Queen Mary
University of London

Complex Networks (MTH6142)
Formative Assignment 10

- **1. The average number of friends of someone friends**
  Given a random uncorrelated network with degree distribution $P(k)$.
  a) Show that

$$\frac{\langle k^2 \rangle}{\langle k \rangle} \geq \langle k \rangle \tag{1}$$

  where the equal sign holds only for the regular networks (all the nodes with the same degree).
  b) Motivate that this result justify the social network paradox summarized in the following sentence: *Your friends have more friends than you do!!*
  Assume for simplicity that the social network is not regular, and that the network is uncorrelated.