

# CSC 400 Estimation Questions

September 7, 2005

Document your sources and describe your reasoning and assumptions in answering the following questions.

- Estimate the total amount of gold dissolved in the world's oceans. Estimate the cost of recovery (per unit mass) with best current technology. Compare with current price of gold.
- Estimate the available energy content per unit mass of granite due to contained trace amounts of uranium. Compare to energy content of coal. Estimate cost of extraction (e.g. to usable uranium dioxide) with known technology. Compare to cost of mining coal with equivalent energy.
- Estimate the total number of ants in the world. Estimate their total biomass. Compare to the total human biomass.
- If methods of oxygen replacement (e.g. photosynthesis) were eliminated, estimate the time it would take for all human activity (respiration, animal husbandry, industry etc.) to render the atmosphere unbreathable due to oxygen depletion. If all additional CO<sub>2</sub> sinks were also eliminated, how long would it take to render the atmosphere unbreathable due to CO<sub>2</sub> accumulation? Compare to the time it would take food to run out if photosynthesis were shut down.
- Estimate the total amount (mass) of matter that is part of an average human body during their lifetime. Don't count air briefly contained in the lungs, but not incorporated into the body. How many atoms in a glass of California chardonnay were once part of Julius Caesar?
- Estimate the number of mosquito bites needed to remove a dangerous amount of blood from an individual. Estimate the amount of human blood annually sucked by mosquitoes (worldwide). How much is donated?