18645 Assignment 1

Q1

1. Hostname: `ece003.ece.local.cmu.edu`
2. CPU model and manufacturer: 2x `Intel(R) Xeon(R) CPU E5-2620 v3 @ 2.40GHz`
3. Frequencies
    i. Min: 1200Mhz
    ii. Base: 2400Mhz
    iii. Max: 3200Mhz
4. Number of physical cores (2 CPUs in total): 12
5. Number of hardware threads: 24
6. Number of Caches: 4
7. Sizes of caches
    i. L1 data: 32K
    ii. L1 instructions: 32K
    iii. L2: 256K
    iv. L3: 15360K

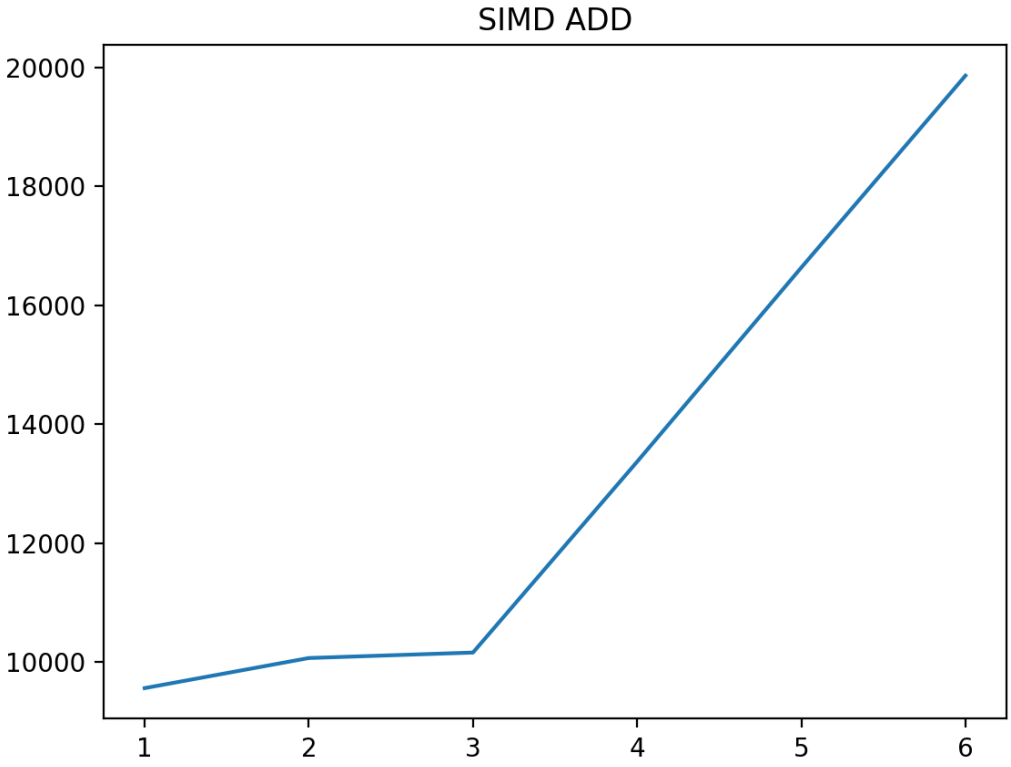
(above info comes from `lscpu`)

Q2

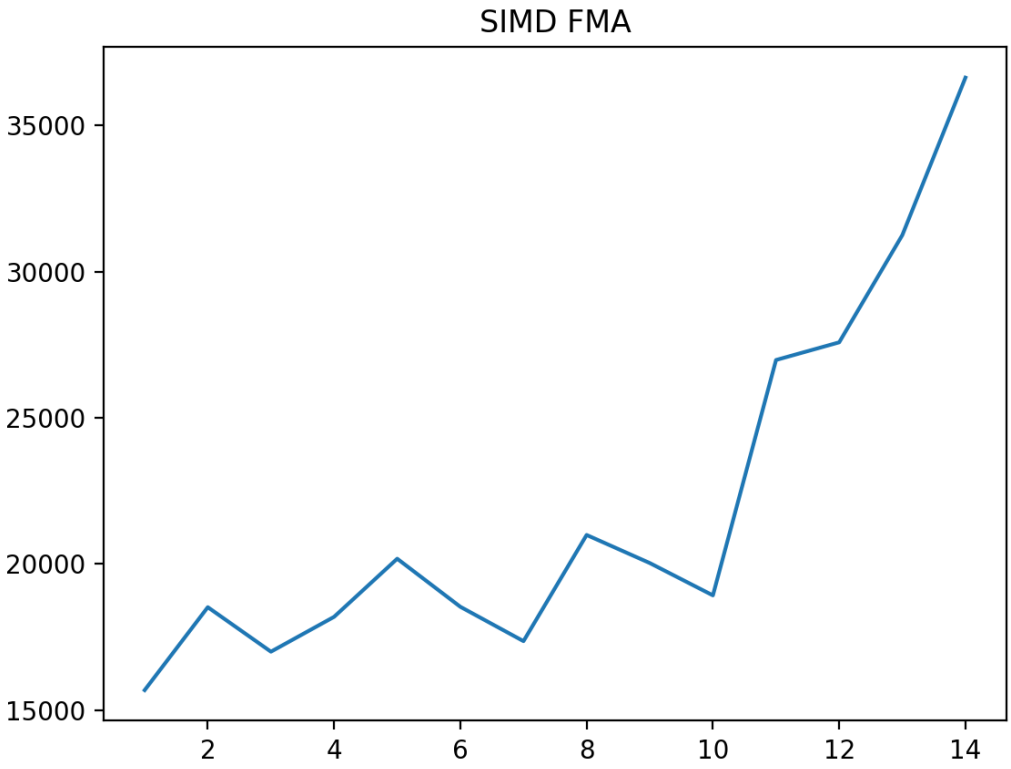
1. latency of `vaddpd` is 3
2. latency of `vfmadd231pd` is 5

Q3

Throughput of add and fma are 1 and 2 respectively.



1. Performance of add drops after chain 3. Throughput = 3 / 3 = 1



Performance of fma drops after chain 10. Throughput = 10 / 5 = 2

2. 2

Q4

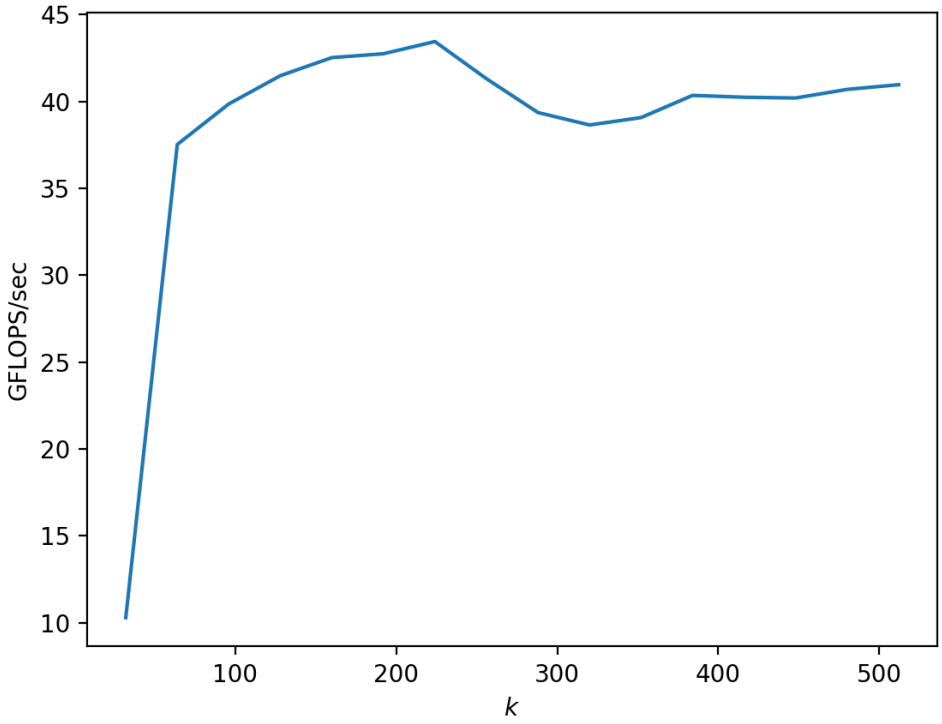
1. 100
2. 200
3. 2 * 4 = 8

Q5

1. 6
2. 24
3. throughput * latency * 4 = 2 * 5 * 4 = 40
4. i. $m = 4, n = 12$

ii. $2 \times 8 \times 2.4 = 38.4\text{GFLOPS/sec}$

iii.



Q6

50h. Longer than any homework from other courses I take this semester.