

Homework set 14: Simple programs in ML — due Wednesday 21 March

Total number of points available on this homework is 100. Full credit is equivalent to 100 points.

1. (40 pts.) Represent Scheme S-expressions as follows: for Scheme atoms, use

datatype *Atom* = *Nil* | *Num of int* | *Id of string*

For the lists themselves, use:

datatype α *Sexp* = *Leaf of* α | *ConsNode of* α *Sexp* * α *Sexp*

Write a function *sexpprint* to convert an S-expression into a character string in the usual Scheme output format.

2. (60 pts.) Continuing the preceding exercise, write a function *sexpparse* to parse a character string containing the text of an S-expression. For any valid expression *e* of type *Atom Sexp*, it should be the case that $e = \text{sexpparse}(\text{sexpprint } e)$.