Principles of Programming Languages

Exam of 2014.07.25

Notes	
Total available time: 2h.	GIVEN NAME
You may use any written material you need.	SURNAME
You cannot use computers or phones during the exam.	SIGNATURE
Scl	neme
Exercise 1.1 (4 points)	
Define a procedure (called <i>vecstrings</i>) that acceps trings. <i>vecstrings</i> is used to put every strings in position $V[s]$, while strings too long are discarded they are collected in a list.	-
Example:	
(define ex '("hi" "there" "have" "an" "interesting" "day"))	
(define v1 (make-vector 7 #f))	
(vecstrings v1 ex) is the vector #(#f #f ("an" "hi") "day" "h	nave" "there" #f)

Exercise 1.2 (6 points)

Define the procedure *make-vecstring*, which is a variant of *vecstrings* returning a closure over V. Such closure has one parameter that must be a string *s* and works like *vecstrings*, by putting *s* in V. When the closure is called with the parameter *'return*, it must return the current value of V.

Example:
(define my-v (make-vecstring v1)) ; the definition of v1 is in Ex. 1.1
(my-v "another")
(my-v "member")
(my-v "no")
(my-v 'return) is the vector #(#f #f ("no" "an" "hi") "day" "have" "there" "member")

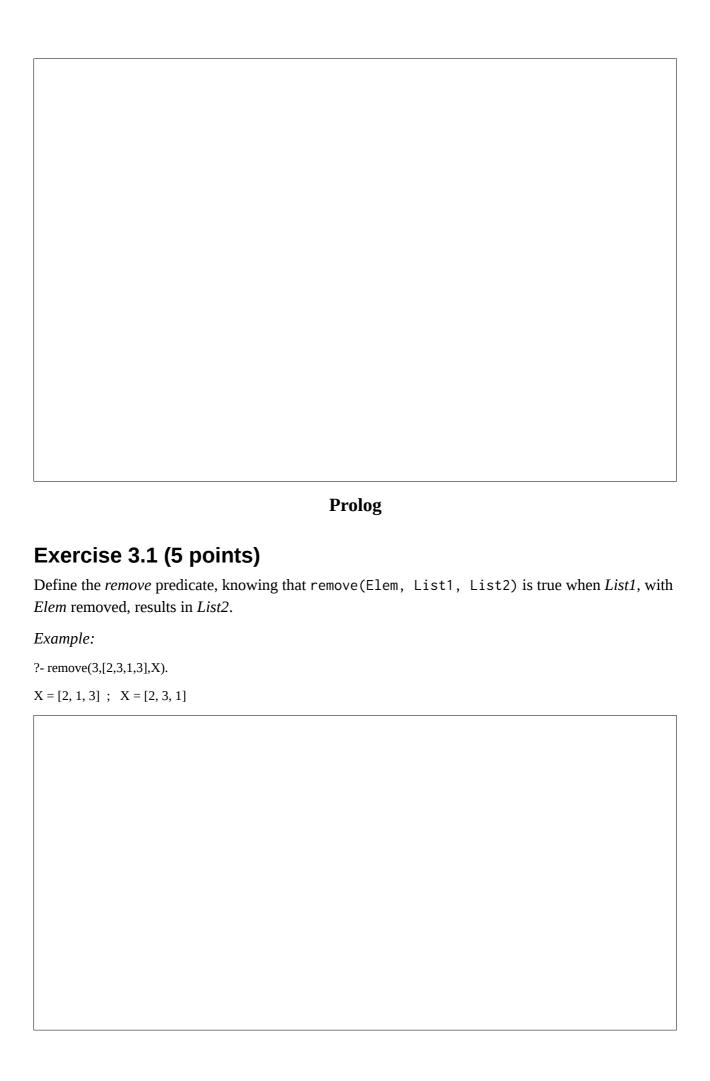
Haskell

Exercise 2.1 (1+2+2 points)

Consider this data definition: data Valn a = Valn a (a -> Bool)

where a is a generic type, and the function: $a \rightarrow Bool$ is a predicate that checks the validity of the stored value.

stored value.
1) Valn cannot derive Eq or Show, why?
2) Make <i>Valn</i> an instance of <i>Eq</i> .
3) Make <i>Valn</i> an instance of <i>Show</i> .
Exercise 2.2 (5 points)
Make <i>Valn</i> an instance of <i>Num</i> , considering that the predicate for two argument functions (e.g. (+))
must be the logical "and" of the two predicates; for one argument functions, say <i>abs</i> , the predicate remains the same.



Exercise 3.2 (3+1+2 points)

Consider this code: proc0(L,S) :- proc1(L,S), proc2(S). proc2([]). proc2([_]). proc2([X,Y|ZS]) :- X =< Y, proc2([Y|ZS]).proc1([],[]). proc1([X|XS],YS) :- proc1(XS,ZS), remove(X,YS,ZS). 1) For what can be proc0 used? What is it? 2) Give reasonable names to proc0, proc1, proc2. 3) Is a good idea to use proc0 in a program? Why?