

Homework 2

Question 1:

Assume that after the crash, DBMS is restarted and its transaction log is as follow,

```
<checkpoint>
<start T1>
<T1, A, 30, 40>
<T1, B, 20, 10>
<start T2>
<T2, C, 10, 15>
<start T3>
<T3, D, 10, 20>
<commit T3>
<T2, C, 15, 40>
<T2, D, 20, 40>
```

Using Undo/Redo logging method to recover all data elements.

Question 2:

Assume that after the crash, DBMS is restarted and its transaction log is as follow,

```
<start T1>
<T1, A, 30, 40>
<start T2>
<T2, B, 40, 60>
<T1, C, 20, 30>
<start ckpt (T1, T2)>
<commit T2>
<start T3>
<T3, B, 60, 50>
<commit T3>
```

Using Undo/Redo logging method to recover all data elements.

Question 3:

Assume that after the crash, DBMS is restarted and its transaction log is as follow,

```
<start ckpt (T1, T2, T3)>
```

<T₁, A, 10>
<T₂, B, 20>
<T₃, C, 30>
<commit T₂>
<T₃, B, 40> <T₁, D, 50>
<abort T₃>

Recover all data elements by using

- i. Undo logging
- ii. Redo logging

Question 4:

Give the following transaction log:

01) <start T₁>
02) <T₁, A, 60>
03) <commit T₁>
04) <start T₂>
05) <T₂, A, 10>
06) <start T₃>
07) <T₃, B, 20>
08) <T₂, C, 30>
09) <start T₄>
10) <T₃, D, 40>
11) <T₄, F, 70>
12) <commit T₃>
13) <T₂, E, 50>
14) <commit T₂>
15) <T₄, B, 80>
16) <commit T₄>

Suppose the record <start ckpt> of the nonquiescent checkpoint is put after following records, when is the record <end ckpt> written on the memory?

- i. <T₁, A, 60>
- ii. <T₂, A, 10>
- iii. <T₃, B, 20>
- iv. <T₃, D, 40>
- v. <T₂, E, 50>

Assume that the system meets a crash after each of cases above, recover all data elements by using

- i. Undo logging
- ii. Redo logging

The end.