

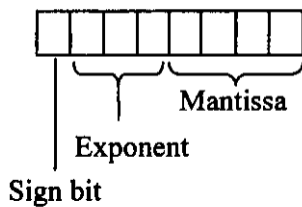
國立高雄大學九十七學年度研究所碩士班招生考試試題

科目：計算機概論
 考試時間：100 分鐘

系所：資訊工程學系碩士班
 本科原始成績：100 分

是否使用計算機：否

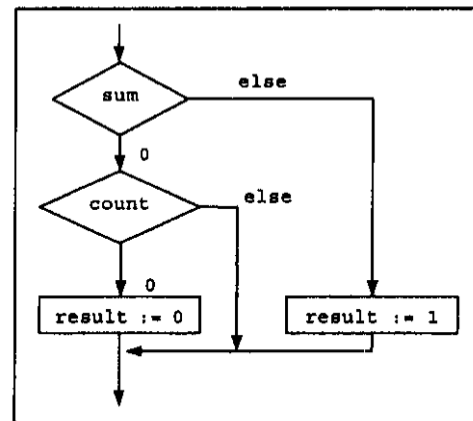
- (10%) (a) Write a truth table for the Boolean function $F(X,Y,Z)=XY+YZ+XZ$. (b) Simplify the function so that it contains the minimal number of terms.
- (10%) Consider a two-dimensional array $M[0..9, 0..9]$. If element $M[0, 0]$ is stored at memory address 2000 (in hexadecimal format), what is the address (in hexadecimal format) of element $M[4, 5]$ if M is a (a) row majored or (b) column majored array?
- (10%) Consider the following simple 8-bit floating point notation. A 0 in the sign bit means that the value stored is nonnegative. Values stored in the exponent and mantissa fields are using 2 complement method. (a) What is the decimal value corresponding to bit pattern 11101011? (b) When we want to store $(3.625)_{10}$ in this notation, we will encounter a truncation error. What part of the value being stored is lost?



- (5%) Ada uses `end if` to mark the end of the `if` clause. Please complete the following program by inserting two `end if` so that it matches the flow chart shown in the left-hand side.

```

if (sum == 0) then
  if (count == 0) then
    result = 0;
  else
    result = 1;
  
```



- (10%) Write a C function `void swap(int **a, int **b)` that exchanges the contents of two integer pointers `a` and `b`.
- (10%) Show the step-by-step construction of an AVL tree resulting from the insertion of the following sequence of keys: 3, 5, 6, 4, 1, 2, 8, 7, 9.

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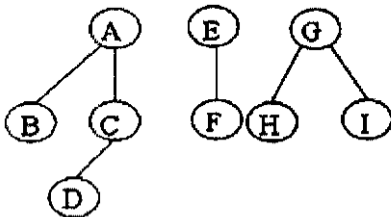
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7. (15%)

- (1). Compare three heaps: (a) max heap (b) deap (c) min-max heap.
- (2). Show the final heap trees of (a) max heap (b) deap (c) min-max heap after inserting nine integers 3, 5, 6, 4, 1, 2, 8, 7, 9

8. (10%) Given the following forest, (1) transform the forest into a binary tree; (2) find the postorder and inorder traversals of the forest.



9. (15%) Given n distinct elements ($n \gg 15$), design a comparison-based algorithm which requires at most $7n$ comparisons to find the 15th largest element.

- (1) Briefly show the comparison-based algorithm.
- (2) According to the above algorithm, write a program in C to find the 15th largest element.

10. (5%) Use the following program to find the traversal of the following tree. (only show the output)

```

typedef struct node {
    int data;
    tree_pointer left_child, right_child;
};
typedef struct node *tree_pointer;
void order (tree_pointer ptr)
{
    If (ptr) {
        If (ptr-> data % 2 == 0) {
            order(ptr-> left_child); order(ptr->right_child);}
        else { order(ptr-> right_child); order(ptr-> left_child);}
        printf("%d\n", ptr->data);
    }
}
    
```

