

Question 1: Recovery (Part 2) [130 points]

- (i) **[10 points] ARIES:**
List the three phases of ARIES.
- (ii) **[10 points] ARIES:**
Can we run the undo phase before the redo phase?
- (iii) **[10 points] Analysis Phase:**
What are the output data structures of the analysis phase?
- (iv) **[10 points] Analysis Phase:**
How does the analysis phase maintain recLSN?
- (v) **[10 points] Analysis Phase:**
How does the analysis phase use TXN-END records?
- (vi) **[10 points] Redo Phase:**
Do we need to redo CLR's?
- (vii) **[10 points] Redo Phase:**
How does the redo phase use: (1) recLSN and (2) pageLSN?
- (viii) **[10 points] Undo Phase:**
How does the undo phase use lastLSN?
- (ix) **[10 points] Undo Phase:**
How does the undo phase use CLR?
- (x) **[10 points] Recovery:**
What does the DBMS do if it crashes during recovery in the Analysis Phase?
- (xi) **[10 points] Recovery:**
What does the DBMS do if it crashes during recovery in the Redo Phase?
- (xii) **[10 points] Recovery:**
How can the DBMS improve performance during recovery in the Redo Phase?
- (xiii) **[10 points] Recovery:**
How can the DBMS improve performance during recovery in the Undo Phase?