COMPUTER SCIENCE TRIPOS Part IA – 2026 – Paper 2

4 Operating Systems (mk428)

(*a*) What is a Process Control Block (PCB), and what information does it typically contain? [4 marks]

(*b*) A system is running four processes, two of which are I/O-bound, and two of which are CPU-bound. The I/O-bound processes alternate between using a 10 ms burst of CPU time and waiting for input. All processes run indefinitely on a single CPU core.

Using a Round Robin scheduling algorithm, describe one possible sequence of activiations of the four processes, i.e. in which order the processes are run and for how long. Show this for a quantum of 5 ms, 10 ms, and 20 ms respectively. On each context switch, indicate whether the running process is preempted or self-suspends. State any assumptions that you make. [6 marks]

(*c*) If you replace the Round Robin scheduler in Part (*b*) with a Shortest Job First scheduler, what behaviour would you expect? Briefly justify your answer. [3 marks]

(*d*) Now replace the Round Robin scheduler with a Shortest Remaining Time First scheduler. Explain the expected behaviour for the scenario in Part (*b*), and how the scheduler implements it. How fair is this scheduling policy? [4 marks]

(*e*) You are writing an app that allows users to make video calls and also record those calls as files on their hard drive. Discuss the scheduling issues that are likely to arise in this app, and how you would handle them. [3 marks]