Announcements

Quiz 1 is next Tuesday, March 7th, from 7:30-9:30pm.
Recitation notes, including solutions and a pointer to prior year's quiz problems, are appearing shortly at:
http://people.csail.mit.edu/jastr/6001/spring06/

From last time

(define (make-units C L H)
  (list C L H))
(define get-units-C car)
(define get-units-L cadr)
(define get-units-H caddr)

(define (make-class number units)
  (list number units))
(define get-class-number car)
(define get-class-units cadr)
(define (get-class-total-units class)
  (let ((units (get-class-units class)))
    (+ (get-units-C units)
        (get-units-L units)
        (get-units-H units))))
(define (same-class? c1 c2)
  (= (get-class-number c1) (get-class-number c2)))

1. Write constructor that returns an empty schedule.

   (define (empty-schedule)

   Order of growth in time, space?

2. Write a procedure that when given a class and a schedule, returns a new schedule including the new class:

   (define (add-class class schedule)
3. Write a procedure that computes the total number of units in a schedule.

\begin{verbatim}
(define (total-scheduled-units sched)
\end{verbatim}

4. Write a procedure that drops a particular class from a schedule.

\begin{verbatim}
(define (drop-class sched classnum)
\end{verbatim}

5. Implement the freshman credit limit by taking in a schedule, and removing classes until the total number of units is less than max-credits.

\begin{verbatim}
(define (credit-limit sched max-credits)
\end{verbatim}
HOPs

(define (make-student number sched-checker)
  (list number (list) sched-checker))
(define get-student-number car)
(define get-student-schedule cadr)
(define get-student-checker caddr)

(define (update-student-schedule student schedule)
  (if ((get-student-checker student) schedule)
      (list (get-student-number student)
            schedule
            (get-student-checker student))
      "invalid schedule"))

6. Finish the call to make-student to limit the student to taking at least 1 class.

(make-student 575904467)

7. Finish the call to make-student to create a first-term freshman (limited to 54 units).

(make-student 575904467)

8. Write a procedure that takes a schedule and returns a list of the names of the classes in the schedule. Use map.

(define (class-names schedule)
  (map

9. Rewrite drop-class to use filter.

10. Rewrite total-scheduled-units to use map and fold-right.
11. Rewrite credit-limit to use fold-right.
Micro Quiz

Name:

1. Write a definition of map, which takes a procedure and a list, and returns a new list containing the result of applying the procedure to each element of the list.
   Map is of type: \((A \rightarrow B), \text{list}< A > \rightarrow \text{list}< B >\).
   Ex: \((\text{map } (\lambda (x) (+ x 2)) (\text{list } 3 5 7)) \rightarrow (5 7 9)\)
   
   \(\text{(define (map proc lst)}\)

2. Write a definition of filter, which takes a predicate and a list and returns a list of all elements for which the predicate returned true.
   Filter is of type: \((A \rightarrow \text{boolean}), \text{list}< A > \rightarrow \text{list}< A >\).
   Ex: \((\text{filter even? } (\text{list } 3 5 7)) \rightarrow ()\)
   \((\text{filter even? } (\text{list } 2 4 5 6)) \rightarrow (2 4 6)\)

   \(\text{(define (filter pred lst)}\)