Air Cargo Problem 1

	Actions	Expansions	Goal Tests	New Nodes	Plan length	Elapsed time (s)
breadth_first_search	20	43	56	178	6	0.006806
depth_first_graph_search	20	21	22	84	20	0.003576
uniform_cost_search	20	60	62	240	6	0.009167
greedy_best_first_graph_search_h_unmet_goals	20	7	9	29	6	0.001674
greedy_best_first_graph_search_h_pg_levelsum	20	6	8	28	6	0.383180
greedy_best_first_graph_search_h_pg_maxlevel	20	6	8	24	6	0.296097
greedy_best_first_graph_search_ h_pg_setlevel	20	6	8	28	6	1.310729
astar_search_h_unmet_goals	20	50	52	206	6	0.009692
astar_search_h_pg_levelsum	20	28	30	122	6	0.982337
astar_search_ h_pg_maxlevel	20	43	45	180	6	1.030627
astar_search_h_pg_setlevel	20	33	35	138	6	3.450170

Air Cargo Problem 2

	Actions	Expansions	Goal Tests	New Nodes	Plan length	Elapsed time (s)
breadth_first_search	72	3343	4609	30503	9	2.042477
depth_first_graph_search	72	624	625	5602	619	3.152794
uniform_cost_search	72	5154	5156	46618	9	3.362243
greedy_best_first_graph_search_h_unmet_goals	72	17	19	170	9	0.019279
greedy_best_first_graph_search_h_pg_levelsum	72	9	11	86	9	8.675272
greedy_best_first_graph_search_h_pg_maxlevel	72	27	29	749	9	17.380373
greedy_best_first_graph_search_ h_pg_setlevel	72	9	11	84	9	28.947336
astar_search_h_unmet_goals	72	2467	2469	22522	9	2.303820
astar_search_h_pg_levelsum	72	357	359	3426	9	224.890090
astar_search_ h_pg_maxlevel	72	2887	2889	26594	9	1299.87944

	Actions	Expansions	Goal Tests	New Nodes	Plan length	Elapsed time (s)
astar_search_h_pg_setlevel	72	1037	1039	9605	9	2163.06907

Air Cargo Problem 3

	Actions	Expansions	Goal Tests	New Nodes	Plan length	Elapsed time (s)
breadth_first_search	88	14663	18098	129625	12	10.94631
depth_first_graph_search	88	408	409	3364	392	1.21685
uniform_cost_search	88	18510	18512	161936	12	29.88629
greedy_best_first_graph_search_h_unmet_goals	88	25	27	230	15	0.073505
greedy_best_first_graph_search_h_pg_levelsum	88	14	16	126	14	39.77159
astar_search_h_unmet_goals	88	7388	7390	65711	12	8.67879
astar_search_h_pg_levelsum	88	369	371	3403	12	352.35235

Air Cargo Problem 4

	Actions	Expansions	Goal Tests	New Nodes	Plan length	Elapsed time (s)
breadth_first_search	104	99736	114953	944130	14	99.41523
greedy_best_first_graph_search_h_unmet_goals	104	29	31	280	18	0.060519
greedy_best_first_graph_search_h_pg_levelsum	104	17	19	165	17	34.75850
astar_search_h_unmet_goals	104	34330	34332	328509	14	58.26855
astar_search_h_pg_levelsum	104	1208	1210	12210	15	5171.96533

Mean New Nodes vs actions

New nodes vs *actions*

Path length vs actions

Path Lenth vs *Actions*

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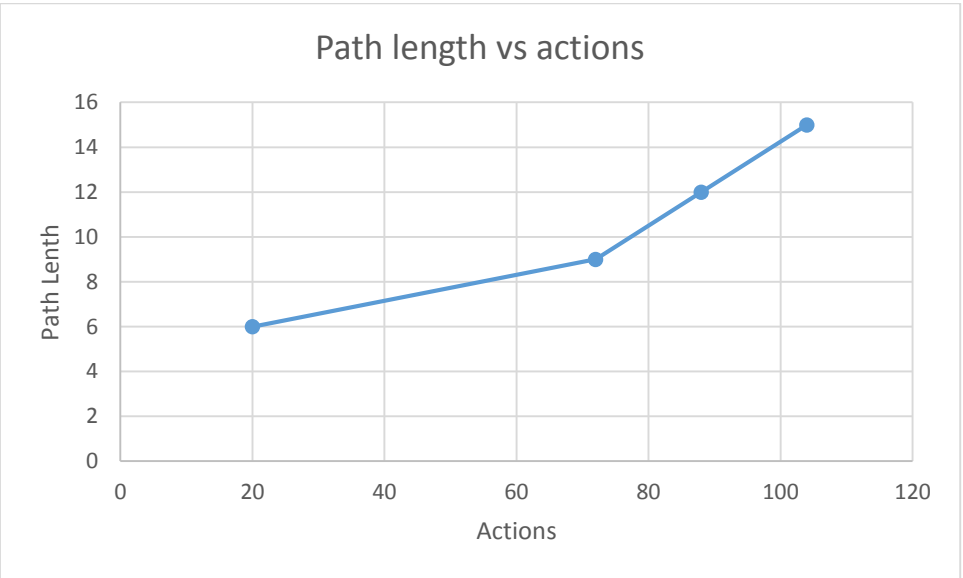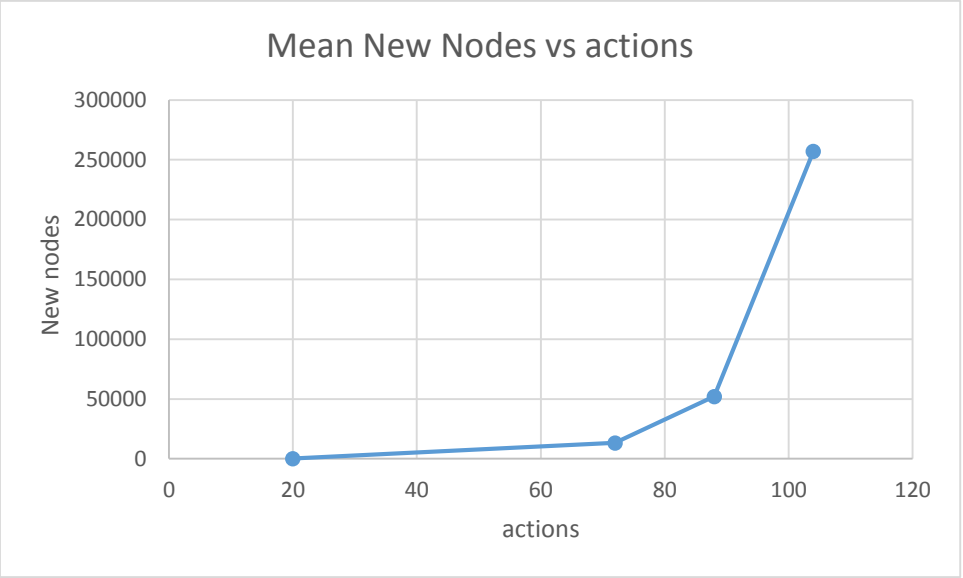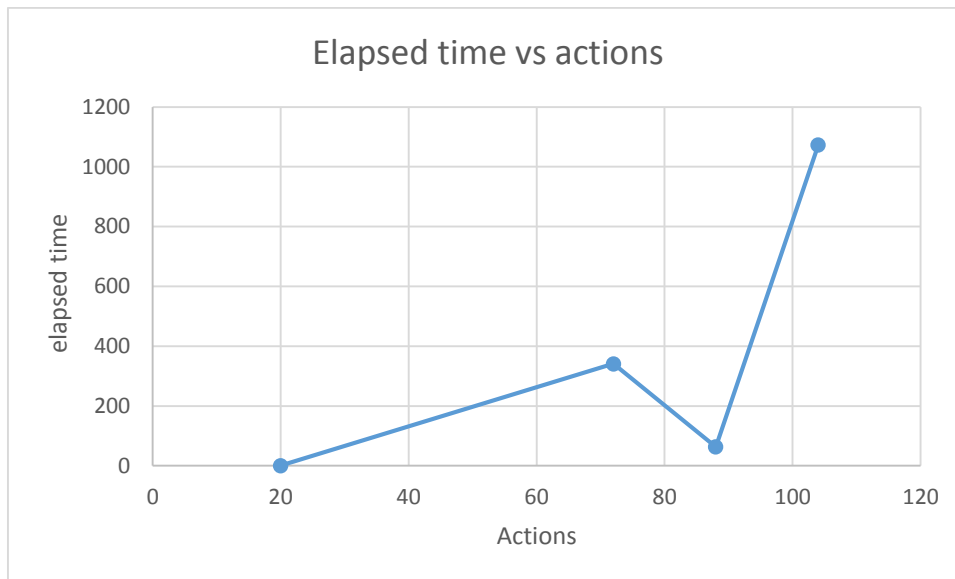
- **Which algorithm or algorithms would be most appropriate for planning in a very restricted domain (i.e., one that has only a few actions) and needs to operate in real time?**

  For a problem with few actions, we can look at problem 1 which has 20 actions. We can see that greedy best first graph search works fine with a very small number of expansions and in a very small amount of time.

- **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)**

  We look at problem 4. The quickest algorithm was greedy best first graph search with h unmet goals, but the plan length is bigger. The astar search with h unmet goals find the best solution with a plan length of 14 but in a higher amount of time

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

  The astar algorithm with a good heuristic guarantee finding the optimal plan