

1. Let's suppose you build a social media application (which must support big data analysis). What is your choice of the database backend?

1. Noe4j
2. SQLite
3. MongoDB
4. MySQL

2. A typical three-tier architecture of a web database application consists of presentation, logic and database layers. Consider the following task -- Post-processing of data to produce a summary report. Identify the layer it belongs to:

1. Database layer
2. Logic Layer
3. Presentation Layer

3. Consider the following query. Assume empNo is the primary key and the table has a B+ tree index on empNo. The only known statistic is that 80% of employees have E numbers starting with '9'. What is the most likely access method used to extract data from the table?

```
SELECT empNo, empName
FROM staffInfo
WHERE empNo LIKE 'E9%';
```

1. Full table scan
2. Index Scan
3. Build a hash table on empNo and then do a hash index scan
4. Index-only scan
5. Without having more statistics, it is difficult to determine

4. Consider the following query. Assume empNo is the primary key and the table has a B+ tree index on empNo. The only known statistic is that 10% of employees have E numbers starting with '9'. What is the most likely access method used to extract data from the table?

```
SELECT empName
FROM staffInfo
WHERE empNo = 'E9999';
```

1. Full table scan
2. Index Scan
3. Build a hash table on empNo and then do a hash index scan
4. Index-only scan
5. Without having more statistics, it is difficult to determine

5. In which of the following circumstances the query optimiser would likely choose full-table scan over index scan?

1. when the query condition is highly selective
2. when the query doesn't have a WHERE clause
3. when the query has a left outer join
4. none of these cases
5. In all of these cases

6. Consider the following two queries. They produce the same result.

In real execution times, which will likely to be the faster one?

```
SELECT s.empName
FROM staffInfo s JOIN dept d ON
      s.deptNo = d.deptNo
WHERE d.deptName = 'HR';
```

```
SELECT s.empName
FROM staffInfo s, dept d
WHERE s.deptNo = d.deptNo AND
      d.deptName = 'HR');
```

1. First query (with JOIN in FROM clause)
2. Second query (with join condition stated in WHERE clause)
3. Cannot determine without knowing the number of employees in HR department
4. Both will be the same speed

7. Why are indexes not always used when processing the WHERE clause? Choose all correct answers.

1. Based on statistics, full table scan can be cheaper
2. Available index is a hash index and WHERE condition is a partial match
3. WHERE condition was applied on an interim result (from a previous step in the query processing) and indexes cannot be used on interim results
4. None of these

8. INSTEAD OF triggers are used when

1. Updating grand total on a shopping cart before check out
2. Inserting log records before updating a bank account
3. Checking if a voter has voted earlier
4. None of the above

9. What is the default indexing method used in enterprise-level database systems?

1. Binary Index
2. B+ Tree Index

- 3. Composite Index
- 4. Primary Key Index
- 5. Bitmap Index

10. Write one difference between a view and a materialized view.