CSE505 – Spring 2021
Assignment 2 – Problem 2
(may be done by a team of two students)
Due Date: **Sunday, March 20** (11:59 pm, online submission)

Problem 1 was posted in A2.pdf. Below is Problem 2. Problem 3 will be posted later.

2 (a) Define a Python generator, called `flatten`, that takes as input a list of integers with arbitrary levels of nesting and *yields one by one* the integers in the list in left-to-right order. For example, a call such as

```
flatten([[[2],4],[[[[6],8]]],[[10],[[11]]]])
```

should *yield one by one* the values 2, 4, 6, 8, 10 and 11.   Test `flatten` by executing:

```
inlist = [[[2],4],[[[[6],8]]],[[9],[[10]]]]

for x in flatten(inlist):
        if x%2 != 0:
                break
        print(x)
```

The printed list should be the numbers 2, 4, 6, and 8 with one number on each line.

Place your definition of `flatten` and the above tester code in a file `A2_problem.py`. You may run Python on `timberlake` by a command such as:

```
/util/bin/python   flatten.py
```

(b) Follow a systematic approach using higher-order procedures (as described in Lecture 11) in order to re-write your definition of `flatten` and the tester code by eliminating all generators, including the built-in list generator. Name the re-written generator as `flatten2`. Be sure to apply the optimization that minimizes the number of thunk functions used.

Augment the file `A2_problem.py` with the definition of `flatten2` and the re-written tester code. Check that flatten2 and the re-written tester code have the same input-output behavior as the original one.

What to Submit

Prepare a top-level directory named A2_UBITId1_UBITId2 if the assignment was done by two students (list UBITId's in alphabetic order); otherwise, name it as A2_UBITId if the assignment is done solo. In this directory place the files A2_problem1.pdf and `A2_problem2.py`, as well as your solution from problem 3 (TBA).

Compress the directory and submit the compressed file using the online submission procedure – instructions posted at Resources → Assignments → Online_Submission.pdf. Only one submission per team is required.

End of Assignment 2 Problem 2