

4 Operating Systems (rmm1002)

- (a) On creation, a UNIX process normally inherits three file descriptors from its parent: *stdin*, *stdout*, and *stderr*.
- (i) Which additional kernel interactions are involved if the user redirects a process' *stdout* to a file? [4 marks]
- (ii) Why is it typically more efficient to connect two processes using a pipe rather than redirecting the first's *stdout* to a file to which the second's *stdin* is also redirected? [2 marks]
- (b) UNIX file descriptors are sometimes described as *capabilities*.
- (i) In what ways do they provide capability functionality? [4 marks]
- (ii) In what ways do they differ from capabilities? [4 marks]
- (c) A common approach to handling the situation where there is no process either scheduled or waiting to be scheduled is to introduce an *Idle* process. An intrepid developer decides that when the Idle process is scheduled it could usefully carry out *filesystem defragmentation*, by rearranging files on disk to ensure each is stored in contiguous blocks. Explain three disadvantages of this use of the Idle process in a modern computer. [6 marks]