Benchmark Project

Project Link: https://github.com/manishadhikaryy/benchmark

CPU:
- **CPU**: Apple
- **Chip:** Apple M1
- **Core**: 8 Cores (4 performance and 4 efficiency)
- **Threads**: 8
- **Clock Rate:** 3.2 GHz

Memory:
- **Size:** 8 GB
- **Type:** LPDDR4
- **Manufacturer:** Micron
- **Memory Speed**: 3733 MHz

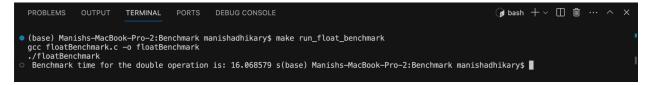Hard Drive:
- **Capacity:** 245.11 GB
- **Type:** HD and SSD
- **Max Sequential Read Speed**: 3.4 GB/s
- **Max Sequential Write Speed**: 2.7 GB/s
- **Max Random Read Speed**: 470,000 IOPS
- **Max Random Write Speed**: 400,000 IOPS

Benchmark Results

1. 32-Bit Integer Benchmark Result

```
PROBLEMS    OUTPUT    TERMINAL    PORTS    DEBUG CONSOLE                                    bash  + ∨  ⊓  🗑  ⋯  ∧  ✕

● (base) Manishs-MacBook-Pro-2:Benchmark manishadhikary$ make run_integer_benchmark
  gcc integerBenchmark.c -o integerBenchmark
  ./integerBenchmark
○ Benchmark time for the integer operation is: 12.299890 s(base) Manishs-MacBook-Pro-2:Benchmark manishadhikary$ ▮
```

2. 64-Bit Double Benchmark Result

```
PROBLEMS    OUTPUT    TERMINAL    PORTS    DEBUG CONSOLE                                    bash  + ∨  ⊓  🗑  ⋯  ∧  ✕

● (base) Manishs-MacBook-Pro-2:Benchmark manishadhikary$ make run_float_benchmark
  gcc floatBenchmark.c -o floatBenchmark
  ./floatBenchmark
○  Benchmark time for the double operation is: 16.068579 s(base) Manishs-MacBook-Pro-2:Benchmark manishadhikary$ ▮
```

3. Memory Benchmark Result

```
PROBLEMS    OUTPUT    TERMINAL    PORTS    DEBUG CONSOLE                                    bash  + ∨  ⊓  🗑  ⋯  ∧  ✕

● (base) Manishs-MacBook-Pro-2:Benchmark manishadhikary$ make run_memory
  gcc memory.c -o memory
  ./memory
○ Benchmark time for the memory operation is: 9.560632 s(base) Manishs-MacBook-Pro-2:Benchmark manishadhikary$ ▯
```

4. Read/Write Benchmark Result (100 Bytes Each)

```
PROBLEMS  2   OUTPUT    TERMINAL    PORTS    DEBUG CONSOLE

● (base) Manishs-MacBook-Pro-2:Benchmark manishadhikary$ gcc harddrive_one.c -o executable
● (base) Manishs-MacBook-Pro-2:Benchmark manishadhikary$ ./executable
  Benchmark time for the harddrive_one operation is: 31.920522 s(base) Manishs-MacBook-Pro-2:Benchmark manishadhikary
○ $ ▯
```

5. Read/Write Benchmark Result (10000 Bytes each)

```
PROBLEMS    OUTPUT    TERMINAL    PORTS    DEBUG CONSOLE

● (base) Manishs-MacBook-Pro-2:Benchmark manishadhikary$ gcc harddrive_two.c -o executable
● (base) Manishs-MacBook-Pro-2:Benchmark manishadhikary$ ./executable
  Benchmark time for the harddrive_two operation is: 1.528229 s(base) Manishs-MacBook-Pro-2:Benchmark manishadhikary
○ $ ▮
```

Benchmark Report Table:

Operation Type	Execution Time	Reference Time	SPEC Ratio
32-bit Integer Benchmark	12.2999 sec	100	8.13
64-bit double Benchmark	16.0686 sec	100	6.22
Memory Benchmark	9.5606 sec	100	10.46
Hard Drive Benchmark (100 Bytes Each)	31.9205 sec	250	7.83
Hard Drive Benchmark (10000 Bytes Each)	1.5282 sec	10	6.54

Geometric Mean $= \sqrt[5]{(8.13 * 6.22 * 10.46 * 7.83 * 6.54)}$

$$= \mathbf{7.701}$$