OS Tutorial 4 2023.
Week starting 2 October 2023.

Q1. What is the relationship between threads and processes?

Q2. Discuss advantages and disadvantages of supporting multi-threaded applications with (kernel-level) threads.

Q3. Is putting security checks in the C library a good or a bad idea? Why?

Q4. What is a race condition? Give an example.

Q5. What must the banker's algorithm know a priori in order to prevent deadlock?

Q6. Describe the general strategy behind deadlock prevention and give an example of a practical deadlock prevention method.

Q7. Consider implementing a device interface (i.e., handling communication between CPU and a device) in a device controller rather than in the OS kernel. Which of the following statements is/are INCORRECT?

      A. Performance can be improved by hard-coded algorithms and utilising dedicated hardware.

      B. Device controller can introduce additional data buffering.

      C. The kernel is simplified by moving algorithms out of it.

      D. Improving algorithms requires a hardware update rather than just a device driver update.

      E. Bugs are less likely to cause an OS crash, and bugs are easier to fix.

Q8. Which statement about direct memory access (DMA) is CORRECT?

      A. The DMA controller operates the memory bus by placing addresses on the bus to perform transfers with the help of the main CPU.

      B. To initiate a DMA transfer, the host reads a DMA command block from the memory.

      C. DMA increases system concurrency by allowing executing instructions in parallel for a larger number of processes.

      D. In order to use DMA, hardware design becomes more complicated because the system must allow the DMA controller to be a bus master.

      E. All the above statements are correct.