

COMPUTER SCIENCE TRIPOS Part II – 2020 – Paper 9

4 Comparative Architectures (rdm34)

- (a) The performance of single-chip computers has improved rapidly over the past 40 years. Describe the major turning points in computer architecture as technology, applications and target markets have driven change. [10 marks]
- (b) Your processor supports simultaneous multithreading (SMT) and has hardware support for two threads. What characteristics would you consider when deciding which two threads would be best to schedule together? [4 marks]
- (c) An analysis of a multicore processor used within a datacentre suggests that its performance could be improved by increasing the number of threads supported in hardware. This could be done by adding more thread contexts to a core with support for simultaneous multithreading and/or adding more cores. Contrast these two different approaches and describe their limitations if we accept our area budget (i.e. die size) is fixed. [6 marks]