MSDS 7330
File Organization and Database Management
Quiz Indexes

This is a synchronous session quiz assignment for MSDS7330, File Organization and Database Management. This quiz is due at the end of the same class period in which it is handed out or whenever the instructor tells you to hand it in; whichever comes first. Enter your answer to each question in the MSDS 7330 Quiz Answer Sheet Word document. Be sure to place your name and today's date in the Quiz Answer Sheet, and place your last name and the unit number at the beginning of the file name. For example, the filename for the quiz answer sheet for Unit 8 for Daniel Engels should be *Engels8MSDS7330QuizAnswerSheet.docx*.

For one question, in the Quiz Answer Sheet write out the explanation why the answer is correct. Your chosen question should be a different question from all other students in the session.

Your answer Word document should be submitted on the 2DS system for the quiz number equal to the unit number. For example, the quiz for Unit 8 should be submitted for Quiz 8.

1) What is the purpose of indexes in databases?
   a) To reduce the size of database storage.
   b) To improve the performance of a database query.
   c) To organize the order in which tables are stored on disk to improve performance.
   d) To normalize a database.
   e) All of the above.
   f) None of the above.

2) What are the two basic kinds of indexes?
   a) Sequential and Random
   b) Dense and Sparse
   c) Ordered and Hash
   d) Bitmap and Multilevel
   e) All of the above.
   f) None of the above.

2) A) How many types of indexes are there in SQL Server? [Hint: Answer 2)A as part of answering 2).]
   a) 1
   b) 2
   c) 3
   d) 4

3) Which of the following are factors on which an index technique should be evaluated?
   a) Access time.
   b) Insertion time.
   c) Space overhead.
   d) Access types.
   e) All of the above.
   f) None of the above.

4) Which of the following statements about indexes is true?
   a) An index is created based upon a *search key*.
   b) Only one index may be created per table.
   c) The *search key* for an index must be a *primary key*.
   d) An index entry must appear for every *search key* value that appears.
   e) All of the above.
   f) None of the above.

5) In ordered indices the file containing the records is sequentially ordered, which index is an index whose search key also defines the sequential order of the file?
   a) Clustered index
   b) Structured index
   c) Unstructured index
   d) Nonclustered index
   e) All of the above.
   f) None of the above.

6) While inserting a record into a single level dense ordered index, if the search-key value does not appear in the index, which of the following happens?
   a) The system adds a pointer to the new record in the index entry with a search-key value closest to the value of the record being inserted.
   b) The system places the record being inserted after the other records with the same search-key values.
   c) The system inserts an index entry with the search-key value and pointer to the new record into the index at the appropriate position.
   d) The system inserts an index entry with the search-key value and pointer to the new record into the index at the end of the index.
   e) All of the above.
   f) None of the above.

7) A B$^+$-tree index is
   a) an ordered, dense single level index.
   b) an ordered, multilevel index that may have unbalanced branches in its structure.
   c) an ordered, multilevel index that has exactly one search key value and one pointer in every leaf node.
   d) an ordered, multilevel index that has a balanced branch structure.
   e) All of the above.
   f) None of the above.

8) A B$^+$-tree node that points only to other B$^+$-tree nodes is called
   a) a leaf node.
   b) an internal node.
   c) a routing node.
   d) a record node.
   e) All of the above.
   f) None of the above.

9) A typical node in a B$^+$-tree has one more pointer than values. Consider the root node of a two level B$^+$-tree. The first pointer points to the beginning of the left-most leaf node. What is the value of the first entry in the root node?
   a) The value of the first entry in the left-most leaf node.
   b) The value of the first entry in the second left-most leaf node.
   c) The value of the last entry in the left-most leaf node.
   d) The value that is one less than the first entry in the second left-most leaf node.
   e) All of the above.
   f) None of the above.

10) The deletion of a search key value in a B$^+$-tree
   a) Deletes the value and its pointer from the leaf nodes only.
   b) May require a recalculation of the B$^+$-tree.
   c) May result in the deleted value being present in a non-leaf node.
   d) May result in a change in the number of levels of the B$^+$-tree.
   e) All of the above.
   f) None of the above.

11) What is the main limitation of Hierarchical indexes?
   a) Limited capacity (unable to hold much data)
   b) Limited flexibility in accessing data
   c) Overhead associated with maintaining indexes
   d) The performance of the database is poor
   e) All of the above.
   f) None of the above.

12) In SQL, an index is created using which of the following SQL statements?
   a) CREATE INDEX < indexName > ON < relationName > (< attributeList >);
   b) CREATE INDEX < indexName > USING < attributeNameList > FROM < relationName >;
   c) CREATE INDEX < indexName > FROM < relationName > GROUP BY < attributeName >;
   d) CREATE INDEX < indexName > (< attributeName1 > < dataType > < attributeName2 > < dataType > $\vdots$ < attributeNameN > < dataType >);
   e) All of the above.
   f) None of the above.