Comprehensive Exam
Databases
Fall 2001

1. Answer questions 1a – 1c using ONLY the data provided in the following relation (32 points).

customer#	cust_name	cust_addr	City	project#	start_date	estimate_cost	zip_code
c_123	XYZ Co.	541 Maple St.	New York	10	01/20/99	$20,000	30899
c_123	XYZ Co.	541 Maple St.	New York	20	02/18/96	$14,300	30899
c_998	ABC Co.	321 Oak St.	New York	10	01/20/99	$ 5,000	30899
c_998	ABC Co.	321 Oak St.	New York	40	04/15/97	$ 3,200	30899
c_092	Hyatt Inc.	3011 L St.	New York	2	05/18/97	$ 5,000	20223
c_092	Hyatt Inc.	3011 L St.	New York	30	09/15/00	$ 5,000	20223
c_567	Norble Inc.	450 L. St.	New York	20	02/18/96	$18,567	20223
c_085	Ynot, Co.	SweetAir Dr	New York	1	04/03/01	$24,500	65964
c_112	Hope Inc.	900 High St.	New York	50	12/18/97	$ 9,000	45666
C_787	Widget Inc.	541 Maple St.	Chicago	1	04/03/01	$24,500	12345

1a) Answer YES or NO as to whether the functional dependency holds (check the appropriate box).

YES	**NO**	**Functional Dependency**
		cust_addr → city
		zipcode → city
		cust_name → customer#
		customer# → project#
		project# → start_date, estimate_cost
		zipcode, city → cust_addr

1b) Find one candidate key in the table using the closure process. Be sure to show Armstrong's Axioms and the steps you take in finding the candidate key.

1c) What normal form is this table currently in? (circle one) 1NF 2NF 3NF BCNF

2. Given the following tables, answer questions 2a – 2e (48 points)

```
CREATE TABLE EMPLOYEE (
EMPLOYEE_ID     VARCHAR2(8) NOT NULL,
FIRST_NAME      VARCHAR2(15)  NOT NULL,
LAST_NAME       VARCHAR2(15)  NOT NULL,
LOCATION        CHAR(3))

CREATE TABLE  PC (
PC_ID           CHAR(5)  NOT NULL,
PC_BRAND        VARCHAR2(10),
PC_MODEL        VARCHAR2 (20),
PC_PROCESSOR    VARCHAR2(10),
PC_CLOCK        CHAR(3),
PC_MEMORY       NUMBER,
PC_HD1_SIZE     NUMBER,
PC_HD1_FREE     NUMBER,
PC_TYPE_FLAG    CHAR(1) NOT NULL)

CREATE TABLE DEPARTMENT (
DEPARTMENT_ID       NUMBER NOT NULL,
DEPARTMENT_NAME     VARCHAR2(15),
BUILDING            VARCHAR2(10) )

CREATE TABLE  EMP_COMPUTER (
ASSIGN_NUMBER       NUMBER NOT NULL,
EMPLOYEE_ID         VARCHAR2(8) NOT NULL,
PC_ID               CHAR(5)  NOT NULL,
PERIPHERAL_ID       CHAR(5) NOT NULL,
DATE_ASSIGNED       DATE,
DEPARTMENT_ID       NUMBER NOT NULL)

CREATE TABLE PC_TYPE_FLAG  (
PC_TYPE_FLAG        CHAR(1) NOT NULL,
PC_TYPE_DESCRIPTION VARCHAR2(10) )

CREATE TABLE PERIPHERAL (
PERIPHERAL_ID       CHAR(5) NOT NULL,
PERIPHERAL_TYPE_ID  NUMBER,
PERIPHERAL_BRAND    VARCHAR2(10),
PERIPHERAL_MODEL    VARCHAR2(15) )

CREATE TABLE PERIPHERAL_TYPE (
PERIPHERAL_TYPE_ID          NUMBER,
PERIPHERAL_TYPE_DESCRIPTION VARCHAR2(20)
)
```

2a) Produce an entity-relationship diagram representing the conceptual schema of these physical tables. Be sure to identify the primary and foreign keys in each table.

2b) Are any of the tables union compatible? Why or why not?

2c) Write the SQL for the following query:
List all of the computer peripheral descriptions for Tom Jones when he worked in the Marketing department.

2d) How would you optimize the performance of this query using indexes in order to get a fast response?

2e) Write the syntax to create a view that would list all the computers and peripherals used in a department.

3. Given the following table: (20 points)

Table1 (PetID,pet_name,PetOwnerSS#,DateofBirth,OwnerLastName,OwnerPhone#)

a) What normal form is the table currently in ? Why?

b) Normalize the table to third normal form.