CS585

Database Systems

Summer 2005

Midterm Exam

Name: _____

Student ID: _____

1) 10 pts
Indicate whether each of the following statements is true or false (T/F):

___View is a mechanism that provides support for physical data independence

___Stored procedures can be used to maintain logical data independence

___A primary key is a candidate key which is minimal

___ Foreign key cannot be NULL

___Any ternary relationship can be reduced to two or three binary relationships

___An expression in group-qualification must have a single value per group

___Dynamic SQL provides a mechanism to create applications that are not database specific

___SQLJ and embedded SQL enforce the same set of SQL standards

___Applications using JDBC drivers that do direct translation to native database API are more efficient than those written in embedded SQL

___Triggers can be used to maintain database consistency

2) 10 pts
Briefly answer the following questions:

- What are derived attributes?

- What is a cardinality of a relation?

- Describe the concept of referential integrity.

- What is an assertion?

- What is a curser and where is it used?

3) 15 pts
Consider the schema design below:

Actors (Name, Gender, Agent)
AppearsIn(Name, Title, Producer)
Movies (Title, Producer, Year, Oscars, Director)

Write an SQL statement for each of the following queries:

a- Find the name of all actors who have worked with both directors “Howard” and “Spielberg”

b- Find the name of all female actors who appeared in a movie titled “The Love Story”.

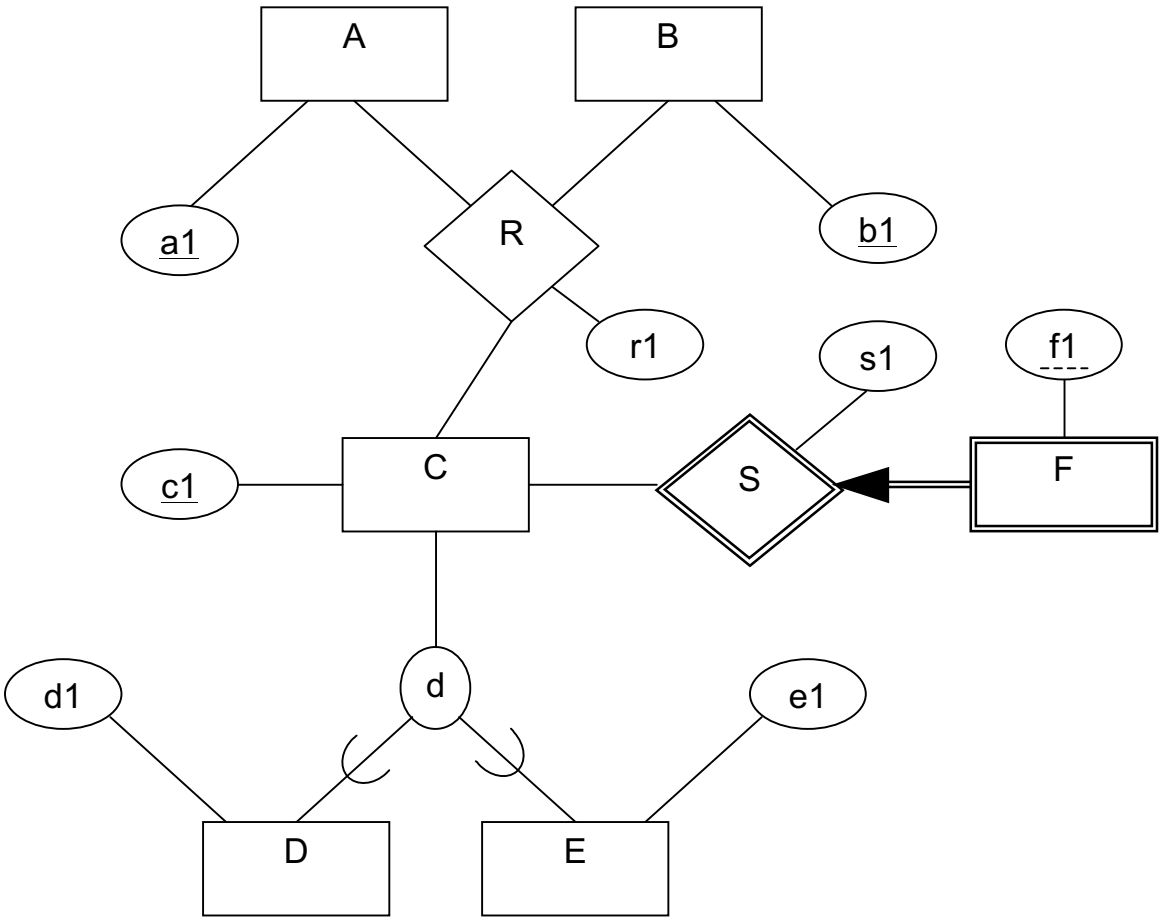
Can we say that all these actors have worked together in a movie? Explain why.

c- Find all producers who have had at least two movies starring “Angelina Jolie”

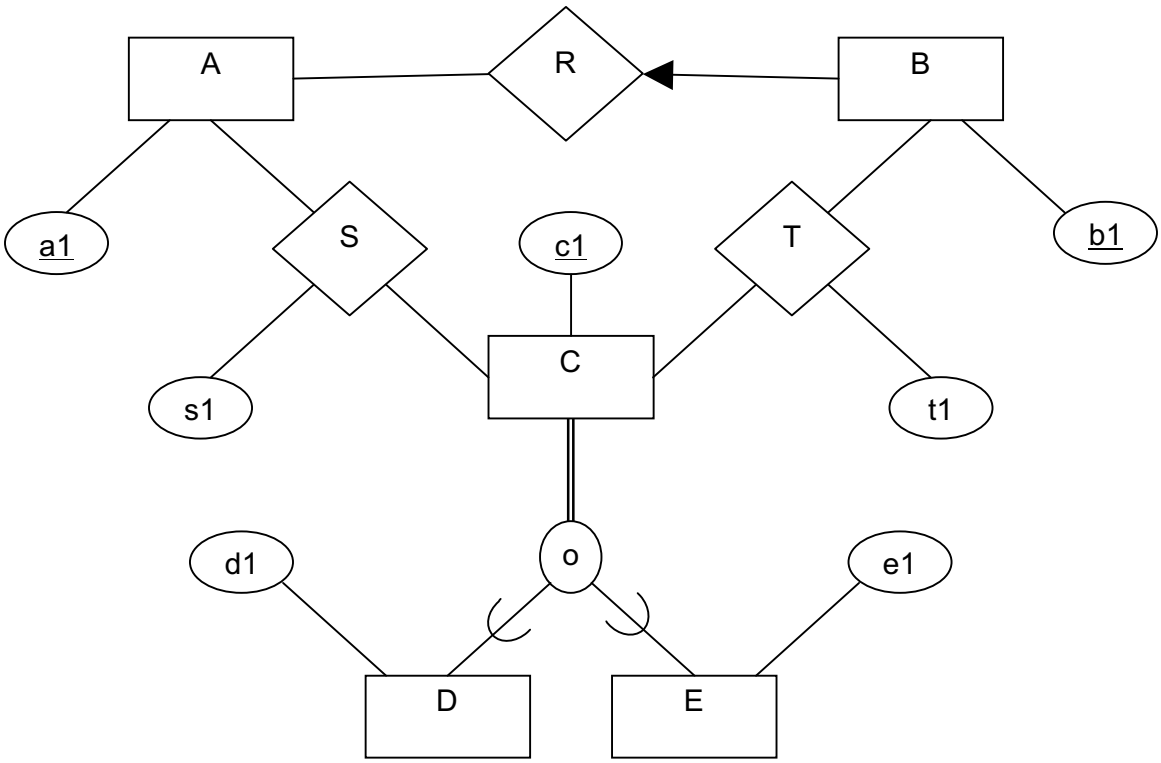
4) 20 pts

Reduce the following 2 EER diagrams to relations using the *pure relational model* (i.e., No Object Oriented or Object Relational). Make sure to identify all primary and foreign keys.

a-



b-



5) 10 pts
Consider the schema design below:

Actors (Name, Gender, Agent)
AppearsIn(Name, Title)
Movies (Title, Year, Oscars, Director)

Correct the SQL statements below if necessary for the following 2 queries:

a- Find all actors who have been in the movie(s) with the most Oscars in 2004

```
SELECT A.Name
FROM Actors A, AppearsIn P, Movies M
WHERE A.Name=P.Name AND P.Title=M.Title AND M.Year=2004 AND
        M.Oscars = MAX (SELECT MM.Oscars
                        FROM Movies MM)
```

b- For each agent find the number of Oscar winning movies they have had actors in.

```
SELECT A.Agent, COUNT(*)
FROM Actors A, AppearsIn P, Movies M
WHERE A.Name=P.Name AND P.Title=M.Title
GROUP BY A.Agent
HAVING M.Oscars >= 1
```

6) 15 pts
In this problem you are asked to create your own object-relational database. The database should employ object-oriented concepts of inheritance, ADT, overloading and overriding. You can keep the model as simple as possible to only demonstrate what is asked for.

a- Present the ER model demonstrating inheritance. Indicate whether this represents a specialization or a generalization.

b- Create all ADTs required to capture the above model. Specify which syntax of SQL you are using.

c- Give an example of overriding using SQL

d- Give an example of overloading using SQL

7) 10 pts
There are many challenges in efficiently implementing an ORDBMS or an OODBMS. Describe two such challenges and possible methods of overcoming them.

8) 10 pts

a- Name 3 different types of JDBC drivers and give a brief explanation of each.

b- Among the above drivers, which is the most efficient in terms of speed in data transmission?

c- Which one requires the lightest driver on the client side?