1. (a) The mass of a single atom of ^{235}U is $(235\,\text{u})(1.661\times10^{-27}\,\text{kg/u}) = 3.90\times10^{-25}\,\text{kg}$, so the number of atoms in 1.0 kg is $(1.0\,\text{kg})/(3.90\times10^{-25}\,\text{kg}) = 2.56\times10^{24}$. An alternate approach (but essentially the same once the connection between the "u" unit and N_A is made) would be to adapt Eq. 43-20.

   (b) The energy released by N fission events is given by $E = NQ$, where Q is the energy released in each event. For 1.0 kg of ^{235}U, $E = (2.56\times10^{24})(200\times10^{6}\,\text{eV})(1.60\times10^{-19}\,\text{J/eV}) = 8.19\times10^{13}\,\text{J}$.

   (c) If P is the power requirement of the lamp, then $t = E/P = (8.19\times10^{13}\,\text{J})/(100\,\text{W}) = 8.19\times10^{11}\,\text{s} = 2.6\times10^{4}\,\text{y}$. The conversion factor $3.156\times10^{7}\,\text{s/y}$ is used to obtain the last result.