Assignment 1

This shows the tables I created for each side length, for 2, 3, and 4. Note that you said that if any execution takes more than 5 seconds, we should end it and give large numbers. Specifically, you suggested Average depth = 20, Average number inserted / removed = 10000, runtime=100 seconds. But, the longest attempts I made with BFS, still taking less than 5 seconds on my machine, had 1345817 inserts and 631681 deletes. And average depth was nearly 15, close to 20. So, I decided to consider that in a case of timeout, average depth would be 25, inserts would be 1500000, and removes would be 700000. Note that this does cause some oddity when using ID at n=4, because normally ID has a similar number of inserts as removes, but when it gets a lot of timeouts, that is no longer the case.

You can see the code I used to generate the data that I added to the table in the data_generator.py that's found in each homework section.

I also decided to add an optional parameter to search with A*. It lets you input the heuristic function as a parameter. I also gave it a default value of Uniform if you don't provide a heuristic function, so as not to mess with the signature.

Table for n=2

	Depth	Inserts	Removes	Time (Seconds)
BFS	1.68	4.71	3.88	2.1700859069824218e-05
ID (DFS)	1.65	6.49	6.1	6.0803890228271485e-05
Uniform	1.49	4.42	3.6	4.323720932006836e-05
A* - h1	1.85	3.89	3.05	2.9914379119873047e-05
A* - h2	1.59	3.42	2.59	5.82432746887207e-05

Table for n=3

	Depth	Inserts	Removes	Time (Seconds)
BFS	5.74	351.29	204.02	0.0010179543495178222
ID (DFS)	6.0	650.97	647.65	0.003577430248260498
Uniform	6.17	845.18	493.57	0.015487053394317628
A* - h1	6.27	48.67	27.22	0.0009739589691162109
A* - h2	6.14	23.74	13.01	0.0008000731468200684

Table for n=4

	Depth	Inserts	Removes	Time (Seconds)
BFS	17.94	795994.69	371722.72	47.31685402393341
ID (DFS)	18.66	843267.7	435263.74	51.47687316656113
Uniform	18.12	812133.11	379041.99	53.2845367527008
A* - h1	15.62	111135.11	51854.73	7.349088234901428
A* - h2	16.07	912.78	434.22	0.07997975587844848