MPI HW： Convert color image to gray image

In this homework, you are required to use MPI to redo your homework to convert color image to gray image. This is a practice about MPI. We do not expect huge performance increase for it.

You need to carefully design your code in a MPI way. Assign a master and the others are workers. And you can outline the job in the following way:

1. Master reads the jpg file.
2. Divide the image into several parts, as even as possible. Some residual left for the master. (For example, you have an image with 100 rows. You separate it to 3 workers. Each worker convert 33 rows. And the last row left for the master to convert. )
3. Master broadcasts the number of pixels to the workers.
4. Each worker allocate memory to store the color of pixels.
5. Master scatters the pixel colors to the workers. You can use function MPI_Scatter to do this.
6. Each worker does the color conversion to gray color. Master also finishes the residual part.
7. Master gathers the converted pixel colors back. You can use function MPI_Gather to do this.
8. Master writes the gray image to a jpg file.

You can learn how to use MPI_Scatter and MPI_Gather from
http://mpitutorial.com/tutorials/mpi-scatter-gather-and-allgather/

Test your code with different processes.

Write a final report and submit together with your code.