Daniel Masarsky

```
  _mm256_store_pd(C+i+x*4+j*n, c[x]);
  ^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

C:\Users\masar\OneDrive\Desktop\Assignment 05>gcc -mavx2  *.c

C:\Users\masar\OneDrive\Desktop\Assignment 05>gcc -mavx2  *.c -o assignment_05.exe
```

```
C:\Users\masar\OneDrive\Desktop\Assignment 05>assignment_05.exe
the elapsed CPU time of dgemm is 10.015000
Clocks per sec: 1000
c[0][0] = 18251.551659
c[0][1] = 10745.745980
c[1][0] = 11042.737281
c[1][1] = 31900.324402
c[2][0] = 1.#INF00
c[2][1] = 1.#INF00
c[3][0] = 10803.712027
c[3][1] = 15757.418778
c[4][0] = 69229.897493
c[4][1] = 14818.159611
c[5][0] = 12384.951172
c[5][1] = 10627.489919
c[6][0] = 40235.864454
c[6][1] = 16799.632784
c[7][0] = 24154.968957
c[7][1] = 11426.479812
c[8][0] = 12533.507230
c[8][1] = 21634.199826
c[9][0] = 16356.840486
c[9][1] = 14244.665903
c[10][0] = 12097.987918
c[10][1] = 9220.113133
```

```
C:\Users\masar\OneDrive\Desktop\csc295>gcc -mavx2 *.c -o dgemm_smid.exe

C:\Users\masar\OneDrive\Desktop\csc295>dgemm_smid.exe
the elapsed CPU time is 2.091000
Clocks per sec: 1000
c[0][0] = 22254.092967
c[0][1] = 22254.092967
c[1][0] = 22254.092967
c[1][1] = 19095.943282
c[2][0] = 22254.092967
c[2][1] = 17888.960775
c[3][0] = 22254.092967
c[3][1] = 16324.543286
c[4][0] = 22254.092967
c[4][1] = 1.#INF00
c[5][0] = 22254.092967
c[5][1] = 12071.588037
c[6][0] = 22254.092967
c[6][1] = 26069.305776
c[7][0] = 22254.092967
c[7][1] = 16535.634817
c[8][0] = 22254.092967
c[8][1] = 11600.960805
c[9][0] = 22254.092967
c[9][1] = 36973.310514
c[10][0] = 22254.092967
```

```
C:\Users\masar\OneDrive\Desktop\Assignment 05>assignment_05.exe
the elapsed CPU time of dgemm_SIMD_Pipelined is 1.700000
Clocks per sec: 1000
c[0][0] = 22254.092967
c[0][1] = 19095.943282
c[1][0] = 1.#INF00
c[1][1] = 1.#INF00
c[2][0] = 12023.919703
c[2][1] = 19042.560838
c[3][0] = 23095.411914
c[3][1] = 263208.629976
c[4][0] = 18035.681316
c[4][1] = 10517.019835
c[5][0] = 11425.695566
c[5][1] = 6150.274286
c[6][0] = 9575.058418
c[6][1] = 10210.803119
c[7][0] = 11063.408049
c[7][1] = 30791.746978
c[8][0] = 15138.547671
c[8][1] = 8907.466805
c[9][0] = 12458.031365
c[9][1] = 8486.824836
c[10][0] = 7601.406087
c[10][1] = 7622.413223
```

Pipeline make it go fast, but at this point isn't it a race in inches instead of miles?

```
C:\Users\masar\OneDrive\Desktop\Assignment 05>assignment_05.exe
the elapsed CPU time of dgemm_SIMD_Pipelined is 31.566000
Clocks per sec: 1000
c[0][0] = 1.#INF00
c[0][1] = 1.#INF00
c[1][0] = 33395.924820
c[1][1] = 210657.138022
c[2][0] = 20810.498057
c[2][1] = 38173.761952
c[3][0] = 18622.056496
c[3][1] = 53755.104366
c[4][0] = 28242.855019
c[4][1] = 40538.323176
c[5][0] = 22213.051125
c[5][1] = 60981.402598
c[6][0] = 21723.910635
c[6][1] = 29876.862487
c[7][0] = 303995.886674
c[7][1] = 88779.997073
c[8][0] = 20106.889080
c[8][1] = 31396.405369
c[9][0] = 18821.152705
c[9][1] = 49365.531261
c[10][0] = 15487.683960
c[10][1] = 25077.685909
```

It take much longer, in fact I actually thought it crashed for a second cause of how it was taking

In terms of assembly pipelining makes the program as fast as its weakest link and unlinke SIMD is actual parallelism, explaining why it was faster

https://github.com/tigerpa616/Computer-Architexture-Organization/tree/master/Assignment%2005

All my code in the above github link -^