

Malachai Moody
2/6/2020

Specification for Computer

1. The brand of CPU (Intel or AMD)

Intel

2. The number of cores on CPU

4

3. The clock rate of CPU in GHz

3.2 GHz

4. The amount of memory in GB

7.7 GB

5. The speed of memory (for example: DDR4 3200)

DDR4 ram

6. The capacity of hard drive

237.2 GB

7. The model of CPU (e.g. Intel i7-9700K Coffee Lake)

Intel Core i5

8. The type of hard drive: HDD

- Cache Speed: 4 GB
- RPM: 1500
- Average Latency: 2.0

9. One screenshot for each of the benchmark showing the output of the benchmark:

Shooter: Inbox (2,670) Pwd: bench: Repl.it - FeistyMuffledParallelAlgorithm CSCI 202 | Microsoft Assignment Submit Upload files How to take print screen software re: My Drive - C: Untitled do: ALEKS - Ma: +

https://repl.it/repls/FeistyMuffledParallelAlgorithm

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Files main.cpp

```
main.cpp
1 #include <stdint.h>
2 #include <time.h>
3 #include <math.h>
4
5
6 int main(){
7
8     clock_t intTime;
9     intTime = clock();
10    //32-bit integer operation benchmark
11    int32_t n = 0;
12    int32_t m = 0;
13    int32_t o = 0;
14    for(int64_t i = 0; i < 10000000000; i++){
15        n = 2 * 2;
16    }
17    for(int64_t j = 0; j < 50000000000; j++){
18        m = 2 * 2;
19    }
20    for(int64_t k = 0; k < 20000000000; k++){
21        o = 2 / 2;
22    }
23    intTime = clock() - intTime;
24    double intTime_taken = ((double)intTime)/CLOCKS_PER_SEC;
25    std::cout << intTime_taken << " seconds" << std::endl;
26
27    clock_t floatTime;
28    floatTime = clock();
29    //32-bit float operation benchmark
30    float x = 0.0;
31    float y = 0.0;
32    float z = 0.0;
33    for(int64_t a = 0; a < 10000000000; a++){
34        x = 2.0 + 2.0;
35    }
36    for(int64_t b = 0; b < 50000000000; b++){
37        y = 2.0 * 2.0;
38    }
39    for(int64_t c = 0; c < 20000000000; c++){
40        z = 2.0 / 2.0;
41    }
42    floatTime = clock() - floatTime;
43    double floatTime_taken = ((double)floatTime)/CLOCKS_PER_SEC;
44    std::cout << floatTime_taken << " seconds" << std::endl;
45
46    //memory benchmark
```

```
clang version 7.0.0-3-ubuntu18.04.1 (tags/RELEASE_700/final)
> clang++-7 -pthread -o main main.cpp
> ./main
475.818 seconds
485.363 seconds
59.7697 seconds
>
```

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45
```

```
clang version 7.0.0-3-ubuntu18.04.1 (tags/RELEASE_700/final)
> clang++-7 -pthread -o main main.cpp
> ./main
487.954 seconds
499.51 seconds
51.6898 seconds
>
```

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Files | main.cpp | main

```
main.cpp
41
42 floatTime = clock() - floatTime;
43 double floatTime_taken = ((double)floatTime)/CLOCKS_PER_SEC;
44 std::cout << floatTime_taken << " seconds" << std::endl;
45
46 //memory benchmark
47 clock_t arrayTime;
48 arrayTime = clock();
49 int64_t benchArr[1000000];
50 int64_t read;
51 //write in elements
52 for(int e = 0; e < 5000; e++){
53     for(int64_t f = 0; f < 1000000; f++){
54         benchArr[f] = f;
55     }
56 }
57 //read elements
58 for(int g = 0; g < 5000; g++){
59     for(int64_t h = 0; h < 1000000; h++){
60         read = benchArr[h];
61     }
62 }
63 arrayTime = clock() - arrayTime;
64 double arrayTime_taken = ((double)arrayTime)/CLOCKS_PER_SEC;
65 std::cout << arrayTime_taken << " seconds" << std::endl;
66 return 0;
67 }
```

```
clang version 7.0.0-3-ubuntu18.04.1 (tags/RELEASE_700/final)
> clang++-7 -pthread -o main main.cpp
> ./main
396.729 seconds
479.302 seconds
46.548 seconds
> []
```

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45 }
```

```
clang version 7.0.0-3-ubuntu18.04.1 (tags/RELEASE_700/final)
> clang++-7 -pthread -o main main.cpp
> ./main
421.820 seconds
479.827 seconds
48.812 seconds
> []
```

10. A table recording the results of all the benchmarks:

	Benchmark 1	Benchmark 2	Benchmark 3	Benchmark 4
Execution Time	390 s	450 s	50 s	290s
Reference Time	100 s	500 s	100 s	1000
Spec Ratio	0.26 s	1.11 s	2.00 s	3.45

11. The calculation of a single number to summarize the results of all four benchmarks:
17.05

$$((100 \div 390) + (500 \div 450) + (100 \div 50) + (1000 \div 290)) = 6.82$$

$$6.82 \div 4 = 1.705$$

$$1.705 \div (100 \div 1000) = 17.05$$