注意事項：

　　1.答案依序書寫於答案卷上，不必抄題。

　　2.答案卷不可書寫任何可辨別個人姓名或特殊標記，違者不予計算。

　　3.請於試題紙上填寫准考證號碼，繳卷時「試題」、「答案卷」一併繳回。

　　4.每題10分，10題共100分。

1. Explain the differences in how much the following scheduling algorithms discriminate in favor of short processes：

   a. FCFS (First Come First Served)

   b. RR (Round-Robin)

   c. Multilevel feedback queues

2. Consider the following segment table：

 | Segment | Base | Length |
   |---------|------|--------|
   | 0 | 139 | 890 |
   | 1 | 5959 | 10 |
   | 2 | 123 | 124 |
   | 3 | 2356 | 1219 |
   | 4 | 1983 | 123 |

   What are the physical addresses for the following logical addresses?

   A. 93

   B. 9

   C. 2548

   D. 9527

   E. 112

3. Discuss the four stages in the overall query optimization process of the DBMS.

4. If $\begin{cases} T(1) = 1 \\ T(n) = T(\frac{n}{2}) + 3 \end{cases}$, then how is T(n) compleity expressed in Big-O?

5. TCP congestion control is composed of three mechanisms, AIMD, slow start, and conservative after timeout events. Please give the detailed narration of TCP congestion control.

6. First, show how pure Aloha and slotted Aloha work. Second, explain why slotted Aloha overwhelm pure Aloha.

7. A cyclic redundancy check (CRC) is an error-detecting code commonly used in digital networks and storage devices to detect accidental changes to raw data. What is the transmitted data under the condition that the data F(x) is 1110100 and the generating polynomial G(x) is 1101 when CRC is used?

8. Distance Vector is an important routing protocol. Please show how the node S builds its Distance Vector.

9. The adjacency linked list representation is as shown in Diagram (2) below. Use the Depth First Search algorithm and write its traverse sequence for this diagram. Also, draw the DFS spanning tree.
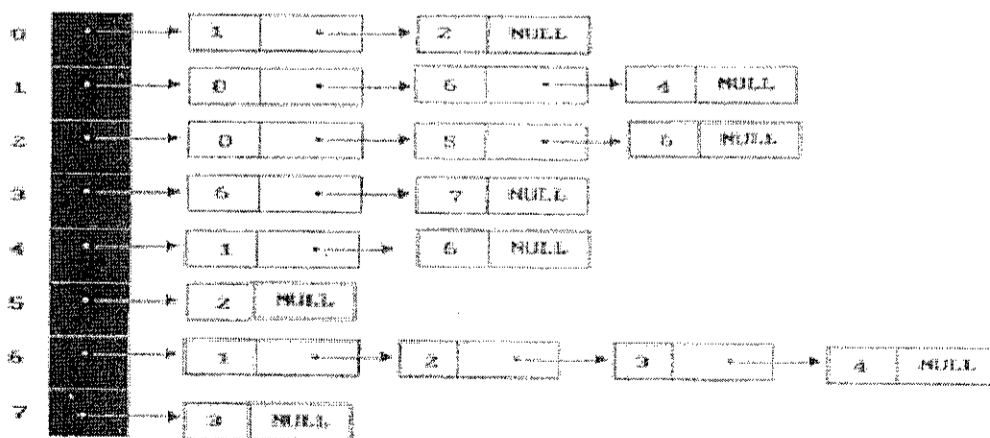
10. Answer whether the following sentences are True (T) or False (F). Also, write the explanation for your answer.

    (1) A binary tree can be empty.

    (2) Any weighted graph G can have one and only one kind of minimal cost spanning tree structure.

    (3) Five nodes can generate 60 different binary trees.

    (4) Any AOV (Activity on Vertex) network G has one and only one topological sort.