Solved Problems - Collective Communications

Problem 2

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Consider a scenario where you have a large dataset that needs to undergo a specific transformation, and the goal is to efficiently parallelize this transformation process using MPI. The dataset is initially distributed among MPI processes, and each process is responsible for transforming its local portion of the data. After the transformation, the results should be gathered to construct the final transformed dataset.

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In this problem, you can consider the `DATA_SIZE` to be 100 and the number of processes to be 5. Also you can assume that the `DATA_SIZE` is a multiple of the number of processes so that we can evenly distribute the work for each process.

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You can suppose that the dataset contains integer numbers in the range [1,`DATA_SIZE`].

The transformation is the square function, so that:

Given an element x , the transformed element is $x \bullet x$

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Hint: This is a problem that involves using **`MPI_Scatter`** to scatter the data, and then **`MPI_Gather`** to gather the results.