Gradiance Online Accelerated Learning

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Help

Spring-20 HW7

Number of questions:	6
Positive points per question:	17.0
Negative points per question:	0.0

1. Consider the following sequence of records present in an undo/redo log:

(START, S); (S, A, 10, 20); (START T); (COMMIT S); (T, B, 5,15); (START U); (T, A, 20, 30); (COMMIT T); (U, B, 15, 25); (U, A, 30, 40).

Let both A and B fit in the same database block (i.e., both are INPUT from disk to memory together and both are OUTPUT from memory to disk together). Assuming that a quiescent checkpoint occured just before S started, determine what are the possible values of A and B on disk. Identify one such possibility from the list below.

- (●) a) A = 20; B = 5
- ( ) b) A = 10; B = 15
- ( ) c) A = 30; B = 5
- ( ) d) A = 40; B = 15

2. At the time of a system crash, let the log segment (in the undo/redo logging scheme) be as follows:

(START R);
(R, B, 1, 20);
(R, A, 13, 15);
(COMMIT R);
(START T);
(T, A, 15, 16);
(START CKPT(T));
(T, B, 20, 10);
(START S);
(COMMIT T);
(S, A, 16, 10);
(END CKPT);
(S, B, 10, 50);
(COMMIT S).

What are the possible values of A and B on disk when the crash occurred (i.e. before recovery from the crash)?

- ( ) a) A= 15; B = 1;
- ( ) b) A= 15; B = 20;
- ( ) c) A= 16; B = 1;
- (●) d) A= 10; B = 50;

3. Let a database has the constraint "X > Y > 0". Which of the following transactions does NOT preserve the consistency of the database?

(Assume X and Y are real numbers - not necessarily integers).

- a) X := X + 4; Y := X - 4
- b) X := Y + 1; Y := X - Y
- c) X := X + 2; Y := Y + 2
- d) X := X + 3; Y := X - 4

4. Let a database contain initial values of X = 5, Y = 13 and Z = 6. In the redo logging scheme, let the redo log contain the sequence of records:

(START, R);
(R, Y, 15);
(R, X, 15);
(COMMIT R);
(START S);
(S, X, 10);
(START T);
(S, Z, 16);
(T, Y, 20);
(COMMIT T).

Which of the following could be the state of the database on disk?

- a) X = 10; Y = 13; Z = 16;
- b) X = 5; Y = 20; Z = 6;
- c) X = 5; Y = 13; Z = 16;
- d) X = 10; Y = 13; Z = 6;

5. Which of the following transactions does NOT preserve the consistency of the database that has the constraint "A must be less than B"? (Assume A and B are integers { not necessarily positive.)

- a) A := B - 2 * A; B := A + 7
- b) A := A + 5; B := B + 7
- c) A := A - 5; B := B - 2
- d) A := B - A; B := B + A + 20

6. Let R be the transaction [X := X + 10; Z := Z - 1], S be the transaction [X := X + 15; Y := Y * 2] and T be the transaction [Y := Y + 10; Z := Z - 5]. What values of X, Y and Z could appear on disk when the undo log has the sequence of records:

(START R);
(START S);
(R, X, 5);
(R, Z, 10);
(COMMIT R);
(S, X, 15);
(S, Y, 20);
(START T);
(COMMIT S);
(T, Y, 40);
(T, Z, 9);

- a) X = 30; Y = 10; Z = 9;
- b) X = 5; Y = 40; Z = 9;
- c) X = 15; Y = 50; Z = 4;
- d) X = 30; Y = 40; Z = 4;

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