

南華大學九十六學年度學士班轉學生招生考試考試試題卷

招生學系
/ 年級

資訊工程學系 / 三年級

編號：C41

科目：資料結構

試題紙第 / 頁共 / 頁

- List the performance from best to worst (由最好至最差的效能) for different running times (不同的執行時間), $O(n \log n)$, $O(n^2)$, $O(2^n)$, $O(\log n)$, and $O(n)$. (10%)
- Show the big-O expression for the following loops. (顯示其執行時間 $O()$) (10%)

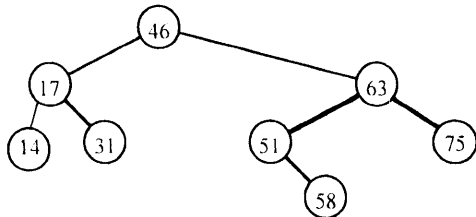
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for (i = 1 ; i <= n ; i *= 2)
  for (j = n ; j >= 1 ; j /= 2)
    num += i * j;
```

- Given a series of sorted data (已知排序好資料), show the steps how to find the number of 84 with binary search (如何以二分法搜尋之步驟而找到數值 84). (10%)

7	15	29	37	47	56	62	67	71	75	82	84	87	89
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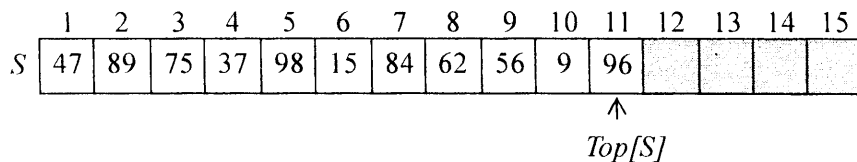
- Given a binary search tree, show the steps how to find the item with the key 58. (如何以二元樹步驟而找到數值 58) (10%)



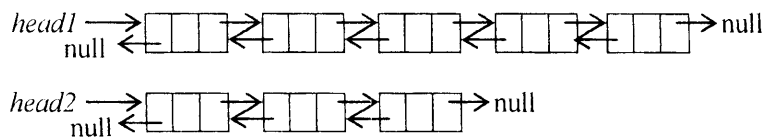
- Write a subroutine that can perform the function of N-factorial (寫出 $n! = n \times (n-1) \times \dots \times 2 \times 1$ 的副程式). (10%)
- Apply an *insertion sort* for the following sequence of numbers. (應用插入排序法作排序，即想像如拿一張張撲克牌而作排序) (10%)

75	32	66	11	94	52	9	83
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- Show the stack S after the operations, $Pop(S)$, $Pop(S)$, $Pop(S)$, $Pop(S)$, $Push(S, 71)$, and $Push(S, 28)$. (顯示一系列運作後之堆疊結果，其中 $Push(S, x)$ 是將數值 x 壓入堆疊，而 $Pop(S)$ 是從堆疊彈出頂端的數值) (10%)



- Show the connection to merge the *head2* list into the end of *head1* list. (將 *head2* 鍊結列 連接至 *head1* 鍊結列的尾端) (10%)



- Given the following undirected graph (see Figure 1), show the minimum spanning tree (畫出最小擴張樹，即以最少值連接所有結點). (10%)

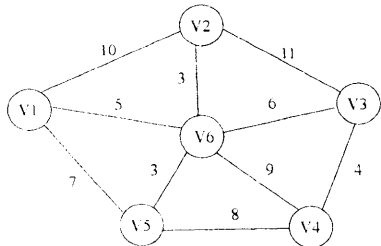


Figure 1

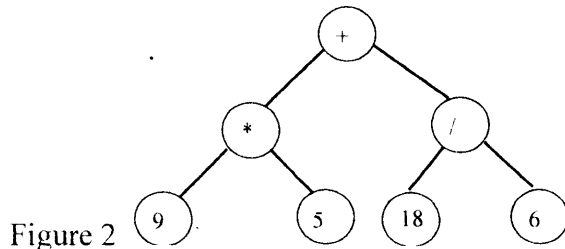


Figure 2

- Given an expression tree (see Figure 2), show the inorder sequence (寫出其中置式). (10%)