COMPUTER SCIENCE TRIPOS Part II – 2018 – Paper 9

15 Types (NK)

(*a*) Explain what logical connective the product type corresponds to, and what patterns of proof the introduction and elimination forms for products correspond to.   [2 marks]

(*b*) Explain what a solution for a typing problem $\Gamma \vdash M : ?$ is, and when a solution is principal.   [4 marks]

(*c*) Give the typing rule for the let-binding form let $x = M_1$ in M_2 in mini-ML with references.   [6 marks]

(*d*) Do the following programs (for mini-ML with references) have solutions? If so, what is the type of the expression? Justify your answer in each case:

    (*i*) let $f = \lambda x\ (x)$ in (f true) :: (f nil)   [4 marks]

    (*ii*) let $f = \lambda x\ (x)$ in let $g = f\ f$ in ($g\ true$) :: (g nil)   [4 marks]