

2005 Paper 2 Question 1

Multi-part question

Answer all parts.

- (a) A one megabyte memory bank with 64-bit data bus is to be constructed from SRAM chips of individual capacity $32\text{K}\times 8$. Sketch out a design for the bank showing clearly how the SRAM chips are arranged. [4 marks]
- (b) Describe, in 30–40 words each, *three* ways in which an underlying theory can help to improve the quality of software systems. [4 marks]
- (c) Acoustic couplers used to connect modems to telephone handsets present an audio interface from the telephone network to computer equipment. Name *one* advantage and *one* disadvantage of using such an interface. [4 marks]
- (d) Show that for any two regular expressions r and s , the regular expressions $r(sr)^*$ and $(rs)^*r$ determine the same regular language. [4 marks]
- (e) Describe a significant invention in software engineering, including the problem it addresses and the manner in which it is supported by modern development tools. [4 marks]