系所組別：工程科學系乙、戊組
考試科目：計算機概論　　　　　　　　　　　　　　　　考試日期：0307，節次：2

※ 考生請注意：本試題 □可 ☑不可 使用計算機

1. Give the English full names and functions of the following terms commonly used in computer science. (Each 2%, total 20%)

   (a) RAID;　　(f) WiMAX;
   (b) P2P;　　 (g) 3G;
   (c) DLL;　　 (h) NAS;
   (d) GPS;　　 (i) MPEG;
   (e) FPGA;　　(j) USB.

2. Design an algorithm to determine if an integer is a power of two. (10%)

3. What are the differences between multiprocessor, multiprocessing, multiprogramming, multithreading, and superscalar systems? (10%)

4. Show that the height of binary tree with $n \geq 0$ nodes is at most n and at least $\lceil \log_2(n+1) \rceil$, where $\lceil x \rceil$ means the least integer that is equal to or greater than x. (15%)

5. How can you implement a binary search tree data structure by using an array data structure? Discuss the pros and cons. (10%)

6. Use AND, OR, and NOT logic gates to design a two-bit binary adder/subtractor. Give examples to show that your result is worked correctly. (15%)

7. Use **C** programming language to design a merge sort program which input a sequence of integers, sort the integers, and then output the sorted result. The program must be self readable. (20%)