CS540 Practice Assignment 6

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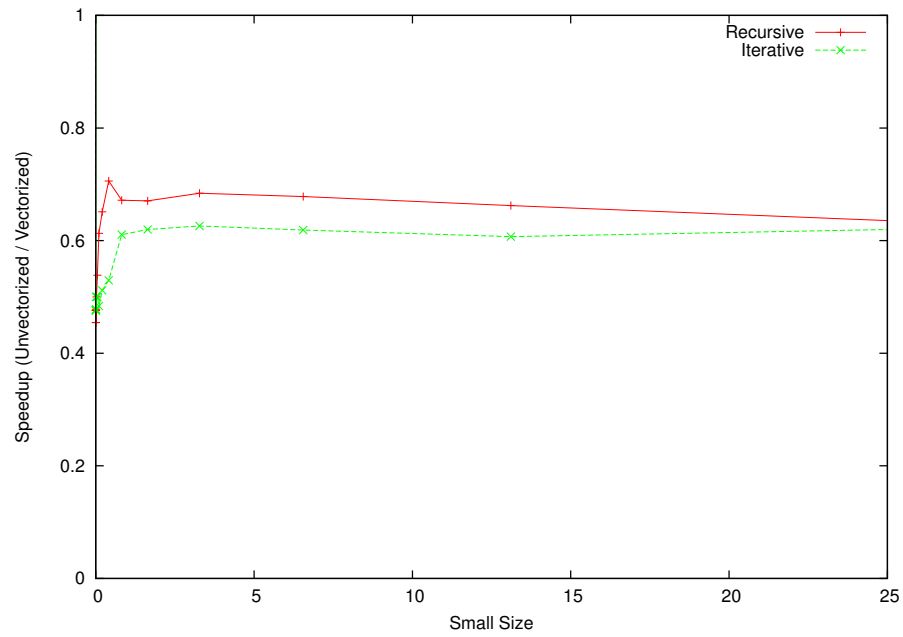
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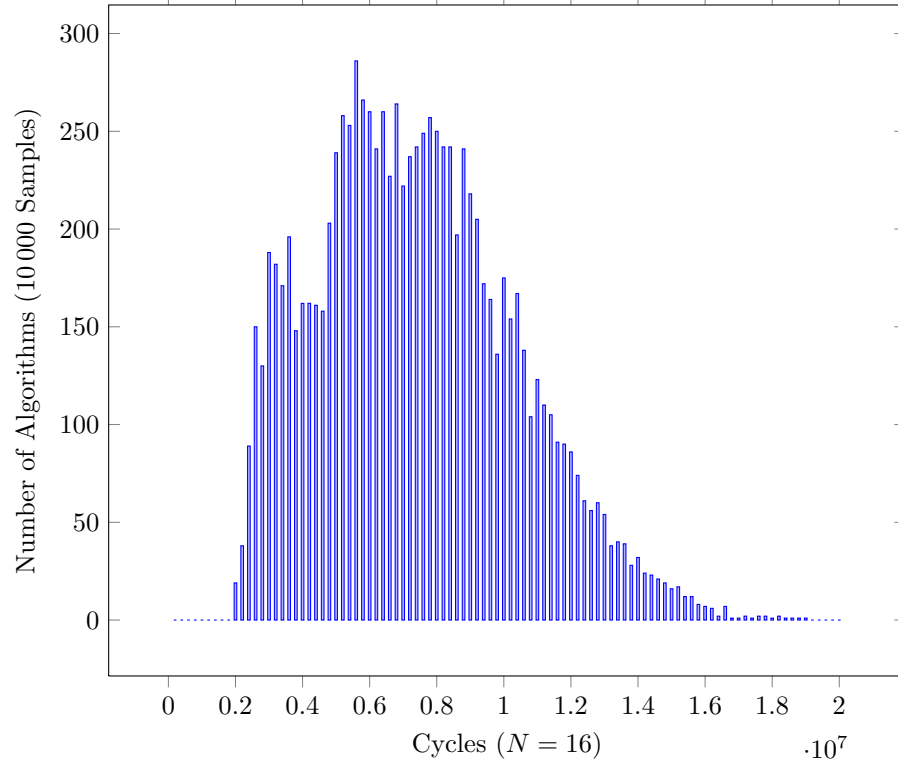# 1 Tasks

1. Prove by induction that I tensor A1...At = (I tensor A1)...(I tensor At), or more generally A1...At tensor B1...Bt = (A1 tensor B1)...(At tensor Bt).

2. Install and test WHT package

3. Implement recursive and iterative WHT algorithms (in place)

4. Implement radix 4 recursive and iterative WHT algorithms (in place)

5. Using the original WHT package, perform timings for recursive and iterative WHT with different sizes of small. Also measure small and compare to iterative. You may want to write a script to generate input to the WHT package measure function.

6. Using the original WHT package, time random WHTs and produce histogram You will need to write a script to generate and time random WHT algorithms (see the matlab code for a model).

7. Using the original WHT package, run dynamic programming and compare to recursive, iterative and random. You will need to write a script to perform dynamic programming (see the matlab code for a model).

2 Results

2.1 Timings for Iterative vs. Recursive

2.2 Histogram of Timings for Random WHTs

2.3 Results of running Dynamic Programming

N	Time (μs)	Plan
1	354.0	small[1]
2	357.0	small[2]
3	518.0	small[3]
4	604.0	small[4]
5	1061.0	small[5]
6	1379.0	split[small[3],small[3]]
7	2210.0	split[small[4],small[3]]
8	3647.0	split[small[4],small[4]]
9	8005.0	split[small[3],small[3],small[3]]
10	16564.0	split[small[4],small[3],small[3]]
11	34021.0	split[small[4],small[4],small[3]]
12	70951.0	split[small[4],small[4],small[4]]
13	192616.0	split[small[3],small[3],small[3],small[2],small[2]]
14	385364.0	split[small[3],small[3],small[3],small[3],small[2]]
15	769626.0	split[small[3],small[3],small[3],small[3],small[3]]
16	1855763.0	split[small[3],small[3],small[3],small[3],small[2],small[2]]
17	3715648.0	split[small[3],small[3],small[3],small[3],small[3],small[2]]