

HW8 #5

$T1: \underline{R_1(x)}, \underline{R_1(y)}, \underline{W_1(y)}$

$T2: \underline{R_2(x)}, \underline{W_2(x)}, R_2(y)$

$*(\underline{T1}, \underline{T2})$

$(T2, T1)$

$x: \underline{R_1, R_2, W_2}$

$y: R_1, W_1, R_2$



(T_1, T_2) : (1) T_1, T_2

(2) $R_1(x)$, $R_2(x)$, $W_2(x)$, $R_2(y)$
 $\swarrow \searrow$
 $R_1(y)$, $W_1(y)$

\Downarrow

(2) $R_2(x)$, $R_1(x)$, $W_2(x)$,

$R_1(y)$, $W_1(y)$, $R_2(y)$



HW7 #6

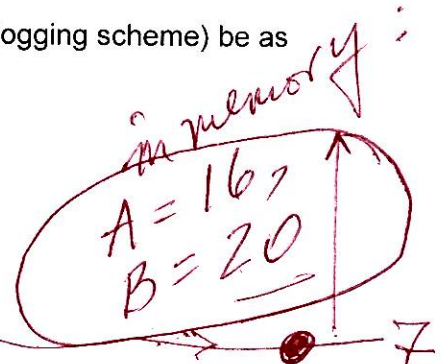


- Incorrect Choice 8: $X = 10; Y = 15; Z = 16;$
 Incorrect Choice 9: $X = 10; Y = 20; Z = 16;$
 Incorrect Choice 10: $X = 5; Y = 13; Z = 16;$
 Incorrect Choice 11: $X = 5; Y = 15; Z = 16;$
 Incorrect Choice 12: $X = 5; Y = 20; Z = 16;$

Question 6

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

- 1 (START R);
- 2 (R, B, 1, 20);
- 3 (R, A, 13, 15);
- 4 (COMMIT R);
- 5 (START T);
- 6 (T, A, 15, 16);
- 7 (START CKPT(T));
- 8 (T, B, 20, 10);
- 9 (START S);
- 10 (COMMIT T);
- 11 (S, A, 16, 10);
- 12 (END CKPT);
- 13 (S, B, 10, 50);
- 14 (COMMIT S).



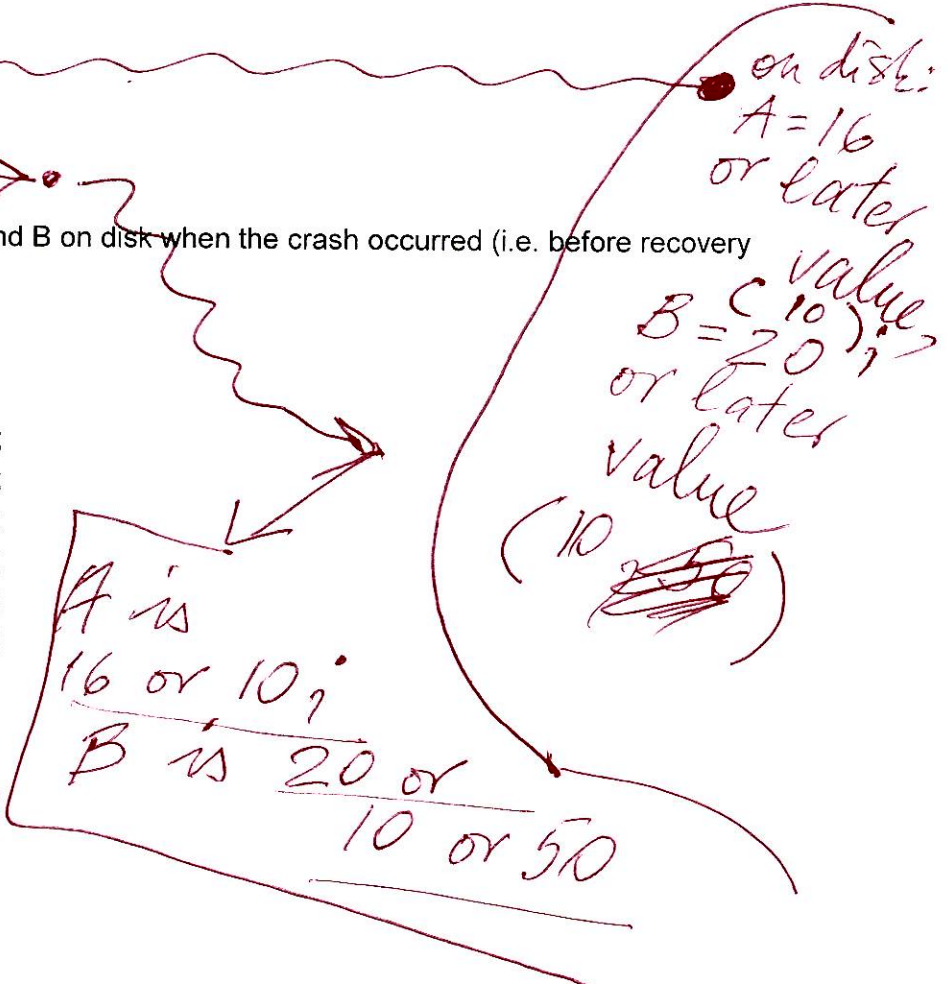
What are the possible values of A and B on disk when the crash occurred (i.e. before recovery from the crash)?

Correct choices:

- Correct Choice 1: $A = 10; B = 10;$
 Correct Choice 2: $A = 10; B = 20;$
 Correct Choice 3: $A = 10; B = 50;$
 Correct Choice 4: $A = 16; B = 10;$
 Correct Choice 5: $A = 16; B = 20;$
 Correct Choice 6: $A = 16; B = 50;$

Incorrect choices :

- Incorrect Choice 1: $A = 13; B = 10;$
 Incorrect Choice 2: $A = 13; B = 20;$



Incorrect Choice 3: X = 5; Y = 40; Z = 4;
 Incorrect Choice 4: X = 15; Y = 40; Z = 4;
 Incorrect Choice 5: X = 15; Y = 50; Z = 4;
 Incorrect Choice 6: X = 15; Y = 50; Z = 9;
 Incorrect Choice 7: X = 30; Y = 10; Z = 4;
 Incorrect Choice 8: X = 30; Y = 10; Z = 9;
 Incorrect Choice 9: X = 5; Y = 10; Z = 9;
 Incorrect Choice 10: X = 5; Y = 10; Z = 4;

Question 5

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?

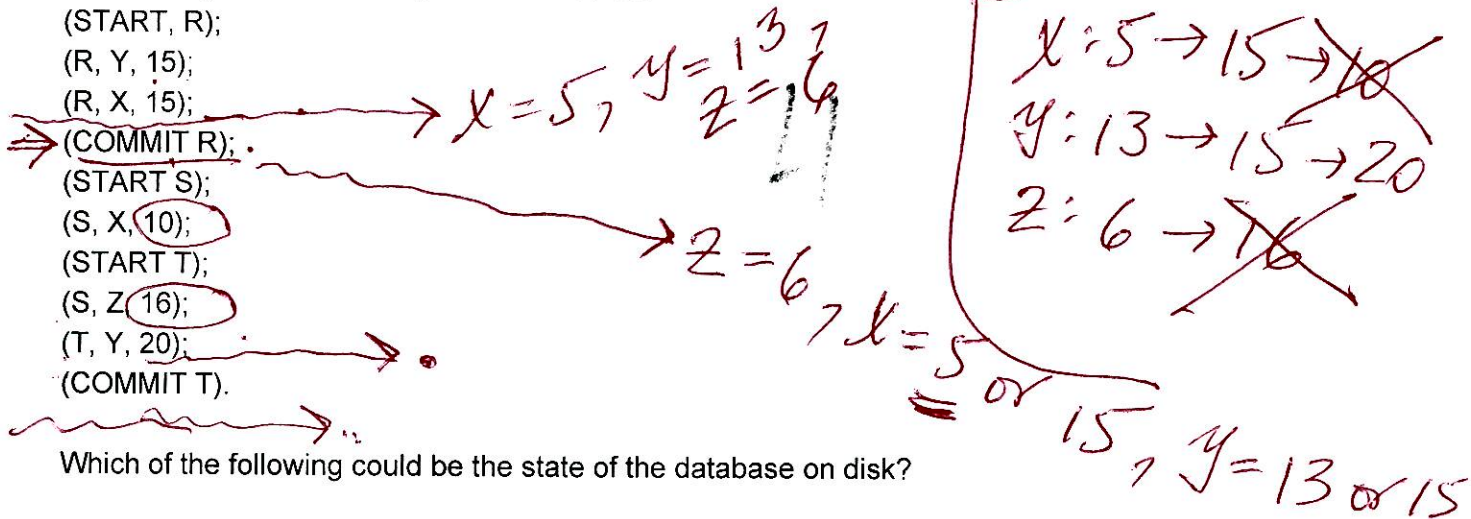
Correct choices:

Correct Choice 1: X = 5; Y = 13; Z = 6;
 Correct Choice 2: X = 5; Y = 15; Z = 6;
 Correct Choice 3: X = 5; Y = 20; Z = 6;
 Correct Choice 4: X = 15; Y = 13; Z = 6;
 Correct Choice 5: X = 15; Y = 15; Z = 6;
 Correct Choice 6: X = 15; Y = 20; Z = 6;

Incorrect choices :

Incorrect Choice 1: X = 10; Y = 13; Z = 6;
 Incorrect Choice 2: X = 10; Y = 15; Z = 6;
 Incorrect Choice 3: X = 10; Y = 20; Z = 6;
 Incorrect Choice 4: X = 15; Y = 13; Z = 16;
 Incorrect Choice 5: X = 15; Y = 15; Z = 16;
 Incorrect Choice 6: X = 15; Y = 20; Z = 16;
 Incorrect Choice 7: X = 10; Y = 13; Z = 16;

HW7#5



Correct Choice 6: $X := X - 2; Y := X - 1$
 Correct Choice 7: $X := X + 20; Y := Y * 2$
 Correct Choice 8: $X := Y + 10; Y := X - 1.01 * Y$

Incorrect choices :

Incorrect Choice 1: $X := X * 2; Y := X - 2 * Y$
 Incorrect Choice 2: $X := Y + 1; Y := X - Y$
 Incorrect Choice 3: $X := X + 2; Y := Y + 2$
 Incorrect Choice 4: $X := Y * 2.5; Y := X - 1.5 * Y$
 Incorrect Choice 5: $X := X + 4; Y := X - 4$
 Incorrect Choice 6: $X := X + 5; Y := X - Y$
 Incorrect Choice 7: $X := Y + 1; Y := X - 1$
 Incorrect Choice 8: $X := X * 2; Y := Y * 2$

Question 4

HW7 #4

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);

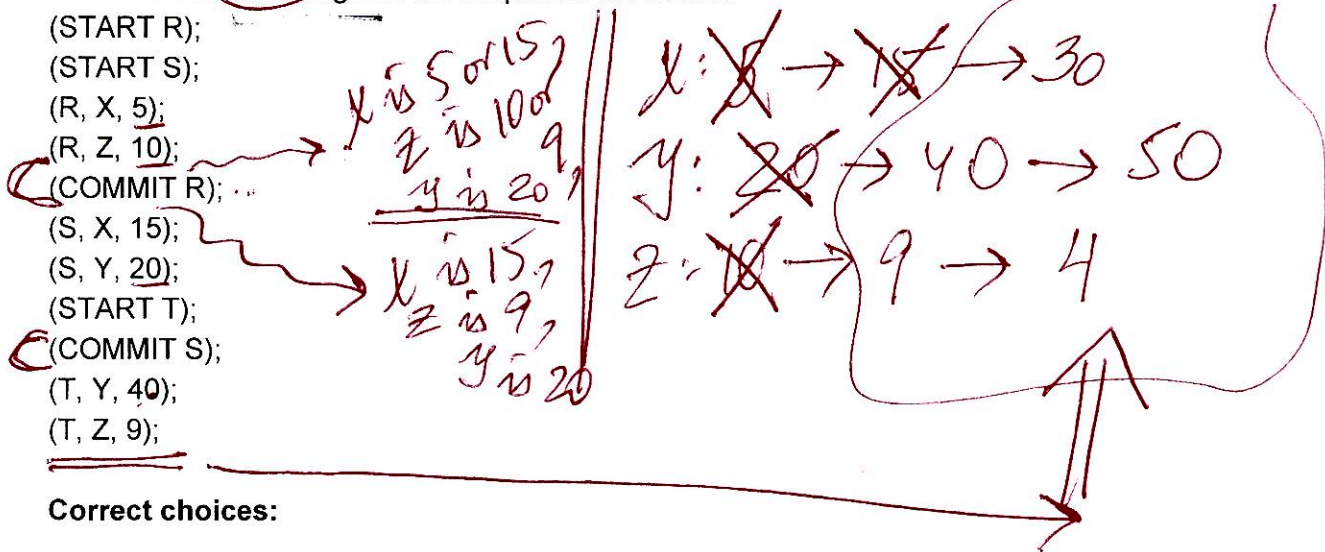
(T, Z, 9);

Correct choices:

Correct Choice 1: $X = 30; Y = 40; Z = 9;$
 Correct Choice 2: $X = 30; Y = 40; Z = 4;$
 Correct Choice 3: $X = 30; Y = 50; Z = 9;$
 Correct Choice 4: $X = 30; Y = 50; Z = 4;$

Incorrect choices :

Incorrect Choice 1: $X = 5; Y = 40; Z = 9;$
 Incorrect Choice 2: $X = 5; Y = 50; Z = 9;$



HW6 # 3

Problem 3

The relation $R(x)$ consists of a set of integers --- that is, one-component tuples with an integer component.

Alice's transaction is a query:

A1 SELECT SUM(x)
FROM R;

A2 COMMIT;

Betty's transaction is a sequence of inserts:

B1 INSERT INTO R VALUES(10);

B2 INSERT INTO R VALUES(50);

B3 INSERT INTO R VALUES(70);

B4 COMMIT;

Carol's transaction is a sequence of deletes:

C1 DELETE FROM R WHERE x=70;

C2 DELETE FROM R WHERE x=50;

C3 COMMIT;

Before any of these transactions execute, the sum of the integers in R is 5000, and none of these integers are 10, 50, or 70. If Alice's, Betty's, and Carol's transactions run at about the same time, and each runs under isolation level READ COMMITTED, which of these sums could be produced by Alice's transaction?

Correct choices:

Correct Choice 1: 5000

Correct Choice 2: 5130

Correct Choice 3: 5010

Correct Choice 4: 5080

Incorrect choices:

Incorrect Choice 1: 5020

Incorrect Choice 2: 5050

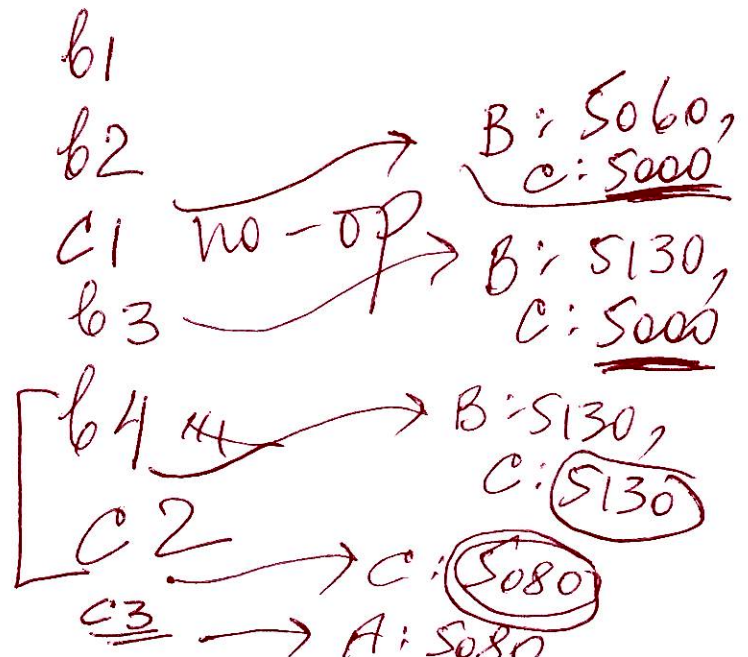
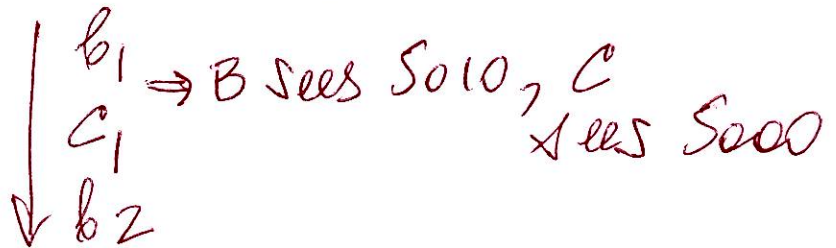
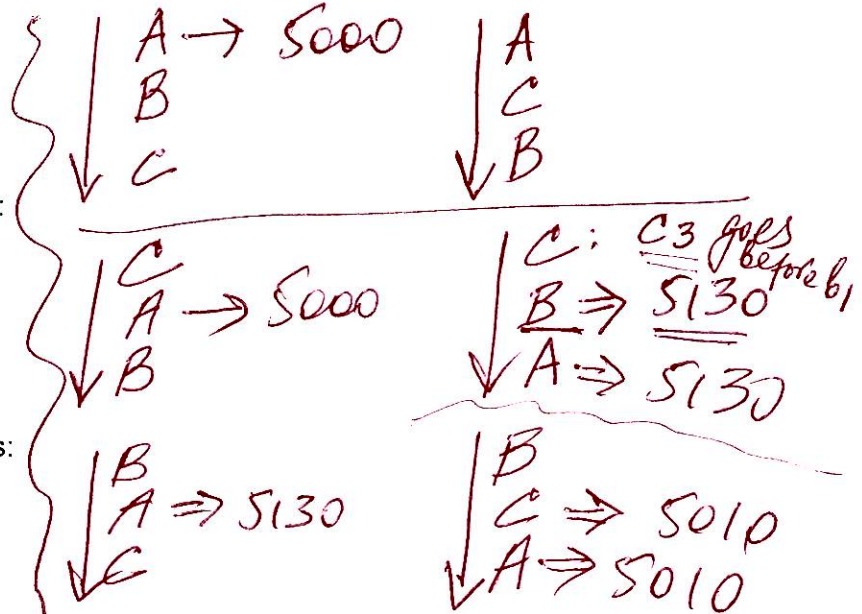
Incorrect Choice 3: 4940

Incorrect Choice 4: 5070

Incorrect Choice 5: 4990

Incorrect Choice 6: 5060

Incorrect Choice 7: 5120



HW8 #1

$R_1(X), W_1(Y), R_2(Y), W_2(Z),$
 $W_1(X), \underline{C_1}, W_2(X), \underline{C_2}$

- serial? ($T_1 \rightarrow T_2, T_2 \rightarrow T_1$) No

- serializable? Yes

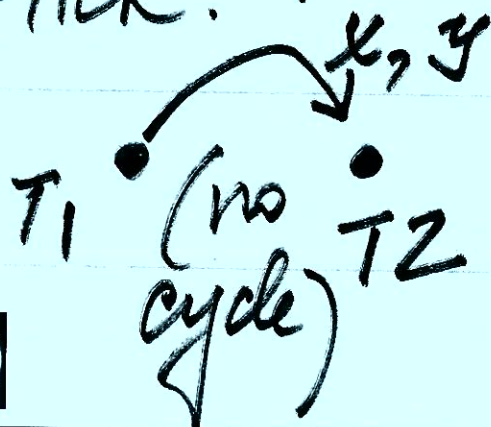
- recoverable? Yes

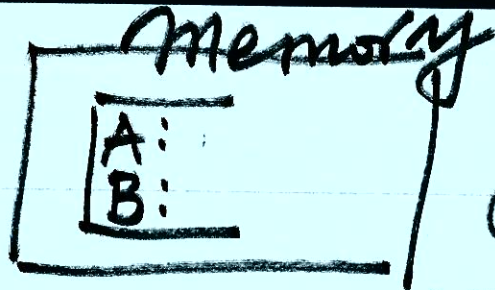
- ACID? NO

$X: R_1, W_1, W_2$

$Y: W_1, R_2$ Reads from

$Z: W_2$





HW7 #1

on disk
A=10
B=5

(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) -

[A: 10
B: 5 on disk

[A: 20 on disk
B: 5 on disk

[A: 20 on disk
B: 15 on disk

