1 Introduction

The purpose of this assignment is for you to gain experience with writing small programs in Scheme.

2 A Set Library

We are going to write a library of set-manipulation functions. A set is represented as a non-nested list of atoms. No elements may be duplicated. You should provide the functions isSet?, set-union, and set-intersection. All functions must be recursive.

The isSet? function should have the following behavior:

```scheme
> (isSet? '())
#t
> (isSet? '(a))
#t
> (isSet? '(a b))
#t
> (isSet? '(1 2 a))
#t
> (isSet? '(1 2 (a)))
#f
> (isSet? '(1 2 1))
#f
```

The set-union function should have the following behavior:

```scheme
> (set-union '() '())
() > (set-union '(a) '())
(a) > (set-union '(a) '(b))
(a b) > (set-union '(a) '(a))
(a) > (set-union '(a b c) '(1 2))
(a b c 1 2)
```
The \texttt{set-intersection} function should have the following behavior:

\begin{verbatim}
> (set-intersection '() '())
()  
> (set-intersection '(a) '())
()  
> (set-intersection '(a) '(b))
()  
> (set-intersection '(a) '(a))
(a)  
> (set-intersection '(a b c) '(1 b c))
(b c)  
> (set-intersection '(a) '(b b))
fail
\end{verbatim}

\section*{3 Extension (no extra credit)}

Write a function \texttt{set-make} which takes a nested list (possibly with duplicate elements) and constructs a set by flattening the input list and removing duplicates. The function should have the following behavior:

\begin{verbatim}
> (set-make '())
()  
> (set-make '(a))
(a)  
> (set-make '(a a))
(a)  
> (set-make '(()))
()  
> (set-make '(()))
()  
> (set-make '(()))
(a)  
> (set-make '((a) (b (c)))))
(a b c)  
> (set-make '((a) (b (a)))))
(a b)
\end{verbatim}

\section*{4 Submission and Assessment}

The deadline for this assignment is 10:30, Monday, February 3. You should submit the assignment (a text-file containing the function definitions) electronically using the \texttt{Unix} command \texttt{"turnin cs520.1 <files>"}. This assignment is worth 4\% of your final grade.

\begin{quote}
\textbf{Don't show your code to anyone, don't read anyone else's code, don't discuss the details of your code with anyone. If you need help with the assignment see the instructor.}
\end{quote}