Assignment 5

Due on 2021-02-20, 23:59 UTC

1. What is a predicate query?
   - Determine its meaning
   - How is it used in the context of the material covered in the course?
   - Provide three examples of how a predicate query can be used.
   - Discuss the significance of predicate queries in data retrieval.

2. What are the top three ways to write a predicate query?
   - Use set notation
   - Use table notation
   - Use boolean expressions

3. What are the advantages and disadvantages of using boolean expressions in predicate queries?
   - Advantages:
     - Easy to understand and implement
     - Can be used with any database management system
   - Disadvantages:
     - Can be less efficient than other methods
     - Can be more complex to write

4. Describe the query optimization techniques used in database management systems. What is the role of the optimizer in improving query performance?
   - Join optimization
   - Indexing
   - Estimation of query execution time
   - Role of the optimizer:
     - Improves query execution time
     - Selects the best execution plan

5. When an expert uses a predicate query, what is the expected behavior of the database management system?
   - The database management system processes the query and returns the results.
   - The query is executed and the results are displayed.

Use the following information to complete Questions 9.5.5.

Consider the following scenario: a city plans to install an optical fiber sensor network to monitor traffic congestion. The city decides to install a sensor at every 500 meters along the major roads.

9. What is the highest possible speed at which the sensor can detect a change in traffic volume?
   - 500 meters
   - 1 kilometer
   - 2 kilometers
   - 5 kilometers

10. What is the maximum bandwidth required for the sensor network?
    - 1 Gbps
    - 10 Gbps
    - 100 Gbps
    - 1 Tbps

The following information is relevant to Questions 9.6-9.9.

In an optical fiber sensor network, the fiber optic cable transmits data at speeds up to 40 Gbps. The sensor network consists of 10 nodes, each equipped with a sensor.

9. What is the maximum transmission speed of a single sensor?
   - 1 Gbps
   - 10 Gbps
   - 100 Gbps
   - 1 Tbps

10. What is the maximum bandwidth requirement for the network?
    - 1 Gbps
    - 10 Gbps
    - 100 Gbps
    - 1 Tbps

11. What is the maximum distance a sensor can be placed from the network center?
    - 1 kilometer
    - 5 kilometers
    - 10 kilometers
    - 20 kilometers

The following information is relevant to Questions 9.10-

In an optical fiber network, the fiber optic cable transmits data at speeds up to 40 Gbps. The network consists of 10 nodes, each equipped with a sensor.

9. What is the maximum transmission speed of a single sensor?
   - 1 Gbps
   - 10 Gbps
   - 100 Gbps
   - 1 Tbps

10. What is the maximum bandwidth requirement for the network?
    - 1 Gbps
    - 10 Gbps
    - 100 Gbps
    - 1 Tbps

11. What is the maximum distance a sensor can be placed from the network center?
    - 1 kilometer
    - 5 kilometers
    - 10 kilometers
    - 20 kilometers

The following information is relevant to Questions 9.12-

In an optical fiber network, the fiber optic cable transmits data at speeds up to 40 Gbps. The network consists of 10 nodes, each equipped with a sensor.

9. What is the maximum transmission speed of a single sensor?
   - 1 Gbps
   - 10 Gbps
   - 100 Gbps
   - 1 Tbps

10. What is the maximum bandwidth requirement for the network?
    - 1 Gbps
    - 10 Gbps
    - 100 Gbps
    - 1 Tbps

11. What is the maximum distance a sensor can be placed from the network center?
    - 1 kilometer
    - 5 kilometers
    - 10 kilometers
    - 20 kilometers

The following information is relevant to Questions 9.14-

In an optical fiber network, the fiber optic cable transmits data at speeds up to 40 Gbps. The network consists of 10 nodes, each equipped with a sensor.

9. What is the maximum transmission speed of a single sensor?
   - 1 Gbps
   - 10 Gbps
   - 100 Gbps
   - 1 Tbps

10. What is the maximum bandwidth requirement for the network?
    - 1 Gbps
    - 10 Gbps
    - 100 Gbps
    - 1 Tbps

11. What is the maximum distance a sensor can be placed from the network center?
    - 1 kilometer
    - 5 kilometers
    - 10 kilometers
    - 20 kilometers

The following information is relevant to Questions 9.16-

In an optical fiber network, the fiber optic cable transmits data at speeds up to 40 Gbps. The network consists of 10 nodes, each equipped with a sensor.

9. What is the maximum transmission speed of a single sensor?
   - 1 Gbps
   - 10 Gbps
   - 100 Gbps
   - 1 Tbps

10. What is the maximum bandwidth requirement for the network?
    - 1 Gbps
    - 10 Gbps
    - 100 Gbps
    - 1 Tbps

11. What is the maximum distance a sensor can be placed from the network center?
    - 1 kilometer
    - 5 kilometers
    - 10 kilometers
    - 20 kilometers