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Analysis of Machine Problem 1

Table 1: Alloc-free Cycles For Different Values of a and b.

	a		
b	**1**	**2**	**3**
1	4	14	106
2	6	27	541
3	8	44	2432
4	10	65	10307
5	12	90	42438
6	14	119	172233
7	16	152	693964
8	18	189	2785999

Table 2: Runtimes (seconds) For Different Values of a and b.

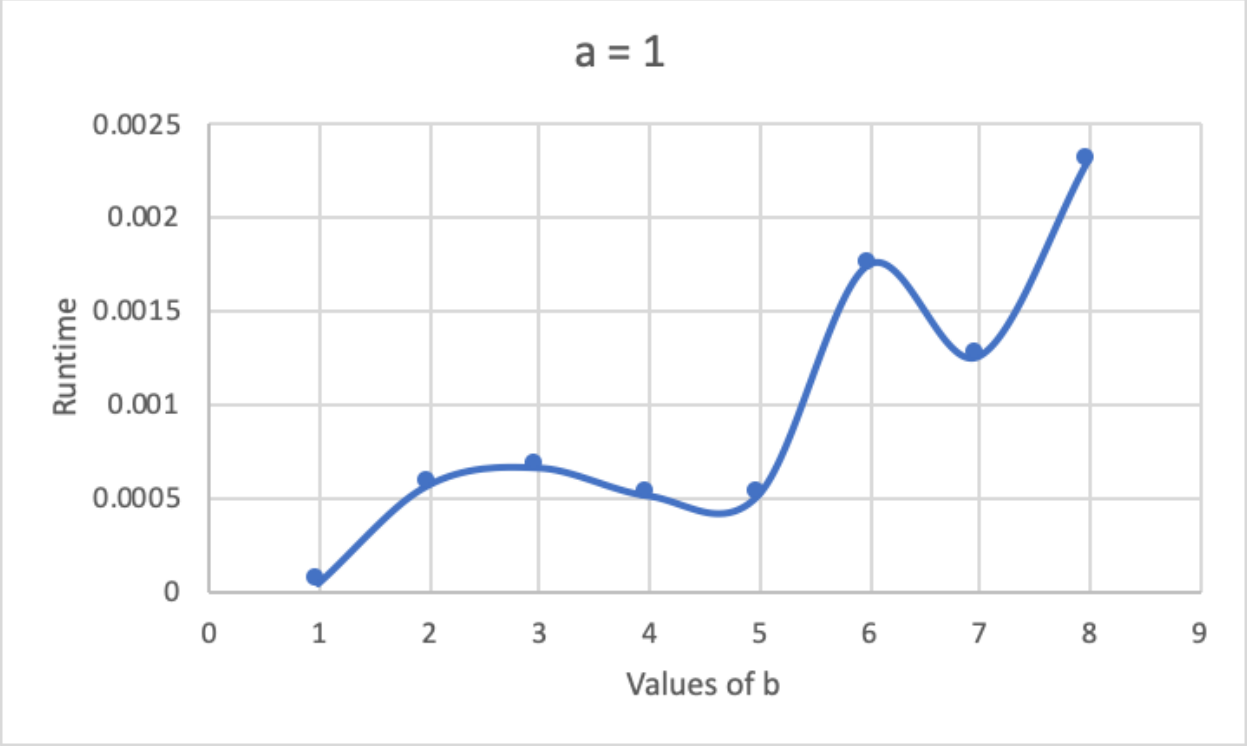
	a		
b	**1**	**2**	**3**
1	0.000048	0.000976	0.6491
2	0.000572	0.000604	0.32426
3	0.000665	0.002345	0.149575
4	0.000516	0.000519	0.585908
5	0.000519	0.004769	2.454742
6	0.001746	0.011566	9.830760
7	0.001258	0.011457	39.141147
8	0.002305	0.01265	180.725354

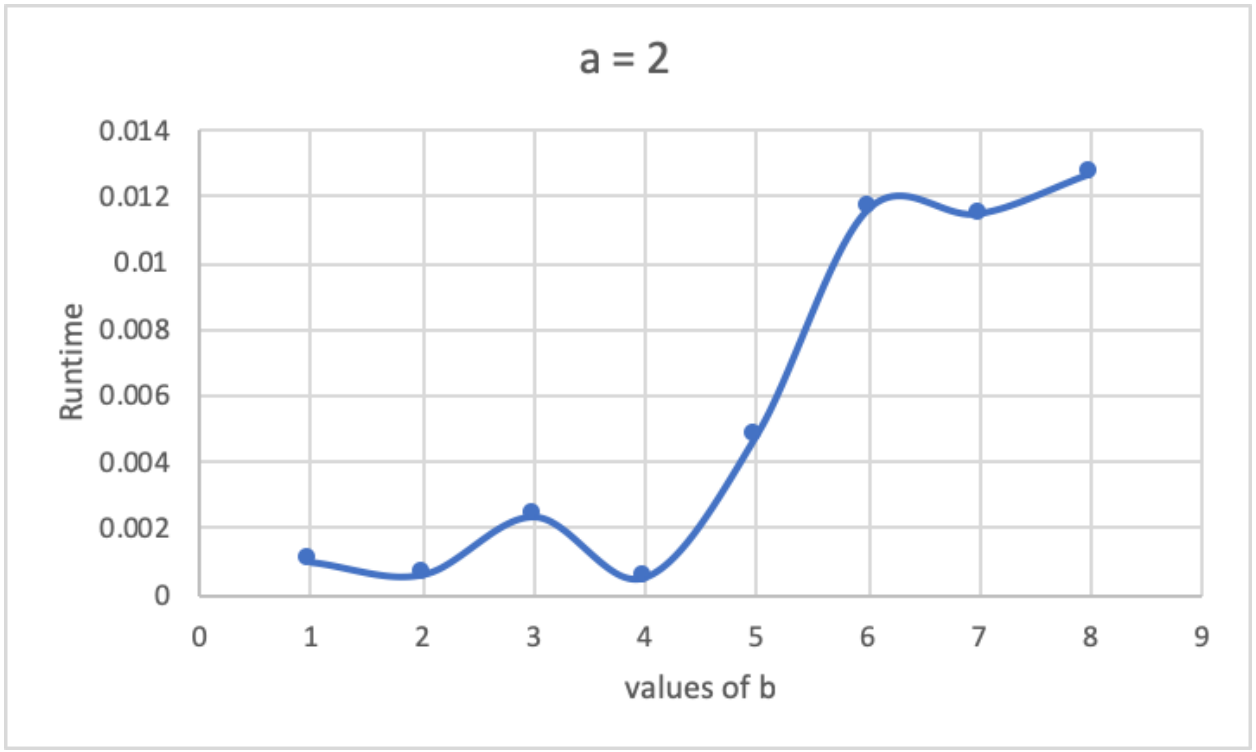
Runtime vs. Alloc-free Cycles

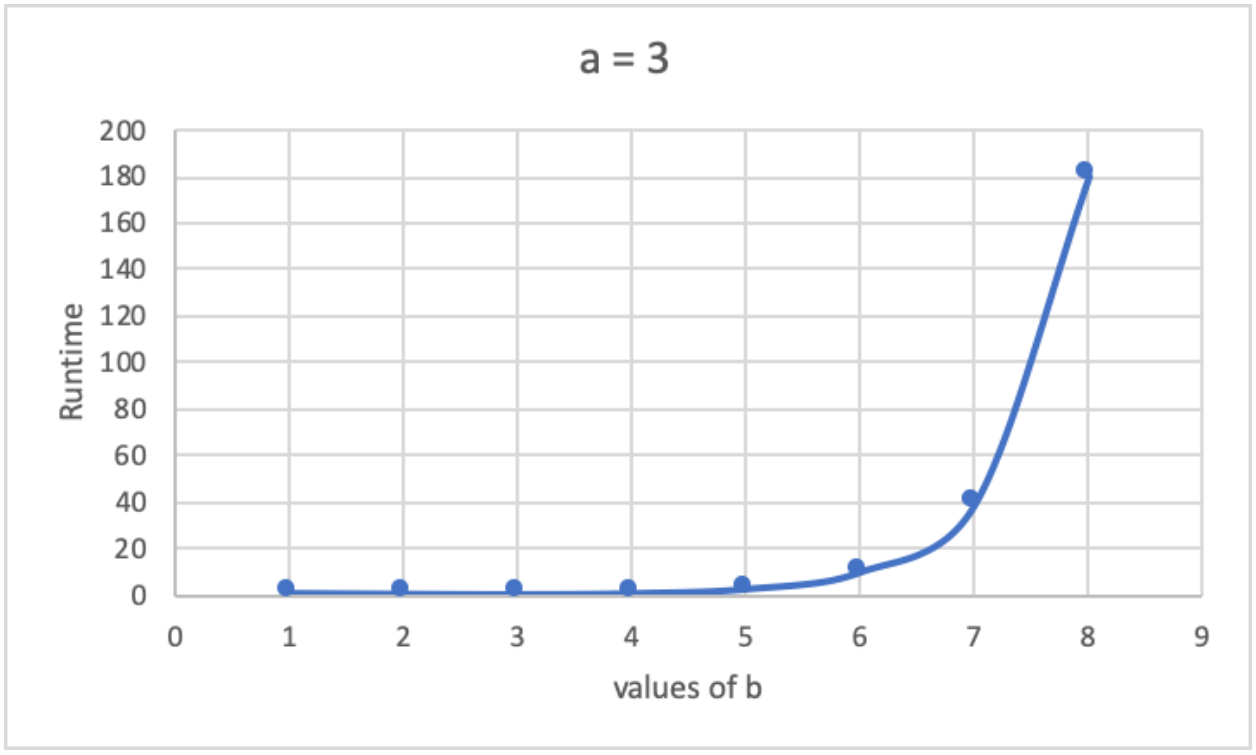
These values varied greatly for different arguments passed into a and b. The alloc-free cycles ranged from 4 to 2785999 as shown in Table 1. The effect on runtimes that all these alloc-free cycles is shown in Table 2. One important note in the calculation of these tables is that running the same inputs of a and b results in different runtimes. However, it was decided that for this assignment, the demonstration of exponential runtime growth was sufficient in the analysis. A more accurate representation would take a large sample size and calculate an average using the data.

Possible Improvements

Perhaps a better system of coalescing and splitting of the blocks would make for a more efficient buddy allocator.




a = 2
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
Runtime
0
1
2
3
4
5
6
7
8
9
values of b


a = 3
200
180
160
140
120
100
80
60
40
20
0
Runtime
0
1
2
3
4
5
6
7
8
9
values of b