3 Compiler Construction (TGG)

Programming answers should be written in some notation approximating SML or OCaml.

(a) Describe what is meant by tail recursion. [4 marks]

(b) Eliminate tail recursion from foldl given below. Explain your answer.

(*
foldl : ('a -> 'b -> 'a) -> 'a -> 'b list -> 'a
*)
let rec foldl f accu l =
match l with
[] -> accu
| a::l -> foldl f (f accu a) l

[8 marks]

(c) Eliminate tail recursion from the following mutually tail-recursive functions. Explain your answer.

let rec is_even n =
  if n = 0
  then true
  else is_odd (n - 1)

and is_odd n =
  if n = 0
  then false
  else is_even(n - 1)

[8 marks]