CS585
Database Systems
Spring 2006
Midterm Exam

Name: _____

Student ID: _____

	Maximum	Received
Problem 1	10	
Problem 2	10	
Problem 3	15	
Problem 4	20	
Problem 5	10	
Problem 6	10	
Problem 7	10	
Problem 8	15	

1) 7 pts
Indicate whether each of the following statements is true or false (T/F):

___If the expression in a WHERE clause evaluates to "UNKNOWN" the results of the query will be unpredictable and implementation dependent

___A ternary relationship can always be replaced by an equivalent set of 3 binary relationships

___A weak entity set must have total participation in the identifying relationship set

___All equivalent SQL queries will have the same performance characteristics on a given DBMS

___A table constraint in SQL can reference more than one table

___An assertion in SQL can reference more than one table

___Inheritance can be modeled using the relational model

2) 10 pts
   Briefly answer the following questions:

   - Name two advantages in using stored procedures when interacting with a database from within an application.

   - Give an example of when it is NOT useful to use stored procedures when interacting with a database from within an application.

   - Describe a scenario where it is necessary to use dynamic SQL

   - Name one disadvantage in using dynamic SQL

3) 6 pts
   Give 2 pros and 2 cons for each of the following types of databases
   a- RDBMS

   b-ORDBMS

   c-OODBMS

4) 15 pts
   Consider the schema design below:

   Plants (PlantName, Type, MaxHeight)
   GrowIn (PlantName, RegionName, Country)
   Regions (RegionName, Country, altitude, latitude, climate)

   Write an SQL statement for each of the following queries:

   a- Find the name of all plants of type "Conifer" that can grow in "Dry" climates.

   b- Find out if Roses (Rose being the Name of the plant) can grow in altitudes above 7000 feet and latitudes above 45 degree.

c- Find all plants that are unique to each country.

5) 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-

a1

A

b1

o

B

C

R

D

c1

S

T

d1

s1

E

t1

e1
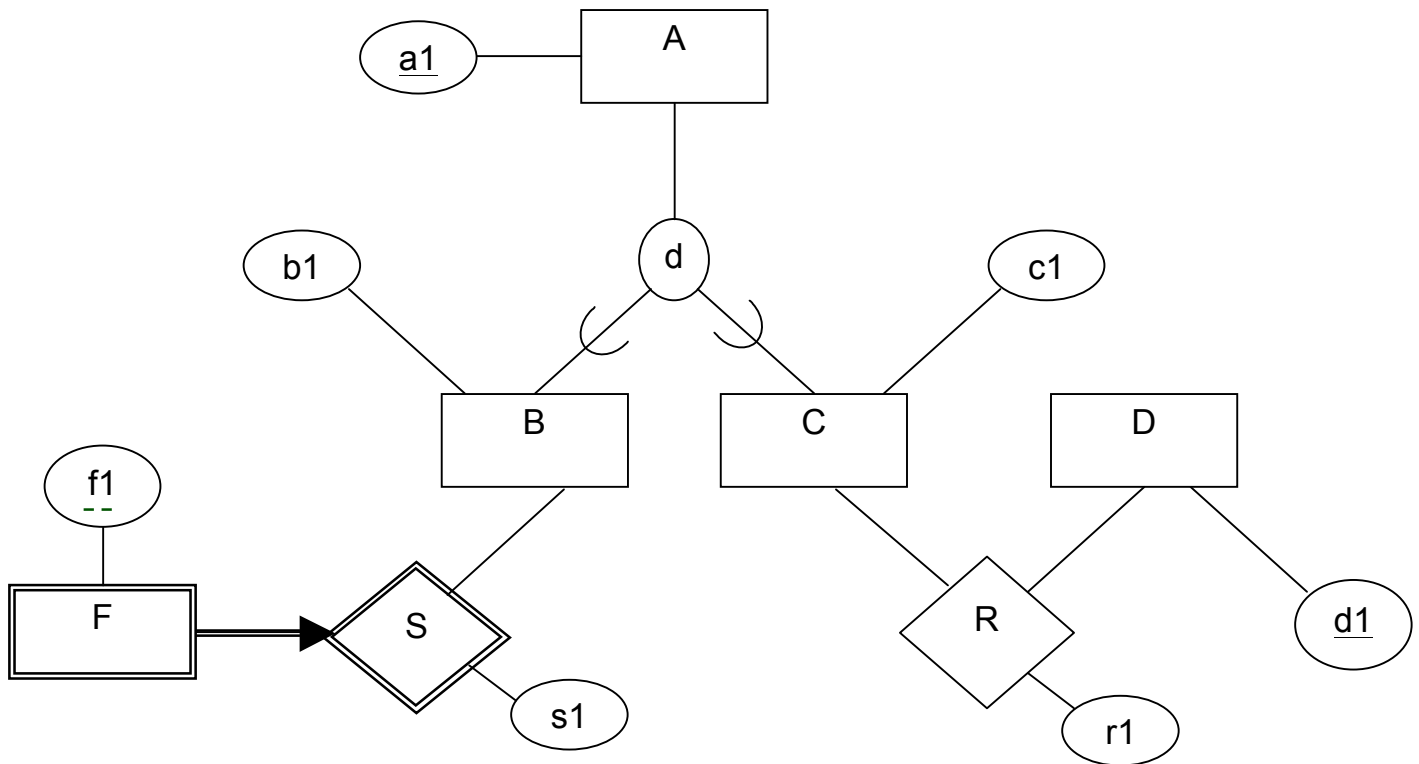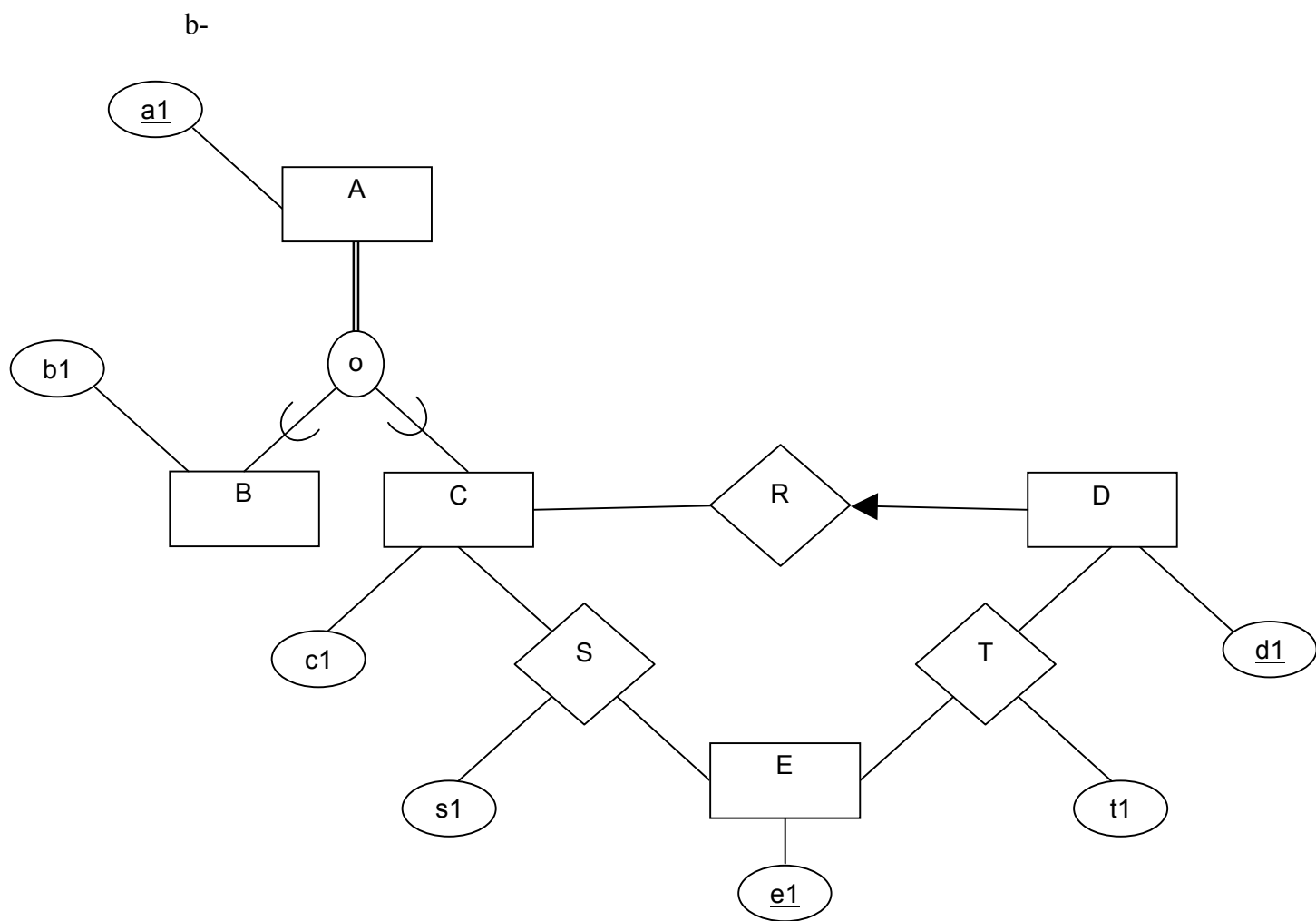
Additional space for problem 4.

6) 10 pts
   Consider the schema design below:

   Plants (<u>PlantName</u>, Type, MaxHeight)
   GrowIn (<u>PlantName</u>, <u>RegionName</u>)
   Regions (<u>RegionName,</u> <u>Country,</u> altitude, latitude, climate)

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

   a- Find the country(or countries) with the largest variety of plant types

   SELECT R.Country
   FROM   Regions R, Plants P
   WHERE COUNT (P.Type) = MAX (SELECT COUNT(P.Type)
                                                    FROM Plants P1
                                                    WHERE P1.Type=P.Type)

b- For each plant find the average altitude and average latitude they grow in for all regions excluding those regions with "Tropical" climates.

SELECT AVG(P.Altitude), AVG(P.latitude)
FROM Plants P, Regions R
WHERE R.climate <> "Tropical"

7) 10 pts
   In extending an RDBMS to efficiently support spatial data types such as points,
   lines, and regions, describe all the work that needs to be done at each level in
   order to provide such spatial capabilities.
   a- At the logical level

   b- At the physical level

8) 10 pts

The following 6 points are insterted into a spatial DBMS that uses an R-Tree of size (2,4) as an index structure to store points. Show the R-Tree after each insert in the given order.

Point #	X	Y
1	2.	3.
2	1.	2.
3	3.	3.
4	1.	4.
5	3.	2.
6	2.	1.

9) 15 pts
Describe the pros and cons in using triggers versus other integrity constraints.

Describe the pros and cons in using embedded SQL versus JDBC

Additional Space

Additional Space