

資訊工程研究所

程式語言 (30%)

1. 請選擇適合下列各程式語言之特徵或性質(複選,可重複選用),並將程式語言名稱及所選擇之代碼書寫於答案卷。(20%)

* 程式語言 : (1) FORTRAN 77 (2) PASCAL (3) LISP (4) ADA (5) PROLOG

* 特徵或性質:

- | | |
|-----------------------------|---------------------------------|
| (A) Data encapsulation | (B) List processing |
| (C) Goal unification | (D) User-defined data types |
| (E) Rendezvous | (F) FORMAT statement |
| (G) Non-procedural language | (H) Fourth generation language |
| (I) Call-by-name | (J) S-expression |
| (K) Recursive call | (L) Concurrent programming |
| (M) Prefix notation | (N) String processing language |
| (O) Co-routines | (P) Object-oriented programming |
| (Q) ALGOL-like syntax | (R) Call-by-text |
| (S) Packages | (T) Logic programming |
| (U) Set data type | (V) Exception handling |
| (W) Computation efficiency | (X) Shallow binding |
| (Y) Assigned GOTO statement | (Z) Functional programming |

2. 解釋名詞。(10%)

- (1) Dynamic scoping (4%)
(2) Overloading (3%)
(3) Dangling reference (3%)

ALGORITHMS. (30%)

- Write a nonrecursive procedure to compute x^n , where x is a real number and n a positive integer. Do not use a stack. Do a worst-case complexity analysis of your algorithm. (10%)
- Describe an algorithm to find the median of a set of n elements $A[1], A[2], \dots, A[n]$. The time complexity of your algorithm should be $O(n)$. (10%)
- Define the following terminologies: P, NP, NP-complete, and NP-hard; and use a diagram to describe their relationship. (10%)

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資料結構

[1] 請配合圖說明下列各 terminology (專門術語)

(A) Boundary Tag Method (7%)

(B) Indexed Sequential File (7%)

(C) Priority Queue (6%)

[2] 試說明選擇一個適合的 sorting algorithm 時, 你將考慮那些因素? 以下列之 data 而言, 你認為 quicksort, heapsort, merge sort 或 bubble sort 那一種最適合, 為什麼?

3, 55, 49, 17, 18, 22, 29, 31, 33, 39, 43, 45 (10%)

[3] 試比較 FORTRAN 及 PASCAL 語言在提供建 tree 之資料結構上, 有何相似或相異之功能 (10%)