

大同大學 89 學年度研究所招生入學考試試題

考試科目 計算機概論 所別 資訊經營研究所 第 2 / 2 頁

註：本次考試 不可 參考自己的書籍及筆記 不可 查字典 不可 使用計算器

<接上頁>

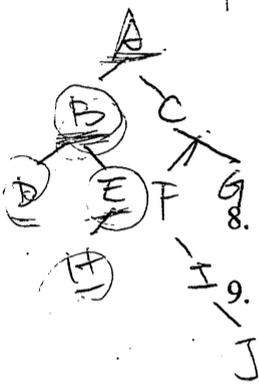
7. (8%) The following traversals unambiguously define a binary tree.
inorder: DBHJEAFFKICG ; postorder: DJHEBKIFGCA

- (1) Draw the tree;
- (2) List the preorder traversal;
- (3) Determine the order in which the node will be visited by invoking function g().

```
f(NODEPTR tree)
{
    if (tree != NULL) {
        printf("%d", tree->info);
        f(tree->left);
        f(tree->right);
    }
}
```

```
g(NODEPTR tree)
{
    if (tree != NULL) {
        -f(tree->left);
        printf("%d", tree->info);
        f(tree->right);
    }
}
```

DBHJEAFFKICG
DJHEBKIFGCA



8. (6%) Order the following 6 growth rates in increasing order: 2^n , $2^{\log n}$, $n!$, $n \log n$, $(\log n)^9$, $\log n$

9. (6%) Suppose that X is a two-dimensional array stored in a byte-addressable machine and each element of X occupies two bytes. The address of X(4, 2) is decimal 1978 and X(2, 3) is 1986.
(1) What is the address of X(3, 8)?
(2) How many rows does X have?
(3) Is X an array in row-major or column-major? Or, it is undecidable.

10. (6%) Summarize the distinction between top-down and bottom-up design strategies.

11. (6%) Explain baud rate and hardware bandwidth. How are they measured? What are their relationships with the data transmission rate?

12. (6%) Write a C recursive function to find a maximum value from an array with n positive integers.

13. (6%) 簡述聲音(sound wave)如何數位化以儲存在computer or CD上，並以之計算一分鐘CD品質之音效所需的儲存空間。(Assuming with 16 bits & 44.1 kHz sampling rate)

14. (6%) AI相關名詞解釋：(1) Turing Test (2) Production Systems (3) Heuristic Search

Handwritten calculations and diagrams for question 13:

$(4,2) = 1978$
 $(2,3) = 1986$
 $1978 = 1960 + (3-1) \times 6 \times 2 + 2 \times 2 = 1960 + 12 + 8 = 1980$
 $1986 = 1960 + (3-1) \times 6 \times 2 + 2 \times 2 = 1960 + 12 + 8 = 1980$
 $1986 - 1980 = 6$
 $6 / 2 = 3$
 $3 + 1 = 4$
 $4 \times 2 = 8$
 $1978 + 8 = 1986$
 $1986 + 8 = 1994$
 $1994 + 8 = 2002$
 $2002 + 8 = 2010$
 $2010 + 8 = 2018$
 $2018 + 8 = 2026$
 $2026 + 8 = 2034$
 $2034 + 8 = 2042$
 $2042 + 8 = 2050$
 $2050 + 8 = 2058$
 $2058 + 8 = 2066$
 $2066 + 8 = 2074$
 $2074 + 8 = 2082$
 $2082 + 8 = 2090$
 $2090 + 8 = 2098$
 $2098 + 8 = 2106$
 $2106 + 8 = 2114$
 $2114 + 8 = 2122$
 $2122 + 8 = 2130$
 $2130 + 8 = 2138$
 $2138 + 8 = 2146$
 $2146 + 8 = 2154$
 $2154 + 8 = 2162$
 $2162 + 8 = 2170$
 $2170 + 8 = 2178$
 $2178 + 8 = 2186$
 $2186 + 8 = 2194$
 $2194 + 8 = 2202$
 $2202 + 8 = 2210$
 $2210 + 8 = 2218$
 $2218 + 8 = 2226$
 $2226 + 8 = 2234$
 $2234 + 8 = 2242$
 $2242 + 8 = 2250$
 $2250 + 8 = 2258$
 $2258 + 8 = 2266$
 $2266 + 8 = 2274$
 $2274 + 8 = 2282$
 $2282 + 8 = 2290$
 $2290 + 8 = 2298$
 $2298 + 8 = 2306$
 $2306 + 8 = 2314$
 $2314 + 8 = 2322$
 $2322 + 8 = 2330$
 $2330 + 8 = 2338$
 $2338 + 8 = 2346$
 $2346 + 8 = 2354$
 $2354 + 8 = 2362$
 $2362 + 8 = 2370$
 $2370 + 8 = 2378$
 $2378 + 8 = 2386$
 $2386 + 8 = 2394$
 $2394 + 8 = 2402$
 $2402 + 8 = 2410$
 $2410 + 8 = 2418$
 $2418 + 8 = 2426$
 $2426 + 8 = 2434$
 $2434 + 8 = 2442$
 $2442 + 8 = 2450$
 $2450 + 8 = 2458$
 $2458 + 8 = 2466$
 $2466 + 8 = 2474$
 $2474 + 8 = 2482$
 $2482 + 8 = 2490$
 $2490 + 8 = 2498$
 $2498 + 8 = 2506$
 $2506 + 8 = 2514$
 $2514 + 8 = 2522$
 $2522 + 8 = 2530$
 $2530 + 8 = 2538$
 $2538 + 8 = 2546$
 $2546 + 8 = 2554$
 $2554 + 8 = 2562$
 $2562 + 8 = 2570$
 $2570 + 8 = 2578$
 $2578 + 8 = 2586$
 $2586 + 8 = 2594$
 $2594 + 8 = 2602$
 $2602 + 8 = 2610$
 $2610 + 8 = 2618$
 $2618 + 8 = 2626$
 $2626 + 8 = 2634$
 $2634 + 8 = 2642$
 $2642 + 8 = 2650$
 $2650 + 8 = 2658$
 $2658 + 8 = 2666$
 $2666 + 8 = 2674$
 $2674 + 8 = 2682$
 $2682 + 8 = 2690$
 $2690 + 8 = 2698$
 $2698 + 8 = 2706$
 $2706 + 8 = 2714$
 $2714 + 8 = 2722$
 $2722 + 8 = 2730$
 $2730 + 8 = 2738$
 $2738 + 8 = 2746$
 $2746 + 8 = 2754$
 $2754 + 8 = 2762$
 $2762 + 8 = 2770$
 $2770 + 8 = 2778$
 $2778 + 8 = 2786$
 $2786 + 8 = 2794$
 $2794 + 8 = 2802$
 $2802 + 8 = 2810$
 $2810 + 8 = 2818$
 $2818 + 8 = 2826$
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 $2834 + 8 = 2842$
 $2842 + 8 = 2850$
 $2850 + 8 = 2858$
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 $2866 + 8 = 2874$
 $2874 + 8 = 2882$
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 $2890 + 8 = 2898$
 $2898 + 8 = 2906$
 $2906 + 8 = 2914$
 $2914 + 8 = 2922$
 $2922 + 8 = 2930$
 $2930 + 8 = 2938$
 $2938 + 8 = 2946$
 $2946 + 8 = 2954$
 $2954 + 8 = 2962$
 $2962 + 8 = 2970$
 $2970 + 8 = 2978$
 $2978 + 8 = 2986$
 $2986 + 8 = 2994$
 $2994 + 8 = 3002$