Computer Systems CCE1011

1. Describe the fetch and execute cycle and its relation to the special registers inside the processor.

2. Is the internal data bus inside a processor available as pins on the processor chip. Give reasons for your answer

3. Starting from the slower devices to the faster give a list and typical data transfer values for devices that are used to input and output from a processor.

4. A von Neumann machine has both data and instructions inside a program. How does the processor distinguish an instruction operand from a data operand?

5. A program can have built into it a procedure which is executed before returning? What operations are necessary to ensure proper continuation of the program after the procedure is executed?

6. How is an interrupt initiated? Why are interrupts important in a processor system?

7. A priority interrupt system can have interrupts serviced at the end of servicing the current interrupt or have an interrupt preempt another. Discuss the advantages and disadvantages of using one of these methods.

8. A processor operates at a clock of 1 GHz. Accessing main memory takes 100ns. An input/output routine program prepares a list of byte characters for output to the printer. The routine consists of ten instructions which initial the transfer of the characters. Characters are transferred to the printer buffer from memory. The printer buffer can take fifty characters. Assume that the characters are transferred at main memory speed. The printing of the characters takes 1 ms per character. At the end the printer raises an interrupt.

   The interrupt service routine uses 5 instructions, which either call again the byte transfer routine or finishes the printer service.

   Assume that there is a block of 500 characters to print, calculate the time taken for the block to print.
   State any further assumptions made.