Section-2

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1 Search and Heuristics

1. States will be defined as the permutation of all variables: (MxN)x(N,S,E,W)xVmax+1. We use Vmax+1 to include all values between 0 and the legal limit.

2. No. Manhattan distance is inadmissible. The cost function uses time steps (actions) required to reach a goal. Manhattan distance assumes that distance is being covered @ 1 unit/time step, which is not necessarily true for V¿1.

3. We can relax the problem to obtain a heuristic. Suppose there were only two legal speeds 0, Vmax and no walls on the grid whatsoever.

4. No. Using inadmissible heuristics will result in a suboptimal goal being explored first, as the cost to get to the optimal goal will be overestimated by A*. Hence the search is neither complete nor optimal.

5. No. If an admissible heuristic is used we are not guaranteed an optimal solution. Counter example: (???). If the heuristic is consistent then we are sure the solution is optimal.

6. We could reach a goal state in a shorter time. It wouldn't be optimal though.

2 Course Scheduling

1. Variables=(1,2,3,4,5), Domains=(A,B,C), Constraints= Let D(i) be the assigned value to the variable i. Then $D(1) \neq D(2), D(2) \neq D(3), D(2) \neq D(4), D(3) \neq D(4)$.

3 Trapped Pac-Man

Will be added in the future...