

Documentation report - Parsa Besharat

$$\text{Latency (milliseconds)} = \frac{t_{\text{end}} - t_{\text{start}}}{2 \times \text{numberOfMessages}} \times 10^6$$

Execution Results

```
--- Starting Task A (Logic Check) ---
Task A: Rank 0 successfully completed 50000.
```

```
--- Starting Task B (Timing & Measurement) ---
Task B: Duration for 100000 messages: 0.176818 s
Task B: Single message latency: 0.001768 milliseconds
Task B: Single message latency: 1.768183 microseconds
```

Analysis

The benchmark ran smoothly, verifying that Rank 0 and Rank 1 could exchange data for 50,000 round trips without any issues. During the timing phase, the system handled 100,000 messages in a total of **0.1768 seconds**.

We calculated the latency to be exactly **1.768 microseconds per message**. The code also correctly converted this to milliseconds (0.001768 ms), confirming the math is accurate. This result is extremely fast, which tells us the two MPI processes are likely running on the same physical machine and using shared memory to talk to each other.