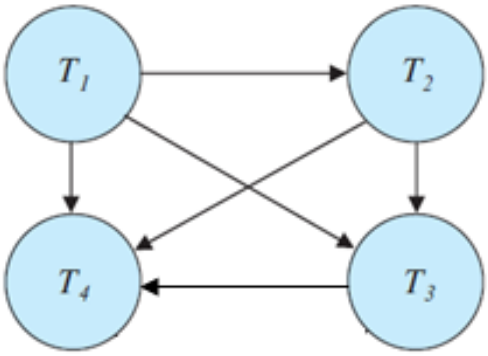
1. (30 pts) Construct a B+ tree for the following set of key values by using algorithms in the text book. Assume that the tree is initially empty and the number of pointers that fits in one node is four. Show the form of the tree after each of the following series of operations.

a) insert 1, 8, 11, 5
b) insert 6, 7,
c) insert 15, 16
d) insert 12, 13, 14
e) delete 15
f) delete 16

2. (5 pts) Consider the precedence graph. Is the corresponding schedule conflict serializable? Explain your answer.



3. (5 pts) Why do database systems support concurrent execution of transactions, despite the extra effort needed to ensure that concurrent execution does not cause any problems?

4. (10 pts) When a transaction is rolled-back under timestamp ordering, it is assigned a new timestamp. Why can it not simply keep its old timestamp?