CS 451
Programming Assignment #3
Scheme
Due 2/20/19, by 6:00am sharp!

The goal of this assignment is to get acquainted with the Scheme programming language (Scheme is a version of Lisp). Do each of the following in Scheme.

(1) Write the function make-list: (make-list n m) returns the list of integers \((n, n+1, \ldots, m)\).
(2) Write the function make-remove: (make-remove n) returns a function that takes a list and returns the elements of that list that are **not** multiples of \(n\). For example,

\[
\begin{align*}
\text{(define f (make-remove 4))} \\
(f '(1 4 5 4 6 7 8 4 2)) & = (1 5 6 7 2)
\end{align*}
\]

(3) Write the function filter: (filter l), for input list \(l\), returns a list containing the first element of \(l\) together with the remaining elements of \(l\) that are not multiples of the first element of \(l\). (hint: use make-remove)
(4) Write the function filter2: (This function is similar to filter.) (filter2 l) returns a list containing the first element of \(l\) followed by the result of filter2 applied to the list obtained by removing form the remainder of \(l\) multiples of the first element of \(l\). If the list is empty, then just return the empty list.

\[
\begin{align*}
\text{(filter2 '(6 2 4 18 19 9 8))} \\
& = (6 + \text{self called on (2 4 19 9 8)}) \\
& = \ldots \\
& = (6 2 19 9)
\end{align*}
\]

What to hand in

(1) As a comment added to the end of your code include the output of the call

\[
\text{(filter2 (make-list 2 100))}
\]

and the answer to the question “What does the function filter2 do when called on the list produced by (make-list 2 100)’?”

(2) Upload your code (with output comment) to Moodle.

Notes

(1) Don’t forget the header comment for each function, which describes its purpose, arguments (inputs), and result (what the function returns).