CS 491/521 Parallel Programming
Homework 3: OpenMP
Due: 10/27, Thursday, 11:59 pm

Optimize the performance of the following code (template on Canvas) using OpenMP as well as other techniques you have learned in the class:

```
for(iter=0; iter<maxiter; iter++)
 {
     maxdiff = 0;
     for(i=1; i<N+1; i++)
         for(j=1; j<N+1; j++)
         {
                 xnew[i][j] = 0.25*(xold[i-1][j]+xold[i+1][j]+xold[i][j-1]+xold[i][j+1]);
                 if ((thisdiff=fabs(xnew[i][j]-xold[i][j]))>maxdiff)
                         maxdiff = thisdiff;
         }
     if(maxdiff<epsilon)
     {
         printf("Solution converged in  %d iterations\n",iter+1);
         printf("Solution at center of grid : %f\n",xnew[(N+1)/2][(N+1)/2]);
         break;
      }
     for(i=1; i<N+1; i++)
         for(j=1; j<N+1; j++)
                 xold[i][j] = xnew[i][j];
}
```

Write a report about how you perform the optimization, and explain any unexpected results you observed. Also, for measuring the performance, you should run the code for at least 3 times and report the average performance.

A template code will be provided, which you can edit to create your optimized version (note that the template code includes measurements of execution time as well as a check for verifying correctness).

Submit your report as well as your optimized code to Canvas. Your report should also include instructions for the TA about how to compile and execute your code on a CS departmental machine.