

COMPUTER SCIENCE TRIPOS Part IB – 2025 – Paper 5

8 Introduction to Computer Architecture (rdm34)

- (a) Why might high-performance system-on-chip (SoC) designs, for example, those that power mobile phones, typically contain many processors, and domain-specific hardware accelerators? [6 marks]
- (b) If we simply wanted to run independent programs on the different cores of a multicore processor, would we need a cache coherency mechanism, a memory consistency model, both, or neither? [4 marks]
- (c) What does the term “side-channel” refer to in the context of hardware security? Provide an example of a side channel that could be present in a processor. [4 marks]
- (d) Why do GPUs typically require high-bandwidth access to main memory? [3 marks]
- (e) Why do we need to keep Translation Lookaside Buffers (TLBs) coherent in a multi-core system? [3 marks]