

2005 Paper 8 Question 13

Specification and Verification I

- (a) What is partial about partial correctness? [2 marks]
- (b) What is the difference between a variant and an invariant? [2 marks]
- (c) Why are annotations needed for mechanising program verification? [2 marks]
- (d) What additional annotations are needed for total correctness? [2 marks]
- (e) How do refinement and *post hoc* verification differ? [2 marks]
- (f) Give an example of a higher-order formula that is not first-order. [2 marks]
- (g) Why is higher-order logic typed? [2 marks]
- (h) How are $\{P\}C\{Q\}$ and $\text{wlp}(C, Q)$ related? [2 marks]
- (i) How can $[c]q$ and $\langle c \rangle q$ be defined in higher-order logic? [2 marks]
- (j) Explain the difference between soundness and completeness. [2 marks]