

20.180 Assignment #1

Due by 5p Thursday 23 February 2006

Q0. Very basic programming logic (10% of grade).

Write out on paper the output produced at the ____?'s during the following sequence of Python commands.

```
>>>a=3
>>>b=4
>>>a==b
_____? Why do you get this result?
>>>a=b
>>>a
_____?
>>>a==b
_____? Why do you get this result?
```

```
>>>for i in range(1,5):
>>> print i
>>>
>>>_____?
```

```
>>>i=1
>>>while i<5:
>>> i=i+1
>>> print i
>>>
>>>_____?
```

Q1. Read/write, dictionaries, and parts (65% of grade).

Create a *Python* program that (a) reads in part names and part DNA sequences from a *text* input file, (b) constructs a *dictionary* with part names as *keys* linked to DNA sequences as *values*, (c) constructs a <promoter><RBS><ORF><terminator><barcode> composite part, (d) *prints* the DNA sequence data of the composite part to the screen and to an output file. Use the five DNA sequences/parts that are available via the BE.180 wiki [<http://openwetware.org/wiki/BE.180>].

What will this composite part do when placed inside a living bacterium?

Q2. Finding open reading frames (25% of grade).

Write a computer program that finds all open reading frames (ORFs) in a sequence of DNA and outputs the DNA sequences of any found ORFs to a text file. For this problem, ORFs are defined as stretches of DNA that start with the sequence "atg," stop with the sequence "taa," and are at least 50 base pairs long. Run this program on the final DNA sequence produced by your Q1 program.