Special Problem 6-4.2

Consider two **conducting cubes** with a **difference** in electric potential of V_s volts.

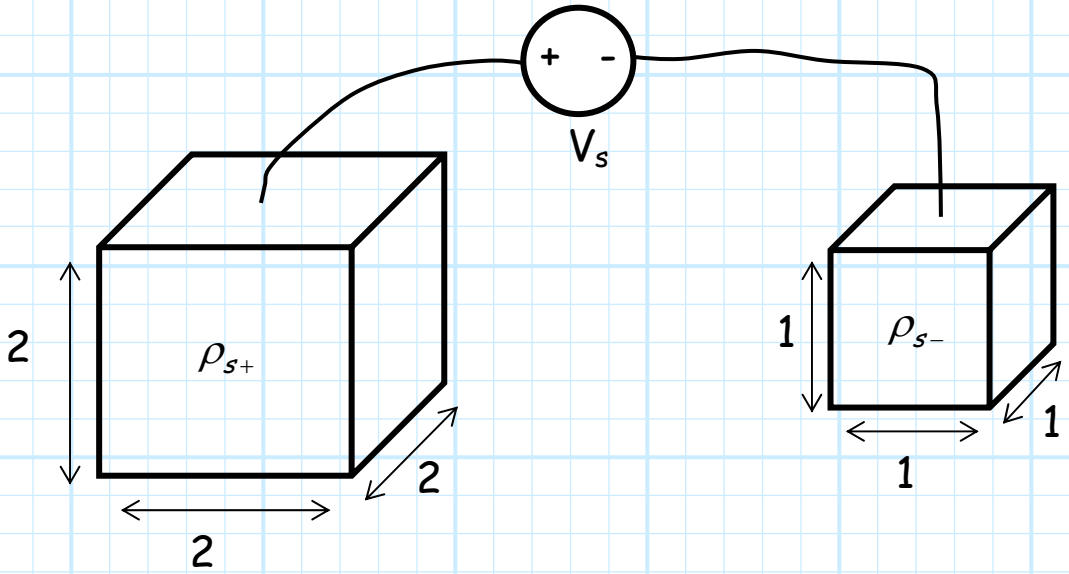
Each edge of the **first** cube is **two** meters in length, and the cube is completely covered (all 6 sides) with surface charge of density:

$$\rho_{s+}(\bar{r}) = \frac{1}{8} \quad \left[\frac{C}{m^2}\right]$$

Each edge of the **second** cube is **one** meter in length, and it is completely covered (all 6 sides) with surface charge of density:

$$\rho_{s-}(\bar{r}) = -\frac{1}{2} \quad \left[\frac{C}{m^2}\right]$$

It took **4.5 Joules** of work to create these charge densities.



Determine the **capacitance** of these conductors, **and** the value (in volts) of $\mathbf{V_s}$.