Problem of the week #7

Due March 13th

**Problem.** Show, with proof, there exists a rearrangement $m_1, m_2, m_3, \cdots$ of the natural numbers $1, 2, 3, \cdots$, a constant $c < 1$, and a bound $N$ for which

$$\sum_{k=1}^{n} \frac{1}{m_k} < c \sum_{k=1}^{n} \frac{1}{k}$$

for all $n \geq N$.

**Note.** Defining the $n$th harmonic number $H_n = 1 + \frac{1}{2} + \cdots + \frac{1}{n}$, you may use the fact that $0 < H_n - \ln n < 1$ for all $n > 1$.

- Partial credit may be given for partial answers.
- Each POW will be due the following week at 1pm.
- Questions? Email: bthorner@unomaha.edu
- Submit solutions to (above email), DSC 210, or DSC 203.
- POWs, solutions, backgrounds, leaderboard available at