國立高雄應用科技大學
九十七學年度碩士班招生考試
資訊工程系

准考證號碼□□□□□□□□□□ （考生必須填寫）

資料結構

注意：a. 本試題共 7 題，共 100 分。
b. 作答時不必抄題，各試題答案必須依題號順序寫在試卷指定的答案欄。
c. 考生作答前請詳閱答案卷之考生注意事項。

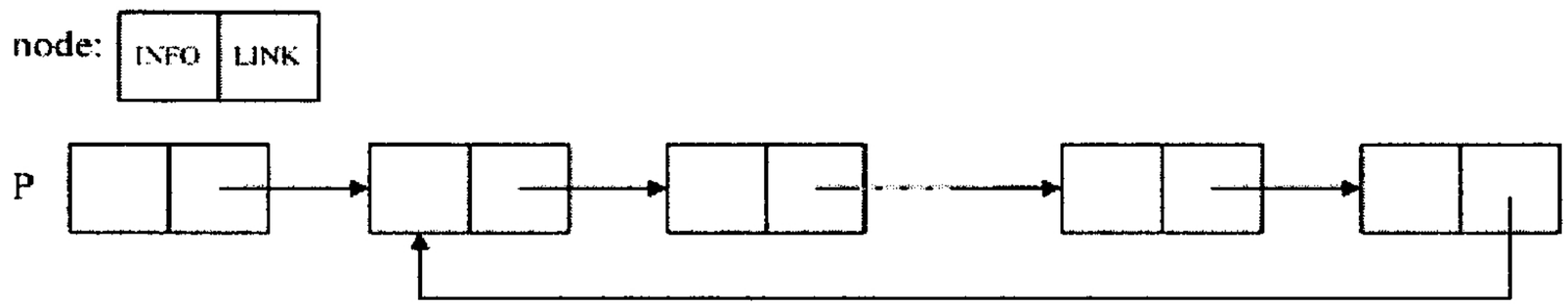
1. (20%) For the following recursive procedure RP1, (a) find RP1 (2468) = ? ; (b) how many times for executing the instruction print (key mod 10) in (a) ?

```
Procedure RP1 (key: integer)
begin
    if  key < 10
        then  print (key);
        else
            begin
                print (key mod 10);
                RP1 (key div 10)
            end
end
```

2. (10%) Considering the following program, write its recursive program.

```
long combi (int n, int r)
  { int i;
    long p = 1;
    for ( i = 1; i ≦ r; i++)
        p = p*(n – i + 1)/i;
    return (p) ;
  }
```

3. (10%) Considering the following program about circular list, what is the function of the program?



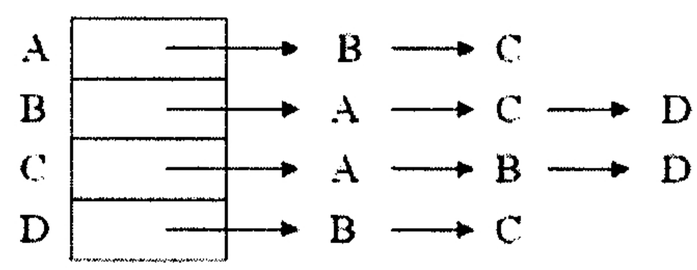

```
Procedure AP1(P)
    call getnode(z)
    INFO(Z) ← INFO(P)
    LINK(Z) ← LINK(P)
    Q ← LINK(P)
    while P≠Q do
        call getnode(z)
        INFO(Z) ← INFO(Q)
        LINK(Z) ← LINK(Q)
        Q ← LINK(Q)
    end while
end
```

4. (30%) Given a data sequence: 82 16 9 95 27 75 42 69 34
   (a) Considering the binary-tree sorting method, what is the constructed binary-tree?
   (b) Considering the binary searching method, first sort the above data sequence and then search data 69 (i.e., key). What is the searched data for each search pass?
   (c) For solving the collision problem in hashing search, what is the result of using linear probing (i.e., linear open addressing) ?
   Note: linear probing function: (h(key) + 1) mod N, h(key) = key mod N ;
   array size N = 11 (i.e., A[0] ~ A[10])

5. (10%) Given an empty stack A, what is the final state of A after executing the following stack operations ?

```
Push(A, 20)
Push(A, 40)
Pop(A)
Push(A, 20)
Push(A, 60)
Pop(A)
Pop(A)
```

6. (10%) Given the following adjacency list of a graph, what is the DFS (Depth First Search) sequence starting from node A ?



7. (10%) $f(x) = 2x^4 + 3x^3 + 5x^2 + 8x + 9$, what is the least number of multiplications required for evaluating f(x) ?