1.9:

Direct memory access is used for high speed I/O devices in order to avoid increasing the CPU’s execution load.

•(a) How does the CPU interface with the device to coordinate the transfer?

啟用DMA控制器，由CPU給予匯流排資料傳輸的權限，DMA控制器不須經過CPU而能在設備與記憶體之間進行資料傳輸，達到減少CPU工作量與提高系統性能。

•(b) How does the CPU know when the memory operations are complete?

CPU會收到來自DMA控制器發出的interrupt信號，並且先執行interrupt需要處理的程序，再回到CPU原本的處理狀態。

•(c) The CPU is allowed to execute other programs while the DMA controller is transferring data. Does this process interfere with the execution of the user programs? If so, describe what forms of interference are caused.

DMA控制器在傳輸資料時，如果CPU也同樣需要訪問記憶體，會導致衝突產生，CPU需要等DMA控制器處理完資料傳輸後才能訪問記憶體，會造成降低系統性能的可能。

2.7:

•What are the two models of interprocess communication? What are the strengths and weakness of the two approaches?

Shared memory 與 Message-passing。

Shared memory:

優點：在同一個機器上實作時會比Message-passing還要有效率的執行程式。

缺點：因為使用到同一個記憶體，需要注意到在記憶體操作上不能有同時被不同程序訪問的情形發生。

Message-passing:

優點：比Shared memory還更好實作，不需要特別考慮記憶體使用問題。

缺點：執行時間上比Shared memory還久，因為時間耗費在建立連線方面。

* + 2.10: What is the main advantage of the *microkernel* approach to system design? How do user programs and system services interact in a microkernel architecture? What are the disadvantages of using the microkernel approach?
  + 3.1: Describe the differences among short-term, medium-term, and long-term scheduling.
  + 3.11: What are the benefits and the disadvantages of each of the following? Consider both the system level and the programmer level.
    - (a) Synchronous and asynchronous communication.
    - (b) Automatic and explicit buffering
    - (c) Send by copy and send by reference
    - (d) Fixed-sized and variable-sized messages