4. (a) Explain the memory hierarchy using a labelled diagram. Your answer should focus on the motivation for the hierarchy and its role in computer system design. [10]

   (b) Cache memory is commonly used to improve computer system performance.

      i. Explain the term *cache memory*. [3]

      ii. Explain why it is possible to significantly improve performance using relatively small cache sizes. [3]

   (c) Interrupt-driven I/O is commonly used by computer systems.

      i. Explain the concept of interrupt-driven I/O. Your answer should incorporate the concept of *context switching*. [5]

      ii. Outline a situation where interrupt-driven I/O would be unsuitable. Your answer should suggest a more appropriate I/O mechanism for this situation. [4]