COMPUTER SCIENCE TRIPOS Part Ia − 2018 − Paper 2

4 Operating Systems (RMM)

(*a*) What is a *page fault*? [2 marks]

(*b*) How is a page fault handled if it is triggered by a process issuing a write for which it has permission on a machine with ample free memory at the point the page fault occurs? [6 marks]

(*c*) If the machine does not have sufficient free memory at the point that the page fault occurs, a *victim page* must be selected for replacement. Describe the ideal algorithm for handling this case, and explain why it cannot be implemented.
[2 marks]

(*d*) Now describe a practical algorithm for selecting a victim page for replacement. In your answer you should discuss its performance, storage and time overheads, indicating any assumptions you make. [6 marks]

(*e*) What is *Bélády's Anomaly*? Can the algorithm described in Part (*d*) suffer from it? Justify your answer. (*Note*: You are not required to demonstrate an instance of Bélády's Anomaly occurring.) [4 marks]