淡江大學 98 學年度碩士班招生考試試題

系別： 電機工程學系積電與計算系統組
電機工程學系機器人工程碩士班

科目：計 算 機 概 論

准帶項目請打「Ｖ」	
Ｖ	簡單型計算機

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1. (32%) Please briefly describe the differences between the following terms:
   (1) CISC and RISC
   (2) iteration and recursion
   (3) isolated I/O and memory-mapped I/O
   (4) polling and interrupt
   (5) direct mapping and fully associative mapping (from blocks in main memory to block frames in cache)
   (6) SR flip-flops and JK flip-flops
   (7) sign-magnitude notations and two's complement notations
   (8) combinational circuits and sequential circuits

2. (12%) From the architecture point of view, what techniques can be used to make a computer run faster? (For example, computer with cache memory will run faster than the one without cache does.) List as many as you can and explain.

3. (10%) Draw the binary tree which has the following two traversals.
   (Assume each node of the tree contains single-character information only.)
   Preorder: G F E B A D C
   Inorder: E F G D A B C

4. (12%) Design a 3-bit odd parity generator (the inputs are a, b, c and the output is P) and a 4-bit odd parity checker. (The inputs are a, b, c, P and the output is C. When error is detected, $C = 1$; otherwise $C = 0$.)

5. (12%) Use the Huffman code technique to compress the following message. (Note that a space is also a character.)
   USING HUFFMAN CODES TO ENCODE A STRING
   Please give the "Huffman tree" for the above message.

6. (10%) Design a circuit that compares three 3-bit numbers, A, B and C, to check whether they are equal or not. The circuit has one output x, so that $x = 0$ if $A=B=C$, and $x = 1$, otherwise.

◀注意背面尚有試題▶

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7. (12%) The Gray code is a binary code for integers. It differs from the ordinary binary representation in that there is just a single bit change between the representations of any two numbers. The eight elements of the 3-bit Gray code are as follows.

Binary Code	Gray Code
000	000
001	001
010	011
011	010
100	110
101	111
110	101
111	100

Design a circuit that converts from the 3-bit binary code to the 3-bit Gray code.