

CS8, Spring 2017, UCSB
Hw8: worth 50% of Lab08 score (50 total points)

Print this form, staple loose pages together, and write your answers on it.

Accepted: On paper, at *your* lab section on Tuesday, May 30.
Place on the front desk as you walk in, before getting seated.

Name (2 pts): _____

Umail (2 pts): _____@umail.ucsb.edu

Lab Time (2 pts) Circle one: 8am 9am 10am 11am

Read section 5.3.1 "Using a while Loop to Process Data" (pp. 173-174). Then skip into Chapter 7 and read the parts of section 7.4.4 entitled "Indefinite Iteration" and "The while loop" (pp. 243-247). Then answer the following questions.

1. Examine the following Python source code that uses a while loop:

```
i = 100
while (i < 499):
    print(i)
    i = i + 100
```

- a. (2 pts) How many times will this loop execute?
- b. (2 pts) what is the value of i after the loop is done executing?
- c. (6 pts) Rewrite the code to use a for loop instead. Be sure the printed results will exactly match the results printed by the while loop above.

2. (10 points: 2 pts each) Some tasks are best handled by "definite iteration" (a for loop), but "indefinite iteration" (a while loop) is better for others. For each task below, specify which type of iteration is best. write "for" or "while" in each case:

- a. Summing the first n values in a list.
- b. Summing the values in a list up to, but not including the first value that is less than 0.
- c. Printing all of the values in a list in order.
- d. Finding the average of values entered by a user, until the user enters the string "quit".
- e. Finding the value of n at which the ratio, $\text{fibonacci}(n)/\text{fibonacci}(n-1)$, is within $1.0e-10$ of the golden ratio. [Remember Lab03.]

3. Page 245 in the text says: "In order to write a correct iterative process using a while loop, it is necessary to include three parts: the initialization, the condition, and the change of state. All of these parts must work together for the iteration to succeed." Study the following loop (from Listing 7.7 on p. 247):

```
aline = datafile.readline()    # line 7
while aline != "":             # line 8
    # processing of aline done on lines 9-12
    aline = datafile.readline() # line 13
```

a. (3 pts) Identify the initialization step (by its line number), and describe its purpose in this example.

b. (3 pts) Identify the condition, and use words to say what must be true for this loop to execute (or alternatively when it will stop executing if you prefer to explain it that way).

c. (4 pts) Identify the change of state, and explain how this part works together with the other two parts to make this loop a correct iterative process.

4. (5 pts) Say what is wrong with the following, and what must be done to fix it:

```
i = 0
while (i < 4):
    print(i)
# SPECIAL NOTE: we suggest you do NOT
# type this in and run it - but if you
# do, use ctrl-C to stop it.
```

From chapter 6, read through section 6.2 (pp. 185-192). Then answer these questions:

5. (4 pts) what are the (specific) effects of executing the following statements?

```
from cImage import *
window = ImageWin("My Drawing", 300, 300)
```

6. (5 pts) [Continuing from 5] Describe and explain the effects of the following.

```
image = EmptyImage(300, 300)
redPixel = Pixel(255, 0, 0)
for i in range(100, 200):
    for j in range(100, 200):
        image.setPixel(i, j, redPixel)
image.draw(window)
```

End of Hw8