

1998 Paper 12 Question 10

Introduction to Functional Programming

Write an ML function `upto` of type `int -> int list` such that `upto n` generates the list `[1,2,3,...,n]`. [7 marks]

What is wrong with the following function to take the head of a list?

```
fun wrong_headed [h,t] = h;
```

What is the type of `wrong_headed`? [5 marks]

Why is the following function to evaluate Fibonacci numbers inefficient?

```
fun fib 0 = 1
  | fib 1 = 1
  | fib n = fib(n-1) + fib(n-2);
```

Write a similar but more efficient version. [8 marks]