CSCI 150: Exam 3 Revision Problems

Instructors: Brent Yorgey and Mark Goadrich

Complete these problems by **Wednesday, December 2** for up to half credit on Exam 3. That is, your final grade on Exam 3 will be the average of your initial grade and your grade on these problems. (However, you cannot lose points on the exam if you do worse on these problems than on the exam.)

These problems must be turned in **in person** to Dr. Goadrich or Dr. Yorgey, either during office hours or by making an appointment. You should also feel free to come by for help if you have started the problems but have questions.

1. Write **recursive** versions of the following two functions:

   ```
   def gcd(a, b):
       while b != 0:
           z = a
           a = b
           b = z % a
       return a

   def mod(a, b):
       while a > b:
           a -= b
       return a
   ```

   Clearly comment the base cases and recursive cases.

2. Write a class called `TootsiePop` to represent a hard candy lollipop filled with chocolate-flavored chewy candy. You will have two components, one for the flavor and one for the number of licks. Your `__init__` method should take two parameters, the initial number of licks (an

int) and a flavor (a `string`). You will need three additional methods, `can_lick()` which returns `True` if the `TootsiePop` has licks remaining, `lick()` which removes one lick from the `TootsiePop` if there are licks remaining, and `bite()` which removes all licks.

3. Ada wants to keep track of her phone numbers in a Python program, and decides to use a dictionary. Kurt and Grace are roommates.

```
pb = {"Alan":5551212, "Kurt":5551234, "Grace":5551234}
```

This will work if she wants to look up someones number, but not if she wants use this dictionary for Caller ID. She writes the following code to create a new reverse dictionary indexed by number.

```
def rev_d(d):
    n = []
    for p in d:
        n[d[p]] = p
    return n
```

(a) Unfortunately, Ada has made both semantic and syntactic errors in her code. What are they? How would you fix this code?

(b) Later, Alan tells Ada he now has a mobile phone number as well as his home number. How can Ada alter her code above to accommodate this?