Assignment 2

Write a C program to enlarge a given image. The images to be transformed are given in PPM ASCII format.

For simplicity, consider files with the following restrictions:

- file type: P3, followed by a newline character
- no comment line after the file type specification
- width (number of columns) and height (number of rows) formatted in ASCII decimal in the second line, separated by a space
- maximal value given in the third line followed by a newline character

What to do:

- Let the given pixel matrix be rows*columns. The enlarged matrix should
  - add one row between every two neighboring rows in the original matrix where the value of each new pixel is the average of the values of the two pixels in the neighboring rows and in the same column;
  - analogously add one column between every two neighboring columns.
- Change the header to reflect the change of the number of rows and number of columns.

Parallel execution:

- Read the pixel matrix into a buffer.
- For each row *i* (*1* <= *i* < *rows*), use *fork()* to create a child process to calculate the new row between row *i* and *i+1*, and to write row *i* and this new row into the transformed file.
- The parent process waits for the child process to terminate before processing the next row.
- The original process will write the last row into the transformed file.

Requirements:

- The picture is given in a PPM file and your program should put the converted one into another PPM file.
- Use argv[1] for the given file and argv[2] for the converted file. In addition, you can use a temporary file called tmp.ppm.
- The number of rows and columns are not fixed numbers.
- The converted file should also follow the PPM format with the above simplification, and can be converted subsequently.

A sample file is given for testing. The following images are from this sample and its first transformation.