# Data Management – exam of 16/07/2009

LAST NAME: _____

NAME: _____

STUDENT CODE: _____

I allow the publication of my grade on the Web site `http://www.dis.uniroma1.it/~lenzerini`, according to the Italian regulation (decreto legislativo 196/2003), which I hereby declare to know. Faithfully,

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**Problem 1** Consider the following schedule

$$S_1 = r_2(T)\, r_1(P)\, r_3(P)\, w_2(P)\, c_2\, w_3(Q)\, c_3\, w_1(T)\, c_1.$$

1. Tell whether $S_1$ is accepted by the 2PL scheduler with exclusive and shared locks. If the answer is yes, then show the schedule obtained from $S_1$ by adding suitable lock and unlock commands. If the answer is no, then explain the answer.
2. Tell whether $S_1$ is recoverable or not.

**Problem 2** Consider the following schedule

$$S_2 = r_2(T)\, r_4(P)\, w_4(T)\, r_3(P)\, w_3(T)\, c_2\, w_3(Q)\, c_3\, r_4(Q)\, w_1(T)\, c_1.$$

and list all serial schedules that are conflict-equivalent to $S_2$, explaining in detail the method you followed to get your answer.

**Problem 3** A schedule with at most one "write" action is called a *1-write-only* schedule. Prove or disprove the following statement: every 1-write-only schedule is in 2PL.

**Problem 4** Let `Book(BookCode,Title,Cost)` be a relation whose key is `BookCode`, and whose tuples require 1024 pages in secondary storage. The relation is used only by the following two operations:

- *search*: given the BookCode of a book, return the title of such book,
- *insertion*: insert a new book, with code, title and cost.

There are two options for representing the relation `Book`, namely by a heap file, or by a sorted file. For each of the following two scenarios, tell which of the two options you would choose, and explain your decision: **(A)** 2 searches every day, and 1 insertion every day, **(B)** 5 searches every week, and 2 insertions every week.

**Problem 5** Consider the relation `Play(Player,Team,Year,Salary)`, and suppose that the most frequent operation performed on the relation is the following query (where `const` is a constant):

```
select Player, Team, Year
from Play
where Year = const
```

Tell which representation method would you choose for the relation `Play`, and explain in detail your answer.