

COMPUTER SCIENCE TRIPOS Part IB – 2013 – Paper 5

3 Computer Design (SWM)

- (a) Moore's law is an observation by Gordon Moore in the 1960s that trends in electronic manufacturing technology would result in transistor density doubling every 18 to 24 months.
- (i) Explain how Moore's law can be applied to processor speed and hard disk density. [5 marks]
- (ii) Today transistor scaling favours transistors over wires and thermal densities limit performance. Why is this resulting in commercial chips having many processor cores rather than one high-performance processor core? [5 marks]
- (b) PCI, used to connect I/O boards to a PC, has been replaced with PCIe. This transition has resulted in parallel communication being replaced by bundles of serial communication channels.
- (i) What is the difference between parallel and serial communication? Why are multiple serial channels now preferred to a parallel link? [5 marks]
- (ii) Why might the latency of a single load of a register on a PCIe device take longer than on PCI? [5 marks]