Week8 Lab1 Report

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1. Identify Top MPI Functions

List the top three MPI functions that consume the most time in the application. Provide a brief explanation for why you think these functions are the most time-consuming.

1. `MPI_File_open`: Time-consuming due to coordination overhead between processes accessing the file system in parallel.
2. `MPI_Allreduce`: Requires synchronization and data exchange among all processes, creating communication bottlenecks, especially with large data.
3. `MPI_File_close`: Involves synchronization to ensure all processes have completed their I/O operations before closing the file.

Communication Event Statistics (836.42% detail, −2.0151e−01 error)							
	Buffer Size	Ncalls	Total Time	Min Time	Max Time	%MPI	%Wall
MPI_File_open	0	32	0.176	2.840e−04	1.072e−02	642.72	1.55
MPI_Allreduce	4	144	0.018	3.386e−05	1.310e−03	67.57	0.16
MPI_File_close	0	32	0.014	4.830e−04	1.606e−03	51.69	0.12
MPI_File_read_at	25000	15	0.011	8.969e−04	8.969e−04	38.82	0.09
MPI_Sendrecv	24576	270	0.009	7.868e−06	1.319e−03	32.24	0.08

Figure 1: Top MPI Functions

2. Visualization

Paste the pie chart generated by the IPM profiler that illustrates the time distribution across different MPI functions in your application.

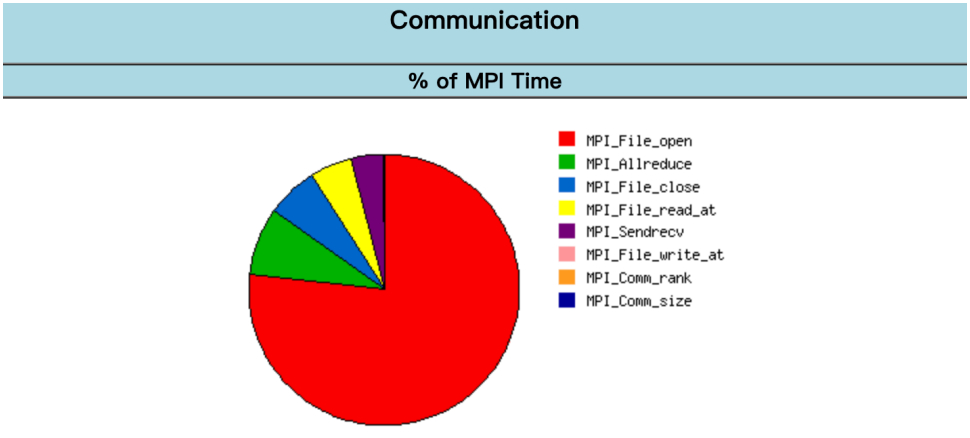

Figure 2: MPI Function Time Distribution