1. Look at the architecture of the locking scheduler given in Lecture Notes 6. What are suitable group modes for a lock table if the lock modes used are:

   (a) read and write locks
   (b) read, write and increment locks

2. Consider an object-oriented database. The objects of class C are stored on two blocks, B₁ and B₂. Block B₁ contains objects O₁ and O₂, while block B₂ contains objects O₃, O₄, and O₅. Classes, blocks, and objects form a hierarchy of lockable data items. Tell the sequence of lock requests and the response of an intention-based scheduler to the following sequences of requests. You may assume all requests occur just before they are needed, and all unlocks occur at the end of the transaction.

   \[ r₁[O₁], w₂[O₂], r₂[O₃], w₁[O₄] \]

3. Show how to add increment locks to an intention-based scheduler.

4. Below is a sequence of events, including start events, where \( st_i \) means that transaction \( T_i \) starts. These sequences represent real time, and the timestamp-based scheduler will allocate timestamps to transactions in the order of their starts. Tell what happens as the sequence executes.

   (a) \( st₁, st₂, r₁[A], r₂[B], w₂[A], w₁[B] \)

5. Tell what happens during the following sequence of events if a multiversion, timestamp-based scheduler is used. What happens instead, if the scheduler does not maintain multiple versions?

   \[ st₁, st₂, st₃, st₄, w₁[A], w₂[A], w₃[A], r₂[A], r₄[a] \]
6. Can a timestamp-based scheduler having a commit bit $C(X)$ have a deadlock? Explain.

7. In the following sequence of event, we use $R_i(X)$ to mean “transaction $T_i$ starts, and its read set is the list of database items $X$”. Also, $V_i$ means “$T_i$ attempts to validate”, and $W_i(X)$ means that “$T_i$ finishes and its write set was $X$”. Tell what happens when the following sequence is processed by a validation-based scheduler.

$$R_1(A,B), R_2(B,C), V_1, R_3(C,D), V_3, W_1(A), V_2, W_2(A), W_3(B)$$