

COMPUTER SCIENCE TRIPOS Part IB – 2013 – Paper 3

4 Compiler Construction (TGG)

- (a) Describe the costs and benefits of performing inline expansion of functions during compilation. [4 marks]
- (b) Describe what is meant by *eliminating tail recursion*, when such an optimization can be applied and why it is a benefit. [4 marks]
- (c) Consider the following ML-like program where the function `f` returns a function:

```
let val a = 99 in
let fun f b = let g c = a + b + c in g end
let val f1 = f 17 in
let val f2 = f 33 in
let val v = (f1 a) + (f2 a) in
...
...
```

Describe carefully how this program fragment could be compiled. Explain how the expression

`(f1 a) + (f2 a)`

would be evaluated by your compiled code. [12 marks]