Sample Questions: MVCC

1 True/False Questions

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

We will cover the answers to about half the questions in class, and the answers to the other half are from the reading. 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 to access this documentation.

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.