

2002 Paper 2 Question 1

Multi-part question

Answer all five parts.

- (a) For each of the following statements, indicate whether it is true or false (there is no need to justify your answer).
- (i) If you have a visitor from out of town you can let her check her e-mail on your University account.
 - (ii) Inebriation is a mitigating excuse if one has broken a rule governing use of University computing facilities.
 - (iii) Appropriate use of the Cambridge University Data Network and the Joint Academic Network means *bona fide* academic activity plus a low level for private purposes.
 - (iv) In Usenet newsgroup discussions your spontaneous first response to what other people say is generally the most stimulating and desirable.

[1 mark each]

- (b) Give an example of redundancy in a safety-critical computer system. How does this affect reliability, hazards and safety? [4 marks]
- (c) Outline the main uses of a formal specification, in the context of software engineering. [4 marks]
- (d) Give a context-free grammar generating the language $\{a^m b^n \mid m \leq n\}$. [4 marks]
- (e) Explain why care is needed when a slower sub-system is clocked from a signal generated by a faster sub-system within a digital hardware design. How can reducing the frequency of data transfers between the two sub-systems help? [4 marks]