MCS 572, Spring 2008
Homework for week 3

1. Write the serial C program to shift the image by $N_x$ and $N_y$ points in the horizontal and vertical direction, respectively, where $N_x$ and $N_y$ should be supplied as command line arguments. The shift should be wrapped-around the image domain, i.e. if the point is shifted beyond the boundary of the domain, it should pop out from the opposite side of the domain (think of a toroidal domain). For the input image you can take the bitmap of the Mandelbrot set. The program should output the postscript image just like the mandelbrot.c.

2. Write the parallel version of the same program using the static load distribution. For that, divide the domain into $p$ equal parts (where $p$ is the number of assigned processors), send each part to its processor in the beginning of computation, and receive the set of new coordinates in the end of computation for all points at once.

3. For the $1000 \times 1000$ bitmap, perform the computation with 1 (serial), 2, 4, 8 and 16 processors. Estimate the speedup and efficiency.