

High Performance Computing
Assignment 4
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The code for all the questions can be found at

<https://github.com/SripranavSureshKumar/HPCSpring2022/tree/main/homework4>

Question 1

Vector Vector Multiplication ($N = 2^{25}$)

Machine	Bandwidth (GB/s)	Error
CPU (on cuda1)	22.178022	
cuda1	132.159898	0.000000
cuda2	281.832212	0.000000
cuda3	593.779978	0.000000
cuda5	108.561739	0.000000

Matrix Vector Multiplication ($N = 2^{10}$)

Machine	Bandwidth (GB/s)	Error
CPU (on cuda1)	1.770986	
cuda1	25.665636	0.000000
cuda2	55.232165	0.000000
cuda3	81.902430	0.000000
cuda5	19.571795	0.000000

Question 2

2D Jacobi ($N = 2^7$)

Machine	Time (s)	Error
CPU (on cuda1)	0.452512	
cuda1	0.007730	0.000812
cuda2	0.005319	0.000842
cuda3	0.003457	0.000897
cuda5	0.010404	0.000814

Question 3

TOPIC: Parallel Fraudulent Transaction Detection in Ethereum Blockchain data using MPI

Proposed Steps:

- 1) Setup of Greene Cluster. - **COMPLETED**
- 2) Data sourcing, parsing and transformation - **COMPLETED**
 - a) Parallel read of dataset by multiple processors - **COMPLETED**
- 3) Distributed Transaction Graph construction:
 - a) Parallel Sort to globally sort addresses using processor communication - **COMPLETED**
 - b) Mapping addresses to global id of sorted addresses using processor communication - **COMPLETED**
 - c) Grouping transactions to form adjacency lists - **TO BE COMPLETED**
- 4) Distributed Blacklisted Node Trace Forest Creation
 - a) Local operations within the processor - **COMPLETED**
 - b) Communication between processors - **TO BE COMPLETED**
 - c) Cumulative Forest - **TO BE COMPLETED**