Questions on Table Storage

1 True/False Questions

This document contains sample questions for your quiz on MVCC. On your final exam, each correct answer will result in +1 point, each incorrect answer will result in -1 point, and each blank answer in 0 points.

One of the purposes of the quiz is to test your ability to read/understand documentation, and you will be allowed to use a computer for the quiz with no limitations.

1. True False An OID is a signed 4-byte integer.

2. True False Every row is assigned an OID.

3. True False The number 35184372088832 is a valid OID.

4. True False The `initdb` utility will initialize a new database cluster.

5. True False The `POSTGRES_DATA` environment variable stores the path to the base directory.

6. True False It is safe to delete the postgres `pg_xlog` folder in order to free up disk space.

7. True False The file `postgresql.conf` is used to set configuration parameters.

8. True False The folder `pg_stat` contains temporary files for the statistics subsystem.

9. True False Every relation in a postgres database is physically stored on the harddrive as exactly one file.

10. True False With default settings, a table that takes up 160KB on disk has exactly 20 pages.

11. True False TID stands for *Transaction ID*, and every transaction is assigned a unique TID.

12. True False OID stands for *Object ID*, and every table is assigned a unique OID.

13. True False No page can have more than 100 tuples in it.

14. True False Very large tuples can span multiple pages.

15. True False If a tuple exists on disk, then there is guaranteed to be some transaction that can see the tuple.

16. True False In order to remove dead tuples from a table, you must manually run the VACUUM command on that table.

17. True False The postgres documentation recommends disabling autovacuum to improve the performance of very large databases.

18. True False The autovacuum will perform a VACUUM FULL operation when needed to reduce the amount of disk space used by a table.

19. True False The `pg_freespacemap` extension is required to run a VACUUM FULL instead of just a VACUUM.

20. True False Postgres can perform a VACUUM FULL on two different tables at the same time concurrently.

21. True False Postgres can perform a VACUUM on two different tables at the same time concurrently.

22. True False When you use the INSERT command to insert multiple rows into a table at once, these rows are guaranteed to be inserted into the same page.

23. True False When you use the UPDATE command to modify a row, `t_xmax` field will not be modified.

24. True False Running the DELETE command can modify the `t_xmin` field of a row.

25. True False A single DELETE command can delete multiple rows from a table.

26. True False A row with `t_xmin` set to 99 will be visible to a transaction with `xid` of 90.

27. True False `t_cid` and `t_ctid` are synonyms.

28. True False A postgres database cluster can span dozens of computers.

29. True False Postgres is using too much disk space, and you need to free up some space. You identify that there is a large 10TB table that contains about 90% dead tuples. Running the VACUUM command on this table will likely free up several terabytes of disk space.

30. True False Postgres uses a table's FSM to quickly determine which page it can insert a tuple into.

31. True False Postgres uses a table's VM to speed up VACUUMing.

32. True False If you are inserting large text strings into postgres, the postgres documentation recommends compressing them first in order to save space.

33. True False The DELETE command deletes tuples directly from the page files on the harddrive.

34. True False NoSQL databases like MongoDB and CassandraDB use ACID compliant transactions.

35. True False Postgres transactions are ACID compliant.

36. True False The `synchronous_commit` system setting can be used to disable postgresql's ACID guarantees. This speeds up transactions, but may result in data loss if the server crashes.

37. True False If the write ahead log (WAL) grows very large, it is safe to delete it in order to free up disk space.

38. True False If the transaction log (clog/xact) grows very large, it is safe to delete it in order to free up disk space.

39. True False If the database cluster is being stored on an SSD, then the `random_page_cost` system parameter should should be reduced from its default value of 4.

40. True False The default `fillfactor` for tables is 100.

41. True False Increasing a table's `fillfactor` will generally cause the UPDATE operation to go faster, but the SELECT operation to go slower.

42. True False Tables that have INSERTs but no UPDATEs should use a `fillfactor` of 100, but for tables with many updates, it it is recommended to use a lower `fillfactor`.

43. True False There is no difference between a line pointer and an item pointer.

44. True False A page always has 24 bytes of header data.

45. True False A page can have 32 bytes of header data if it contains a column with more than 8 non-NULL values.

46. True False For any given page, the `pd_lower` value can never be greater than the `pg_upper` value.

47. True False Postgres does not suffer from the txid wraparound problem.

48. True False Phantom reads are possible in Postgres's REPEATABLE READ isolation level.

49. True False The visibility map was introduced in Postgres version 8.4 to reduce the cost of VACUUM processing.

50. True False The visibility map holds information about which pages contain dead tuples.

51. True False The postgres server process is the parent of all other postgres processes.

52. True False The WAL buffer is contained in the shared memory area.

53. True False By default, the maximum number of client connections in postgres is 100.