Bioinformatics and Bioinformatic Tools, Fall 2018
Homework 1: Curiosity will not kill you
Due Aug 27 at start of class

1. What is *antibiotic resistance* and why is it a public health crisis? What is the name of a new antibiotic reported in *Nature* in 2015 that kills pathogens without detectable resistance?

2. Watch the CBS 60 minutes episode titled "The Alzheimer's Laboratory". If you are unable to find the video clip of the show, you can find a script of the show at: `https://www.cbsnews.com/news/60-minutes-alzheimers-disease-medellin-colombia-lesley-stahl/`. The show is about a small town in Antioquia in Colombia with an unusually large number of severe cases of early-onset Alzheimer's disease. It is also an inspiring human story of a persistent local doctor called Francisco Lopera and the massive effort to come to grips with a great mystery.

   After you watch the two episodes, write a few sentences on where you saw a role for Bioinformatics and for the collaboration between computing and life sciences.

3. What is the C-value of an organism? What is its relationship to the genome size? Read about the *C-value enigma* in:

   - Gregory, TR (2004). "Macroevolution, hierarchy theory, and the C-value enigma". *Paleobiology* **30**:179-202. or
   - Gregory TR (2001). "Coincidence, coevolution, or causation? DNA content, cell size, and the C-value enigma". *Biological Reviews* **76**(1): 65101

4. Name at least one organim that is relatively smaller than humans in size and whose genome is considerably larger than that of humans. How big is that genome?

5. What is the *Ferrari of the virus world* and why is it called so?

6. What is the *1000 Genomes* project? Look at: `http://www.nature.com/nature/focus/1000genomes/`

7. What is the iPhone App called *LeafSnap*?

8. Investigate at least one cell phone App that measures something related to nature, environment, human health/wellness, diet, nutrition, public health. Summarize the features in that App. Tell me briefly why I might want to download that App. Generate at least one related question the App does not address.