simple hill climbing** →follow the *first* path we find that improves the heuristic value.
- **Steepest ascent hill climbing**, →look at all paths and pick the *best* one from our current position.

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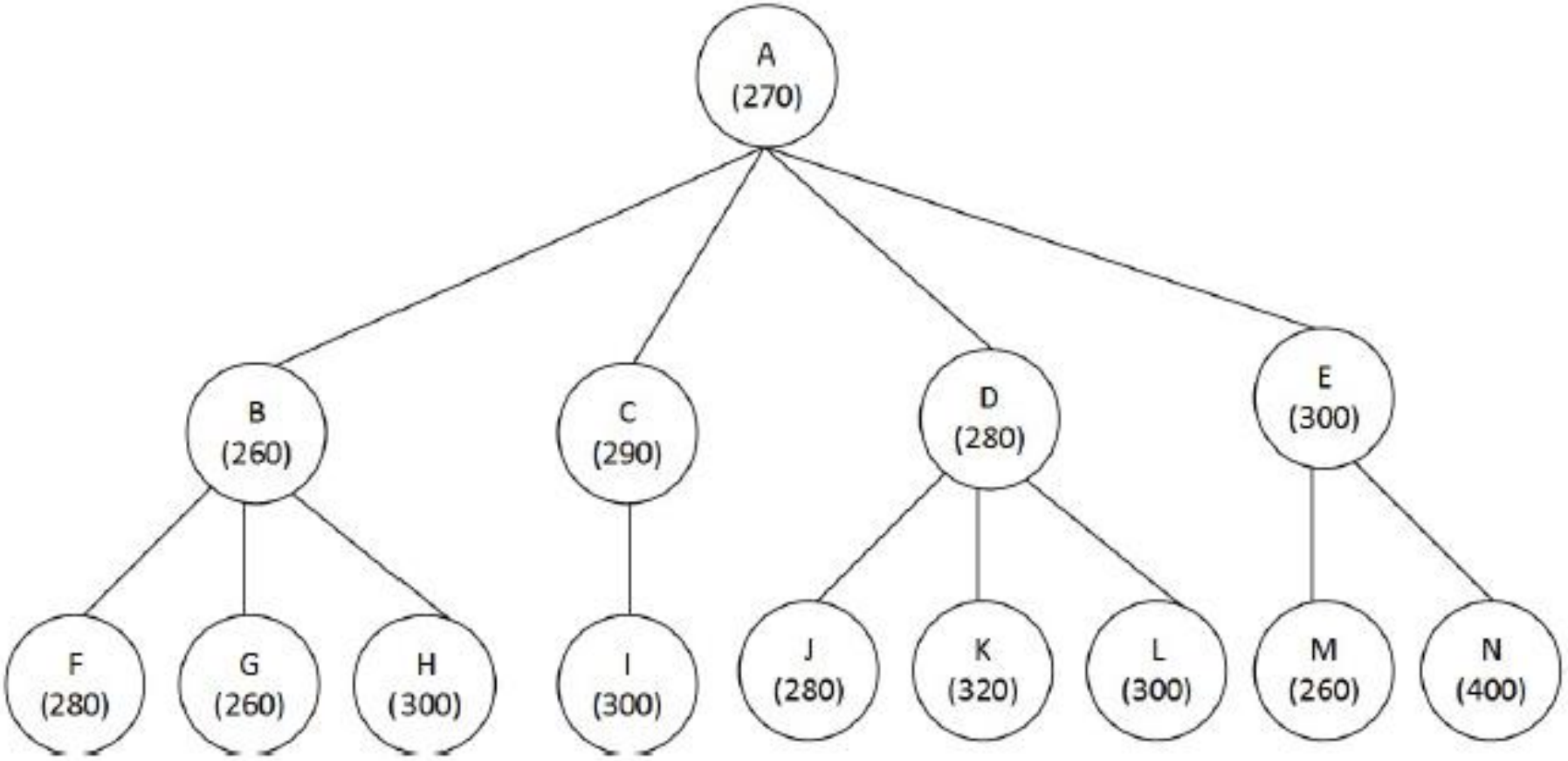

A tree representing different nodes labeled A through N, each with a heuristic value shown in parentheses.

❖ Thank you