

## OUTLINE Class #21

**Reading Assignment:** Read Chapters 9 & 10 in Nilsson

### Heuristic Search (Chapter 9)

- Algorithm A\*
- Admissibility of A\*

### PROCEDURE GRAPH-SEARCH

1. Create a *search graph*,  $G$ , consisting solely of the start node,  $s$ . Put  $s$  on a list called *OPEN*.
2. Create a list called *CLOSED* that is initially empty.
3. LOOP: if *OPEN* is empty, exit with failure.
4. Select the first node on *OPEN*, remove it from *OPEN*, and put it on *CLOSED*. Call this node  $n$ .
5. If  $n$  is a goal node, exit successfully with the solution obtained by tracing a path along the pointers from  $n$  to  $s$  in  $G$ . (see step 7.)
6. Expand node  $n$ , generating the set,  $M$ , of its successors and install them as successors of  $n$  in  $G$ .
7. Establish a pointer to  $n$  from those members of  $M$  that were not already in  $G$  (i.e., not already on either *OPEN* or *CLOSED*). Add these members of  $M$  to *OPEN*. For each member of  $M$  that was already on *OPEN* or *CLOSED*, decide whether or not to redirect its pointer to  $n$ . For each member of  $M$  already on *CLOSED*, decide for each of its descendants in  $G$  whether or not to redirect its pointer.
8. Reorder the list *OPEN*, either according to some arbitrary scheme or according to heuristic merit.
9. GOLOOP