大同大學 103 學年度(暑)轉學入學考試試題

考試科目:資料結構　　　所別:資訊工程學系　　　第 1/1 頁

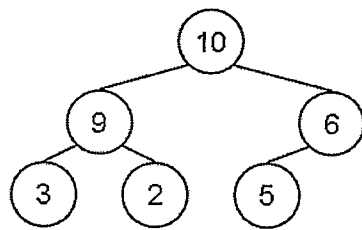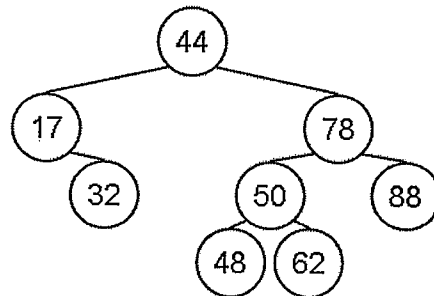註:本次考試 <u>不可以</u>參考自己的書籍及筆記；　<u>不可以</u>使用字典；　<u>不可以</u>使用計算器。
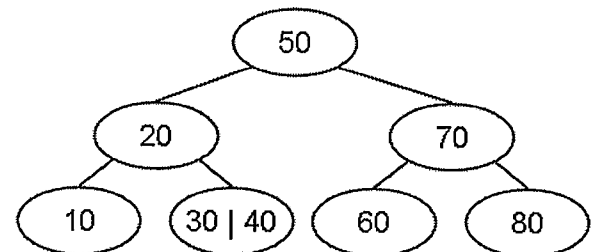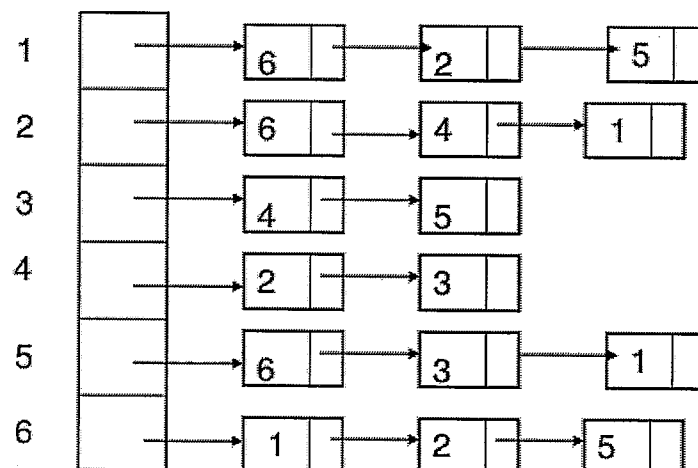

Fig. 1. A max heap　　　Fig. 2. An AVL tree　　　Fig.3. A 2-3 tree

1. (5 p oints) Refer to the **max heap** in Fig. 1. What will the max heap be after node **10** has been removed?

2. (5 p oints) Refer to the **AVL tree** in Fig. 2. What will the AVL tree be after node **44** has been removed?

3. (5 p oints) Refer to the **2-3 tree** in Fig. 3. What will the 2-3 tree be after node **50** has been removed?

4. (5 p oints) Draw a **nonempty tree** that is both a **max heap** and a **binary search tree**.

5. (5 p oints) Draw the **binary expression tree** for the expression (a + b) * (c − d) / e ?

6. (5 p oints) What is the **prefix** notation for the expression (a + b) * (c − d) / e ?

7. (5 p oints) What is the **postfix** notation for the expression (a + b) * (c − d) / e ?

8. (5 p oints) What is the main **difference** between **stacks** and **queues**?

9. (5 points) What is the main **difference** between **queues** and **priority queues**?

10. (10 points) What are **height balanced trees**? What are the **purpose** and **benefit** of height balanced trees?

11. (10 points) What are **hash tables**? What are the **purpose** and **benefit** of hash tables?

12. (10 points) Write an **iterative** C/C++ function **Iter(int n)** that can print the **sequence from n to 1**.

13. (10 points) Write a **recursive** C/C++ function **Recur(int n)** that can print the **sequence from n to 1**.

14. (5 points) Draw the **graph** represented by the **adjacency list** below.

15. (5 points) Do **BFS** on the **graph** and show the visited vertices in order if the starting vertex is **3**.

16. (5 points) Do **DFS** on the **graph** and show the visited vertices in order if the starting vertex is **3**.

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