

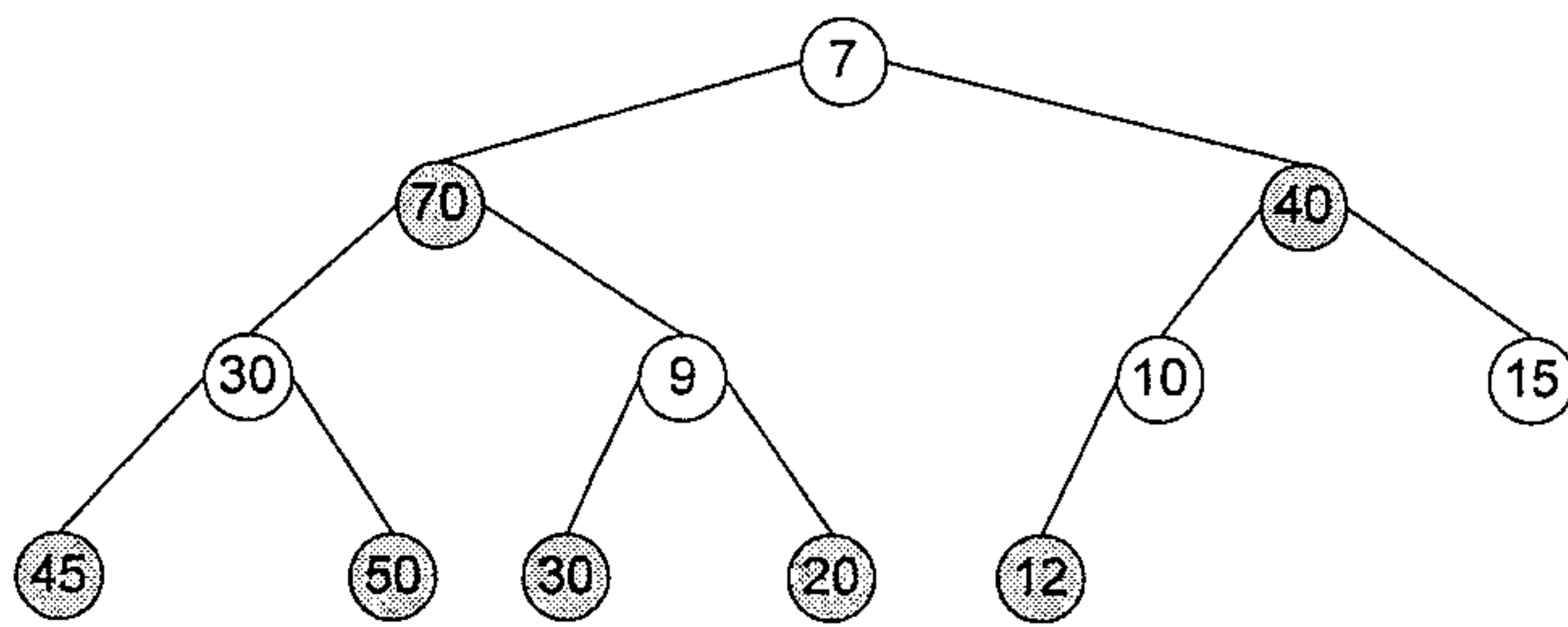
# 國立清華大學 106 學年度碩士班考試入學試題

系所班組別：音樂學系碩士班 音樂工程及應用音樂組

考試科目（代碼）：電腦科學概論(6702)

共 2 頁，第 1 頁 \*請在【答案卷、卡】作答

1. In Database Management Systems (DBMS), the data independency is a very important characteristic. Why is it so important to ensure data independency? (6%) Explain how to ensure data independency. (8%)
2. What are two major approaches to represent sound? (4%) Describe their advantages and disadvantages. (8%)
3. Describe Von Neumann architecture. (6%) What is Von Neumann bottleneck? (6%)
4. The following figure demonstrates a structure popularly employed in the chess game systems. Examine its characteristics carefully and answer the following questions:



- a. What is the name of this data structure? (4%)
  - b. What are the advantages and disadvantages of this structure? (8%)
5. Identify which of the following are functional, object-oriented, procedural, and declarative programming language respectively. (8%)  
1) FORTRAN 2) PROLOG 3) C 4) C++ 5) LISP 6) JAVA  
7) SMALLTKL 8) SCHEME 9) VISUAL BASIC 10) ALGOL
  6. What letters are interrogated by the binary search if it is applied to the list A, B, C, D, E, F, G, H, I, J, K, L, M, N, O when searching for the value J? What about the value Z? (10%)
  7. What is the time computation complexity of binary search in terms of  $O(f(n))$ ? (5%)

## 國立清華大學 106 學年度碩士班考試入學試題

系所班組別：音樂學系碩士班 音樂工程及應用音樂組

考試科目（代碼）：電腦科學概論(6702)

共\_\_2\_\_頁，第\_\_2\_\_頁 \*請在【答案卷、卡】作答

8. Suppose you have two buckets. One has a capacity of exactly 3 liters, the other has a capacity of 5 liters. You can pour water from one bucket to another, empty a bucket, or fill a bucket at any time. Your problem is to place exactly 4 liters of water in the 5-liter bucket. Describe the procedure how this problem can be achieved. (7%)
9. Define TCP and UDP? What is the difference between TCP and UDP? (10%)
10. Design a public key encryption system based on the list 2 3 6 12 24 and the fact that 30 and 38 are multiplicative inverse in a modular system with modulus 67. (10%)