Lecture 9 (More on A^*)

1 Iterative Deepening A^* (IDA^*)

1. Limit value of f and perform A^* interatively increasing the value of f
2. Saves space similar to IDS

2 Weighted A^*

1. A* but $f'(n) = g(n) + w \times h(n)$, this might lead to $w \times h(n)$ not being admissible
2. It is order of magnitudes faster than A^*
3. (if new heuristic not admissible) The solution that is found is suboptimal under the criteria: $c(sol) \leq (w-1) \cdot c(opt)$

3 Anytime Search

Weighted A^* but decrease w in each iteration of the algo finding better solutions with time.

4 Admissible Heuristics

1. Problem relaxation - ignore rules, increase possibilities and assumes a super-graph of actual state space
2. We then solve problem for this supergraph whose (suboptimal) solution is also a solution for our problem

5 Effective Branching Factor

1. Let A^* generate N nodes before finding solution at depth d
2. Then, effective branching factor is $b^* = \sqrt[d]{N}$
3. This is used to determine the efficiency of the heuristic

6 Combining Heuristic

1. h_2 dominates h_1 if both are admissible and $h_2 > h_1$ for all nodes
2. Dominating heuristics perform better or same as non-dominating heuristics
3. Thus, we can take max of a set of heuristics to get a better performing algorithm
4. Heuristic functions form a lattice