

# SI 413 Fall 2021: Homework 4

Due Monday, September 20

Your name:

Citations and collaborators:

Comments, suggestions, or questions for your instructor:

Fill out the first row of the table on a 0-5 scale before turning in.

This rubric is also available on the website under “Admin”:

- **5:** Solution is completely correct, concisely presented, and neatly written.
- **4:** The solution is mostly correct, but one or two minor details were missed, or the presentation could be better.
- **3:** The main idea is correct, but there are some significant mistakes. The presentation is somewhat sloppy or confused.
- **2:** A complete effort was made, but the result is mostly incorrect.
- **1:** The beginning of an attempt was made, but the work is clearly incomplete.
- **0:** Not submitted.

Problem	1	2	3	Total
Self-assessment				
Final assessment				

Many of these exercises are programming exercises, but you do not need to submit them electronically.

## 1 To recurse or not to recurse

Given a list of 2-digit numbers, I want to know the largest digit that appears anywhere. For example:

```
(bigdigit (list 53 23 44 36 12)) ; should return 6  
(bigdigit (list 5 81 53)) ; should return 8
```

Write two versions of the `bigdigit` function: one using recursion (like the last HW), and one using the new things we have learned like `apply`, `map`, and `lambda`.

Hint: for the non-recursive version, I recommend you write a `lambda` function that takes a 2-digit number and produces the largest digit in that number. Then use `map` with this lambda function, and finally pass that whole list to an `apply` call that uses the built-in `max`.

a) Recursive version

b) Non-recursive version

## 2 Pushups

A certain sports team scores points in varying increments (2, 3, 6, 7), and after each score, certain fans must perform a number of push-ups corresponding to the total score at that time.

Write a function (`pushups points`) that takes the points from the most recent score, and returns the total amount of push-ups that must be performed at that time. (You will need to use a global variable to hold the current score and the `set!` function to change it!)

For example, if we start with (`pushups 3`), the returned value is 3. But if the next call is (`pushups 7`), the returned value is 10, since that is the total score at that point.

### 3 Pretty-print inches

Write a function (`print-height inches`) that takes a number of inches and prints the feet and inches nicely. For example, calling (`print-height 70`) should cause the following to be printed:

```
5 feet 10 inches
```

Once this works, make it nicer so that, for example (`print-height 73`) prints

```
6 feet 1 inch
```

(notice not inches) and (`print-height 8`) just prints

```
8 inches
```

and any other cases which seem sensible to you.