1. Suppose a part of the conceptual schema ENTERTAINMENT (E-R diagram) describing cinemas in a big town, films (they exist independent of the cinemas), film distributors (they offer films), and loans. Each film has copies, numbered by a unique identifier. Films are running in cinemas.
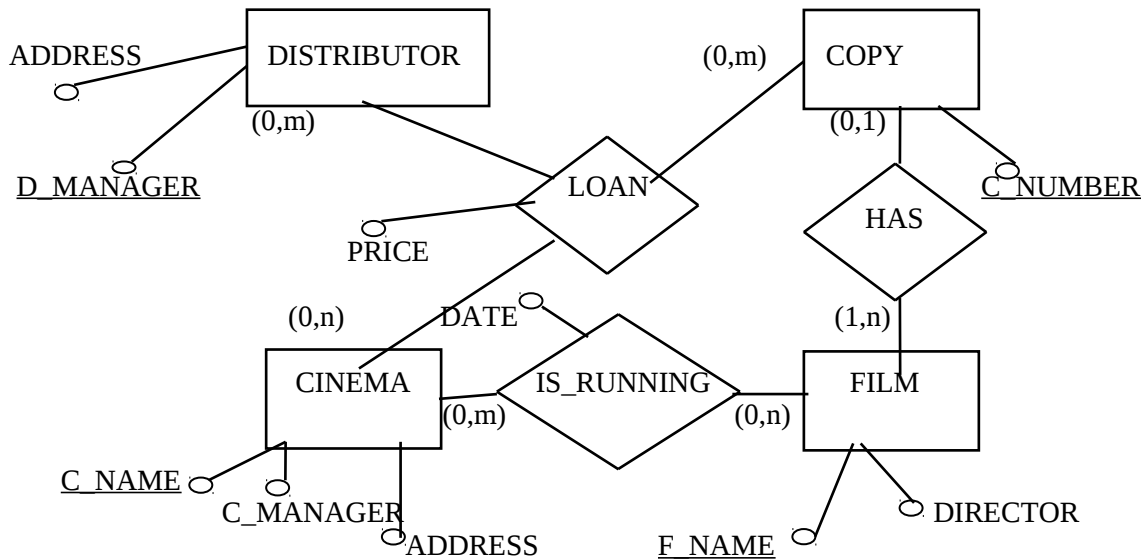
a) Transform schema ENTERTAINMENT into relational database model   2

b) Write all referential integrities for the attribute C_NUMBER in SQL!   1

5. Express in relational algebra the following queries:

b) "List cinemas that are running something, but they have lent nothing"   2

c) "List couples of cinemas that are running the film „James Bond" in the same day.   2

d) " List persons each of them is both the manager of a cinema and the manager of a distributor. We need only these persons, whose addresses of the cinema and the distributor are different.
                                                                                          2

6. Express in SQL the following queries:
"For all directors, list the number of loans concerning their films".   3

The resulted table should contain only such directors who have the number of loans greater than 1.

c) "List the cinemas, that have lent *only* films directed by Visconti."   3

d) "List the distributors that do not lend any film copy.
                                                                                          3

e) " List the distributors having the cheapest lent copy for a given film."   The schema of the resulted table is RESULT(F_NAME, MIN_PRICE, DISTRIBUTOR)   2

8. What is Atomicity (property of transaction). Explain it on exmample.

1

9. Consider the schema R(A,B,C,D) and the set of functional dependencies

F = {D -> A, A -> B, BA -> C, A -> D}.

a) Find all keys of R.

2

b) Construct from R by decomposition a schema of relation database whose all relations are in 3NF.
(Underline keys of these schemes!)

2