Initialize Field with $V_0(i,j)=0$ except for points defining the boundary conditions. (Subscripts will indicate the code iteration step.)

For all Points in Volume Not on Fixed Boundary, Assign a new value $V_n(i,j) = (1/8)\ [V_{(n-1)}(i+1,j-1)+ V_{(n-1)}(i+1,j) + V_{(n-1)}(i+1,j+1)+ V_{(n-1)}(i,j-1)+ V_{(n-1)}(i,j+1)+ V_{(n-1)}(i,j+1)+ V_{(n-1)}(i-1,j-1)+ V_{(n-1)}(i-1,j)+ V_{(n-1)}(i-1,j+1)]$

(in other words, assign a new value $V_n(i,j)$ = the average of all its two-dimensional neighbors in the previous iteration (n-1)).

Leave Points Defining the Boundary Conditions Unchanged.

Note that the quantities on the RHS of the equation are taken from the PREVIOUS iteration step, so that the LHS gives V(i,j) at computational time-step n computed from the 8 spatial neighbors at iteration step (n-1).

NO

Is $\max_{(i,j)}(|V_n(i,j)-V_{(n-1)}(i,j)|) <=$ some tolerance for convergence of the solution?

YES

Congratulations. You've found a numerical solution to Laplace's equations for the specified Boundary Conditions. $V_n(i,j)$ is approximately V(i,j) with an uncertainty a few times your tolerance.