20.180:Introduction

Key Concepts from Day 1

1. Develop a crisp answer to the question "What is Biological Engineering?" (see below).
2. Understand how DNA synthesis lets you "write" DNA.
3. Understand how DNA sequencing and synthesis technologies complement one another, allowing interconversion between genetic material (DNA) and genetic information (...ATCG...).
4. Recognize the challenge of going from (A) imagining an engineered biological system that you might want (for example, a genetic oscillator or a self-growing tree house) to (B) the actual DNA sequence that programs a living system to produce your imaginable system.

Preliminary Assessment Q&A

- **What is Biological Engineering?**
  - Biological Engineering is the characterization, analysis, and design of natural and synthetic biological systems for useful purposes.

- **What does DNA do?**
  - DNA is the genetic material that encodes the information which defines some of the behavior of biological systems.

- **What is DNA sequencing?**
  - DNA sequencing is a technology that allows physical genetic material to be "read out," producing a string of information (for example, ATCGTACA...).

- **What is DNA synthesis?**
  - DNA synthesis is a technology that allows raw chemicals to be combined with information to produce physical genetic material.

- **What are some tools or approaches that are useful for solving complex problems?**
  - Decoupling and decomposition, abstraction, standardization, working in a group, taking a deep breath, and many more.

- **Write down, at whatever level of resolution you most prefer, the genetic program that would make a bacterium blink over time - like a little microscopic lighthouse:**

gtaatacggttataggcatcaaataaaacgaaaggctcagtcgaaagactgggcctttcgttttatctgttgtttgtcggtgaacgct
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