CS294 Homework 2
Due 10/11/11

September 30, 2011

1. Implement SparseMatrix.cpp, get TestMatrix to execute without errors for a wide range of input values [0...150]. The operations specified should be exact in floating point arithmetic.

2. Implement FEPoissonOperator.cpp, both assemble matrix, and build RHS. As a handy item for building the rhs vector, keep in mind that the value of any linear basis function at the centroid of a triangular element is 1/3. This can be derived from barycentric coordinates.

   - FEMain.cpp verifies you have built a symmetric and positive non-zero diagonal matrix. Write a function to verify the assembled matrix is also diagonally dominant.
   - JacobiSolver can operate with an alpha as high as 0.85 for these grids. Tolerance refers to the ratio of norm(residual)/norm(rhs). have your Jacobi solver report the initial norm(rhs), the final norm(residual)/norm(rhs), and the number of iterations it takes to converge. max norm is fine.
   - reinsert puts the internal nodal solution back into the global ordering, with zero in all the boundary value locations.

3. submit a .png file of a plot of solution.vtk for all meshes provided from visit with the default color range and color scheme. the plot should have both the Mesh and Pseudocolor of "nodeData" variable field.