Q1: Explain the transaction processing by DBMS showing the transaction work area in memory, the buffer and the database in disk.

Q2: The accounts A, B, C has the balances 500, 1000 and 1500 respectively. Write a transaction where 20% of C account will deducted and equally divided into two accounts A and B. Write log records for the transaction.

 Q3: The log records are given bellow and the system failed:

<T_0 **start**>
<T_0, A, 1000, 950>
<T_0, B, 2000, 2050>
<T_0 **commit**>
<T_1 **start**>
<T_1, C, 700, 600>

Explain the recovery from failure for the above case.

Q4:
a. Why is checkpoint used in log-based recovery systems?
b. How is a checkpoint performed? Explain with an example.
c. In a database log file, there are two checkpoints in the same day:
    First one: <**checkpoint** L> at time 8AM

    Second one: <**checkpoint** L> at 4PM

The system failed at 5PM. There were 2000 transactions between first and second checkpoint and 100 transactions were active during second checkpoint. After second checkpoint, 500 transactions are committed before failure. There were 200 transactions running during failure. Describe the recovery from failure.