

國立中央大學102學年度碩士班考試入學試題卷

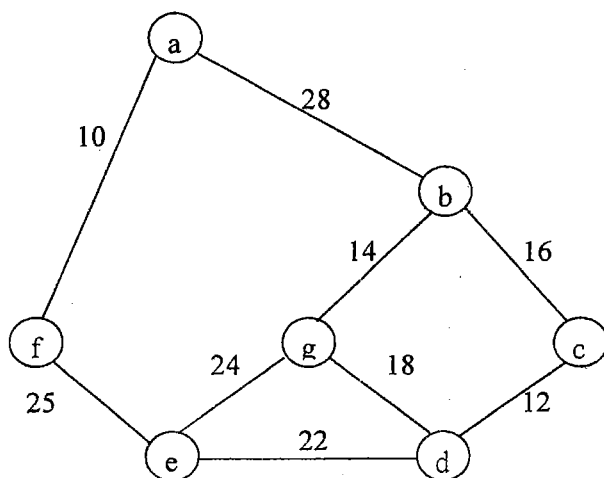
所別：資訊管理學系碩士班 丁組(一般生) 科目：資料結構 共 2 頁 第 1 頁

本科考試禁用計算器

*請在試卷答案卷(卡)內作答

參考用

- (25%) Given the function $f(x) = 12x^{100}y^4 + 35x^5y^3 + 26xy^2 + 2x + 7y + 1$, answer the following questions.
 - Use a representation of one-dimensional array for the function. Specify your answer in detail. (13%)
 - Use a representation of linked list for the function. Specify your answer in detail. (12%)
- (25%) Please describe the steps of performing the Kruskal and Prim algorithms for the minimum cost spanning tree shown below.



- (10%) Explain the sorting algorithm that is most suitable to be used with single linked list? You need to explain why your sorting algorithm could be better than others.
- (15%) Suppose you are given a sorted list of N elements followed by $f(N)$ randomly ordered elements. How would you best sort the entire list if
 - $f(N)=O(1)$ (3%)
 - $f(N)=O(\log N)$ (3%)
 - $f(N)=O(\sqrt{N})$ (3%)
 - How large can $f(N)$ be for the entire list still to be sortable in $O(N)$ time? (6%)Please explain your answer briefly.

注意：背面有試題

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參考用

5. (5%) In your opinion, which data structure is most suitable for the symbol table of an assembler? Explain your answer briefly.
6. (10%) Given the postfix representation of an expression: abcde+*/-fg+/
 - a) Construct the expression tree for the given postfix by using the concept of stack. To get credits, you are supposed to show the construction step by step including the content of the theoretical stack. (8%)
 - b) Find the equivalent prefix expression by using the result of (a). (2%)
7. (10%) Each of $A_{n \times n}$ and $B_{n \times n}$ is an n-by-n matrix. Write a program in C language to compute the matrix $C_{n \times n}$, where $C_{n \times n} = A_{n \times n} * B_{n \times n}$. Your program must output the result like an n-by-n matrix.

注意：背面有試題