

國立台灣科技大學九十七學年度碩博士在職專班招生試題

系所組別：電機工程系博士在職專班戊組

科目：計算機系統

總分 100 分

- Suppose that the hard disk on your personal computer rotates at 3000 revolutions a minute, that each track contains 16 sectors, and that each sector contains 1024 bytes. Approximately what communication rate is required between the disk drive and the disk controller if the controller is going to receive bits from the disk drive as they are read from the spinning disk? (18%)
- Consider a hypothetical microprocessor generating a 16-bit address (for example, assume that the program counter and the address registers are 16 bits wide) and having a 16-bit data bus. (32%)
 - What is the maximum memory address space that the processor can access directly if it is connected to a "16-bit memory"?
 - What is the maximum memory address space that the processor can access directly if it is connected to a "8-bit memory"?
 - If an input and an output instruction can specify an 8-bit I/O port number, how many 8-bit I/O ports can the microprocessor support?
 - If an input and an output instruction can specify an 8-bit I/O port number, how many 16-bit I/O ports can the microprocessor support?
- Explain how to perform *Quicksort* and find its efficiency. (15%)
- Find a *max heap tree* by inserting the following sequence of numbers:
78, 48, 9, 11, 71, 51, 63, 18, 25, and 33. (15%)
- Find a minimum cost spanning tree for the undirected connected graph with the cost beside each link shown below. Please mark the sequence number beside the link when it is added.
 - Prim's* algorithm without any constrain. (10%)
 - Kruskal's* algorithm without any constrain. (10%)

