24.781 Computational Electromagnetics
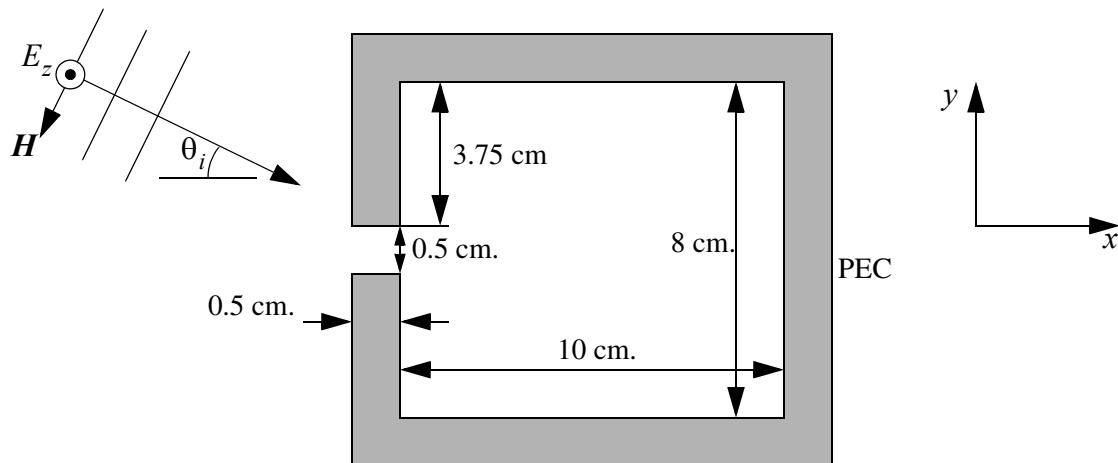
ASSIGNMENT 2
Solution of Time-Domain Problems by Finite Difference Methods

October 26, 2005   **Due Date: Thursday, November 10, 2005**

Write a 2-D FDTD program to solve the shielding problem shown in the figure.

The incident plane-wave is polarized as transverse-magnetic to the z-direction (*i.e.*, only an E_z component of the electric field exists and there is no H_z component of the magnetic field). Use the scattered-field formulation of FDTD and plot the shielding effectiveness as a function of frequency for 100 MHz to 6 GHz. The shielding effectiveness is defined as:

$$SE = -20\log\left(\frac{\max E_z \text{ inside shield}}{\text{value of } E_z \text{ without shield}}\right)$$

Do this for various angles of incidence from $\theta_i = 0$ to $\theta_i = \pi$. Use any absorbing boundary conditions you like to terminate the grid.