# CSE4001 - Parallel and Distributed Computing

# Lab 21+22

# Lab Assignment- 5

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# QUESTION:

Write a C program to handle message passing in the MPI application interface using Group Operators: Scatter and Gather.

# CODE:

#include <mpi.h>

#include <stdio.h>

#include <stdlib.h>

int main(int argc, char \*\*argv) {

int size, rank;

MPI\_Init(&argc, &argv);

MPI\_Comm\_size(MPI\_COMM\_WORLD, &size);

MPI\_Comm\_rank(MPI\_COMM\_WORLD, &rank);

int \*globaldata=NULL;

int localdata;

if (rank == 0) {

globaldata = malloc(size \* sizeof(int) );

for (int i=0; i<size; i++)

globaldata[i] = 3\*i+2;

printf("Processor %d has data: ", rank);

for (int i=0; i<size; i++)

printf("%d ", globaldata[i]);

printf("\n");

}

MPI\_Scatter(globaldata, 1, MPI\_INT, &localdata, 1, MPI\_INT, 0, MPI\_COMM\_WORLD);

printf("Processor %d has data %d\n", rank, localdata);

localdata \*= 2;

printf("Processor %d doubling the data, now has %d\n", rank, localdata);

MPI\_Gather(&localdata, 1, MPI\_INT, globaldata, 1, MPI\_INT, 0, MPI\_COMM\_WORLD);

if (rank == 0) {

printf("Processor %d has data: ", rank);

for (int i=0; i<size; i++)

printf("%d ", globaldata[i]);

printf("\n");

}

if (rank == 0)

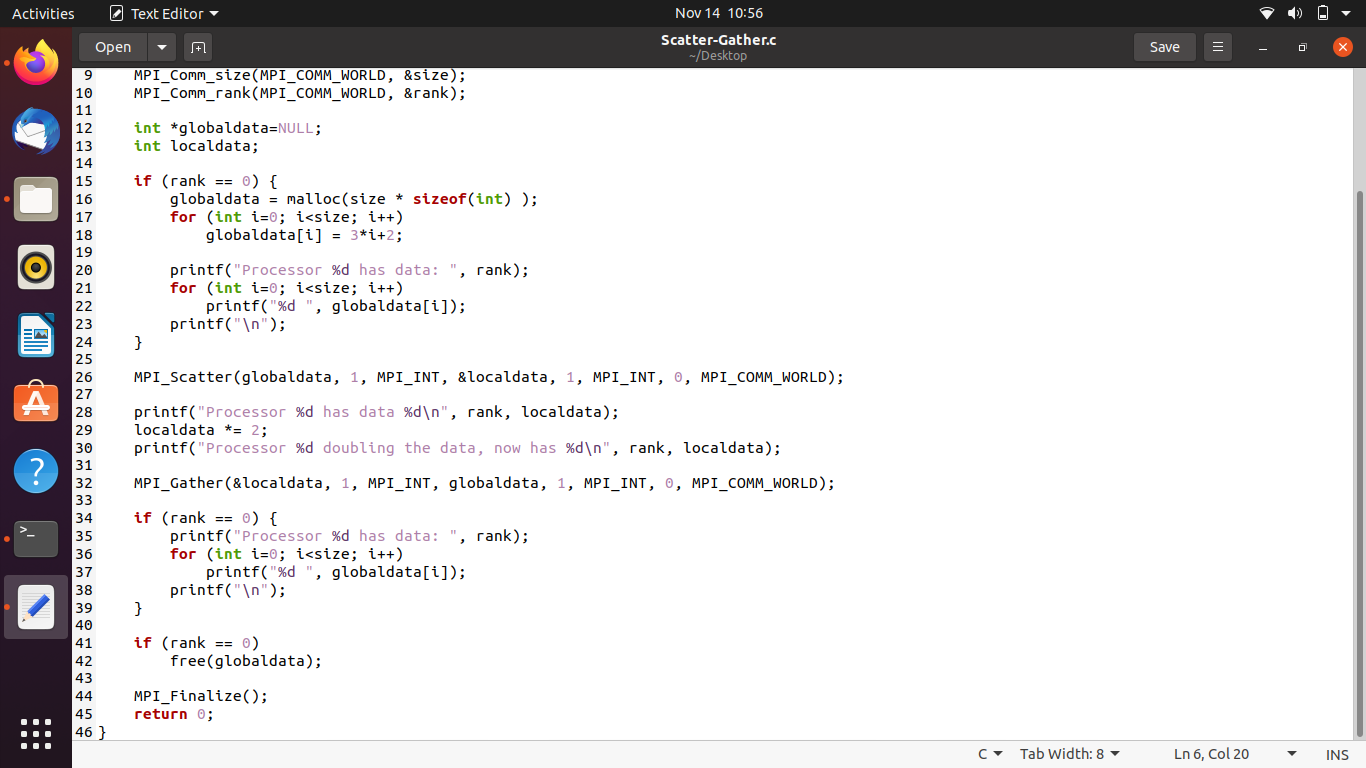
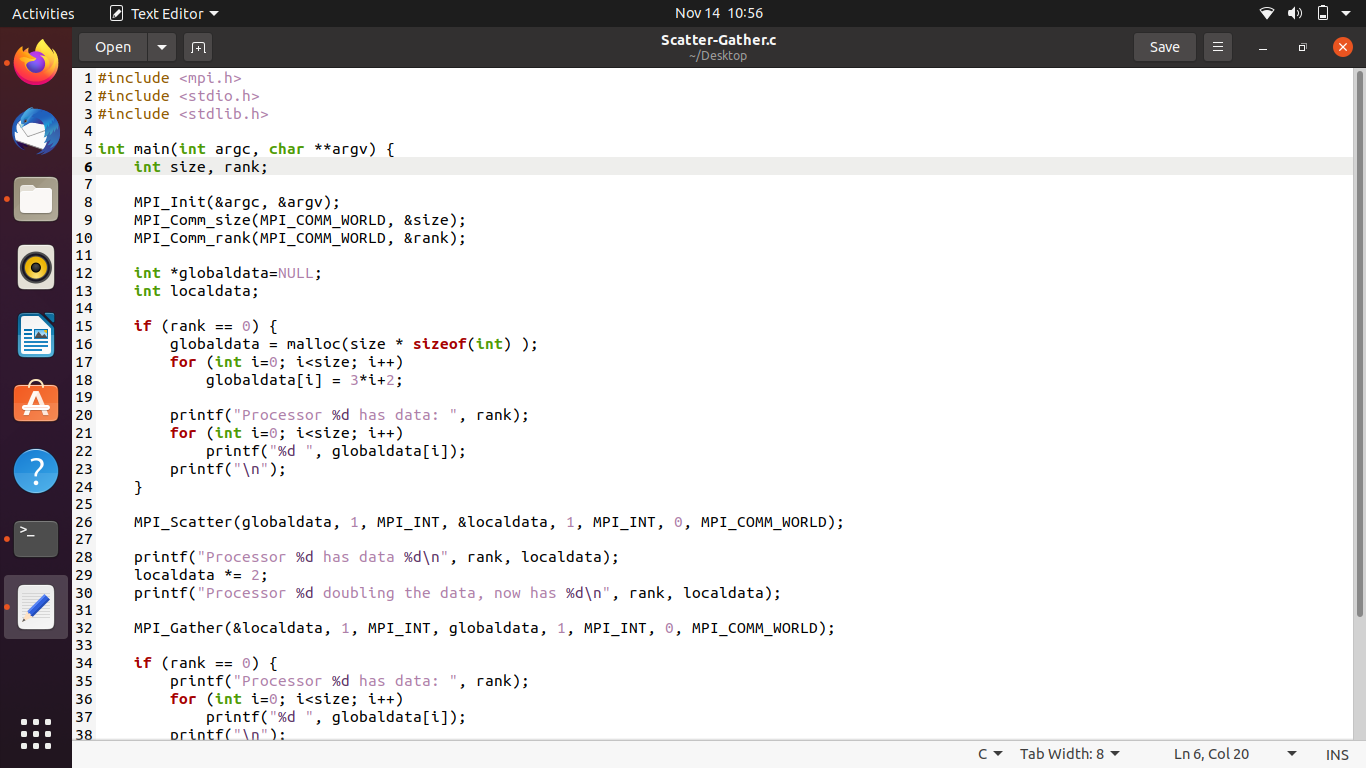
free(globaldata);

MPI\_Finalize();

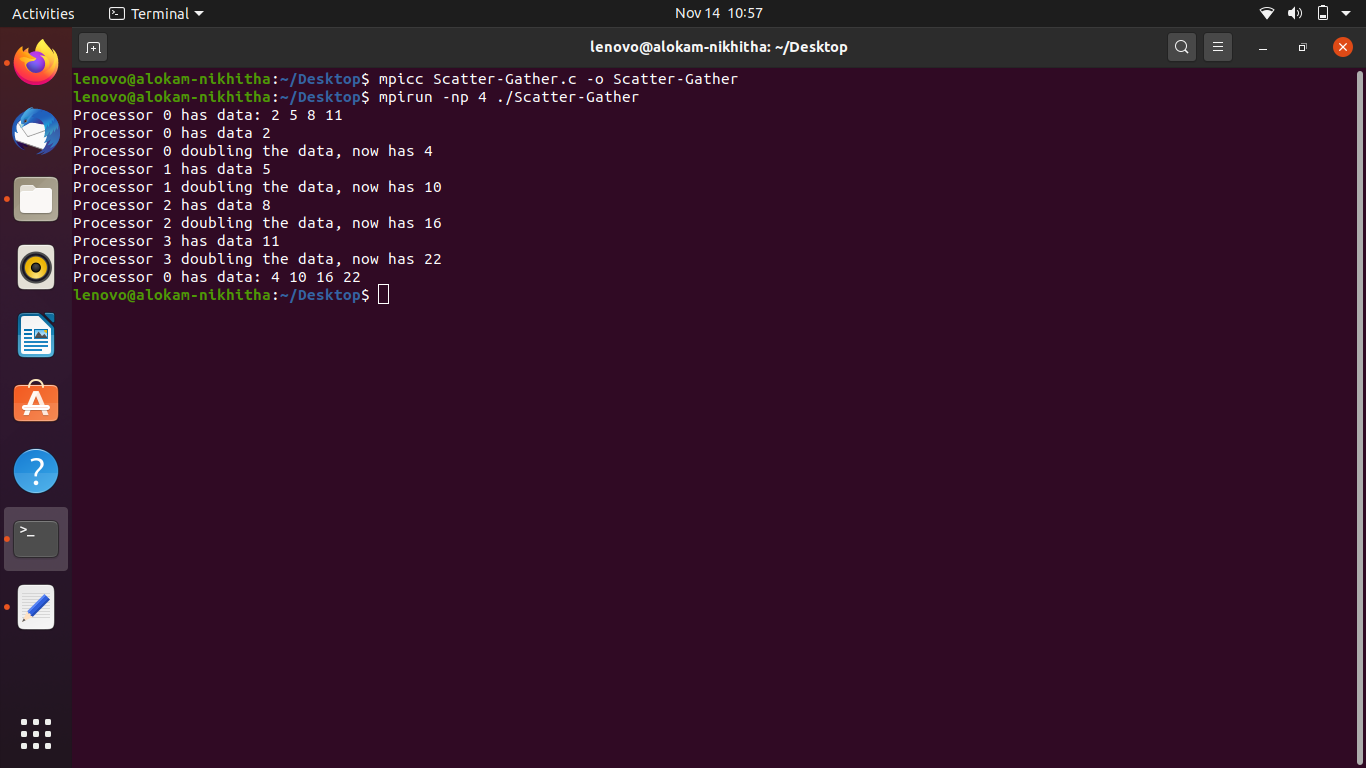
return 0;

}

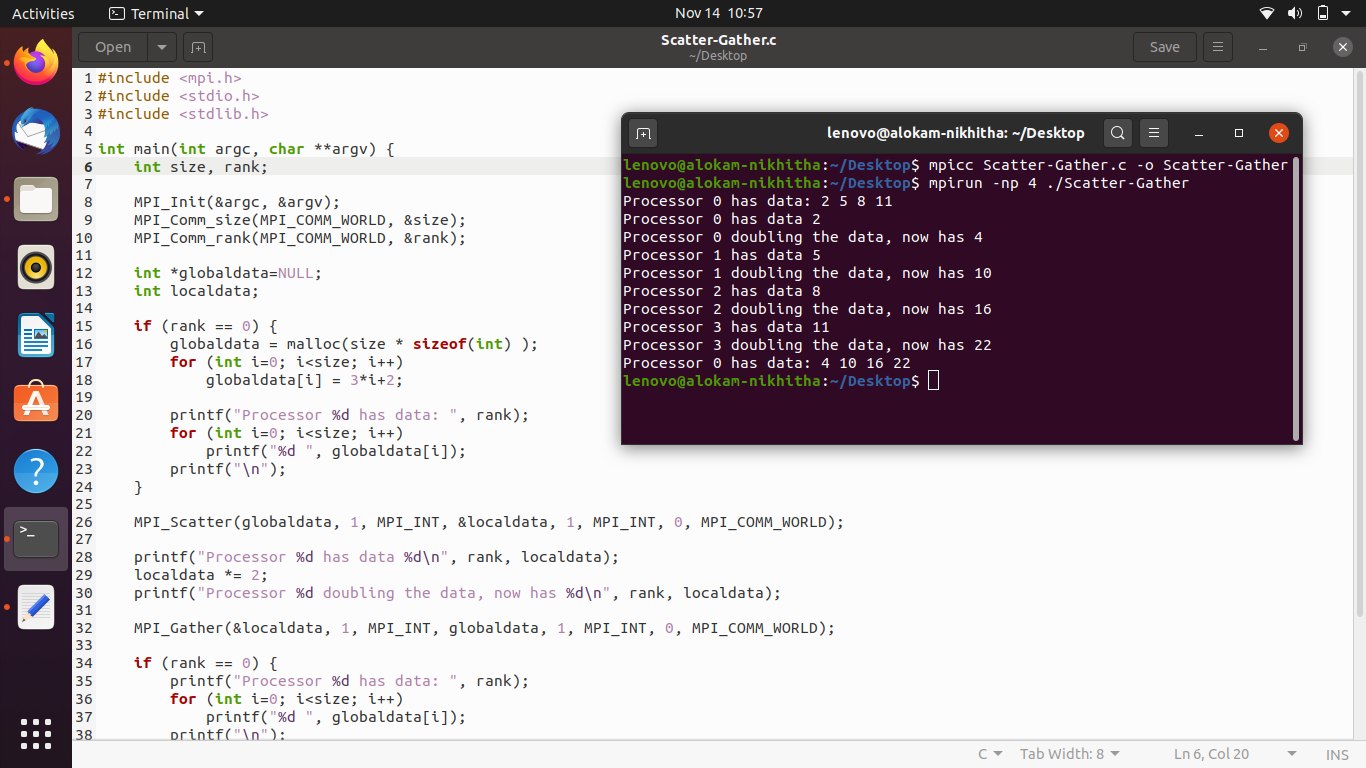
# Code Snippets:

****

# OUTPUT:

****

**OUTPUT WITH CODE:**

****

Result and Inferences:

* We are passing the messages using MPI\_Scatter and MPI\_Gather Commands.
* Initialized the value in array as 3i+2 where i is the index of the array.
* We doubled its value during using different allocation named ldata.
* We used MPI\_Gather command to read data of ldata allocation.
* Finally, We print the values of our initial allocation to check for the results.