國立成功大學

110學年度碩士班招生考試試題

編　號：178

系　所：電機工程學系

科　目：資料結構

日　期：0202

節　次：第 2 節

備　註：不可使用計算機

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※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. For a two dimensional array A, if the location of $A(4,3)$ is 1000 and $A(3,5)$ is 1013. Assume that each element occupies 1 address. What is the location of $A(2,2)$? (10 %)

2. Which of the choices DO NOT contain two equivalent expressions? Note that $A\text{^}B$ is A^B. (15 %)

   (a) Infix *A+B–C* Prefix *-+ABC*

   (b) Postfix *AB+CD–** Prefix **+AB–CD*

   (c) Postfix *AB^C*D–EF/GH+/+* Prefix *+–*^ABCD//EF+GH*

   (d) Postfix *AB+C*DE– –FG+^* Prefix *^–*+ABC–DE+FG*

   (e) None of the above

3. Read the following data in the given order: (30 %)

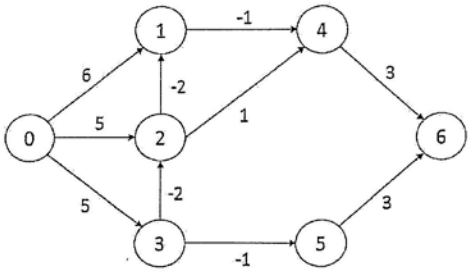
   55, 45, 25, 35, 85, 95, 65, 75, 105, 15

   (a) If you create a max heap for them, what will be the value in root? (10 %)

   (b) If you create a 2-3 tree for them, what will be the value in root? (10 %)

   (c) If you create an AVL tree for them, what will be the value in root? (10 %)

4. Use the Bellman-Ford algorithm, **STEP BY STEP**, to find the shortest path and the length from node 0 to node 6 in the following graph. Note that you get 0 point without showing the result after each step. (15 %)



5. Consider the merge sort and quick sort. Let L_1 and L_2 be two sorted lists of m and n elements, respectively. (15 %)

   (a) What is the maximum number of comparisons needed for merging L_1 and L_2? (5 %)

   (b) What is the minimum number of comparisons needed for merging L_1 and L_2? (5 %)

   (c) Both merge sort and quick sort are suitable for external sorting. Right? Explain your answer. (5 %)

6. Describe three key points for designing a good hashing function. (15 %)