1 Foundations of Computer Science (ACN)

This question has been translated from Standard ML to OCaml

(a) What does the OCaml function map do? Give an example, first coded without map and then with it, to illustrate how it can lead to more compact or comprehensible code. [3 marks]

(b) Functions fold_left and fold_right might be defined as

let rec fold_left f e = function
  | [] -> e
  | x::xs -> fold_left f (f ex) xs

let rec fold_right f l e = match l with
  | [] -> e
  | x::xs -> f x (fold_right f xs e)

Explain what these two functions do and why they may be useful. [4 marks]

(c) Here is a typical use of map:

let mangle n = (n - 2) * (n + 7)
let mangle_list x = map mangle x

Show how to express mangle_list using one of the “fold” functions rather than map. [3 marks]