

Quiz 6

Databases

15 April 2026

Full name:

You have 10 minutes to answer this quiz, directly on this sheet of paper. No electronic devices or material of any kind is allowed. Do not forget to add your name above. Every question amounts to 2 points; the quiz is graded out of 10 points.

Questions

Q1. Circle the only correct answer.

Why do database management systems transfer data between disk and memory in units of **pages** (blocks) rather than individual tuples?

- a. because tuples are always the same size
- b. because the operating system forbids reading single tuples
- c. because the latency cost of each disk access is high, so amortizing it over a larger transfer is more efficient
- d. because pages are easier to sort than tuples

Q2. Circle all correct answers (there may be more than one).

Which of the following statements about B^+ -trees are correct?

- a. All leaves are at the same depth.
- b. They are designed so that each node fits in one disk page.
- c. They are only useful for equality queries, not range queries.
- d. Insertions may cause a leaf node to split.

Q3. In MySQL (InnoDB), a secondary index entry stores the indexed columns together with the primary key of the row. Explain briefly why this means that **short primary keys** are preferable.

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Q4. Circle the only correct answer.

A hash index is well suited for:

- a. range queries such as $10 \leq \text{id} \leq 20$
- b. exact-match queries such as $\text{id} = 3$
- c. sorting the result by key order
- d. queries that return all tuples in a relation

Q5. Consider a B⁺-tree where each internal node has about 200 children. The root is at depth 0 and the leaves are at depth 3. How many leaves can such a tree contain? Circle the only correct answer.

- a. about 600
- b. about 8×10^6
- c. about 4×10^4
- d. about 10^9