COMPUTER SCIENCE TRIPOS Part II – 2013 – Paper 7

5 Comparative Architectures (RDM)

(*a*) Why might a heterogeneous or asymmetric chip-multiprocessor be preferable to a homogeneous or symmetric one? [5 marks]

(*b*) You are a computer architect working on the design of a new processor for the mobile phone market. An initial analysis of applications suggests that there would be worthwhile gains in producing a processor that could offer two different power-performance tradeoffs. The first configuration would maximise the exploitation of ILP and consume the most power. The second would on average perform less well, but would consume less power.

(*i*) Describe how the microarchitecture of a single processor could be modified in order to offer the ability to switch between the two configurations described at run-time. [9 marks]

(*ii*) How might one determine when to switch from one configuration to the other in order to reduce overall power consumption while minimising the impact on the user experience? [6 marks]