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Artificial Intelligence Nanodegree at Udacity
Project2: Build a Forward-Planning Agent

MacBook Pro
Memory:16GB

Table of problem 1 results:

Search Algorithms	Actions	Expansions	Goal Tests	New Nodes	Plan Length	Time (sec)
breadth_first search	20	43	56	178	6	0.0036
depth_first_graph_search	20	21	22	64	20	0.0021
uniform_cost_search	20	60	62	240	6	0.0055
greedy_best_first_graph_search - h_unmet_goals	20	7	9	29	6	0.0009
greedy_best_first_graph_search - h_pg_levelsum	20	6	8	28	6	0.2643
greedy_best_first_graph_search - h_pg_maxlevel	20	6	8	24	6	0.1988
greedy_best_first_graph_search - h_pg_setlevel	20	6	8	28	6	0.3551
astar_search - h_unmet_goals	20	50	52	206	6	0.0053
astar_search - h_pg_levelsum	20	28	30	122	6	0.6702
astar_search - h_pg_maxlevel	20	43	45	180	6	0.7353
astar_search - h_pg_setlevel	20	33	35	138	6	1.0102

Table of problem 2 results:

Search Algorithms	Actions	Expansions	Goal Tests	New Nodes	Plan Length	Time (sec)
breadth_first search	72	3343	4609	30503	9	1.0083
depth_first_graph_search	72	624	625	5602	619	1.3833
uniform_cost_search	72	5154	5156	46618	9	1.6814
greedy_best_first_graph_search - h_unmet_goals	72	17	19	170	9	0.0107
greedy_best_first_graph_search - h_pg_levelsum	72	9	11	86	9	6.3134
greedy_best_first_graph_search - h_pg_maxlevel	72	27	29	249	9	12.365
greedy_best_first_graph_search - h_pg_setlevel	72	9	11	84	9	9.0664
astar_search - h_unmet_goals	72	2467	2469	22522	9	1.1527
astar_search - h_pg_levelsum	72	357	359	3426	9	152.26
astar_search - h_pg_maxlevel	72	2887	2889	26594	9	874.61
astar_search - h_pg_setlevel	72	1037	1039	9605	9	825.90

From problems 1 and 2, I noticed that depth_first_graph_search and uniform_cost_search are slow, so I will omit them next time. Since h_pg_maxlevel and h_pg_setlevel are slow, I will omit them next time.

Table of problem 3 results:

Search Algorithms	Actions	Expansions	Goal Tests	New Nodes	Plan Length	Time (sec)
breadth_first search	88	14663	18098	129625	12	5.5388
greedy_best_first_graph_search - h_unmet_goals	88	25	27	230	15	0.0182
greedy_best_first_graph_search - h_pg_levelsum	88	14	16	126	14	13.822
astar_search - h_unmet_goals	88	7388	7390	65711	12	4.3144
astar_search - h_pg_levelsum	88	369	371	3403	12	250.10

Table of problem 4 results:

Search Algorithms	Actions	Expansions	Goal Tests	New Nodes	Plan Length	Time (sec)
breadth_first search	104	99736	114953	944130	14	53.298
greedy_best_first_graph_search - h_unmet_goals	104	29	31	280	18	0.0298
greedy_best_first_graph_search - h_pg_levelsum	104	17	19	165	17	24.294
astar_search - h_unmet_goals	104	34330	34332	328509	14	28.000
astar_search - h_pg_levelsum	104	1208	1210	12210	15	1409.2

Use your results to answer the following questions:

- Which algorithm or algorithms would be most appropriate for planning in a very restricted domain (i.e., one that has only a few actions) and needs to operate in real time?

→greedy_best_first_graph_search - h_unmet_goals

- Which algorithm or algorithms would be most appropriate for planning in very large domains (e.g., planning delivery routes for all UPS drivers in the U.S. on a given day)

→astar_search - h_pg_levelsum

- Which algorithm or algorithms would be most appropriate for planning problems where it is important to find only optimal plans?

→breadth_first search