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 32K×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]