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EXPERIMENT NO: - 6

AIM: - Establishing an environment for relational database management and data retrieval for the given database. Also, implementation of the ad-hoc query applications in a relational database using SQL.

Problem Definition:
For the conceptual schemata of the given database, establish an environment using the logical relation structures. The global schemata of which is as below. Assume suitable data if necessary.

PILOT (ENUM, LICENSE, PT135_DATE, MED_TYPE, RATING, MED_DATE)
EMPLOYEE (ENUM, TITLE, LNAME, FNAME, INITIAL, DOB, HIRE-DATE)
CUSTOMER (CODE, CLNAME, CFNAME, CAREACODE, CPHONE, CBALANCE)
AIRCRAT (AC_NUMBER, MOD_CODE, AC_TTAF, AC_TTEL, AC_TTER)
MODEL (MCODE, M_MFGR, M_NAME, M_SEATS, M_CHG_MILE)
CHARTER (CTR- TRIP, CTR- DATE,CTR _PILOT,CTR- COPILOT, CTR_DESTINA TION, AC_NUMBER, HRS_FLOWN, HRS- WAIT, FUEL_GALLONS, TR_OIL_QTS, CODE)

Relation Name: **PILOT**

Attribute Name	Data Description
ENUM	NUMBER(3)
LICENSE	VARCHAR(5)
RATING	VARCHAR(25)
MED_TYPE	CHAR(l)
MED_DATE	DATE
PT135_DATE	DATE

Relation Name: **EMPLOYEE**

Attribute Name	Data Description
ENUM	NUMBER(3)
TITLE	CHAR(3)
LNAME	VARCHAR(15)
FNAME	VARCHAR(15)
INITIAL	CAHR(1)
DOB	DATE
HIRE_DATE	DATE

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Relation Name: **AIRCRAFT**

Attribute Name	Data Description
AC_NUMBER	CHAR(5)
MOD_CODE	VARCHAR(10)
AC_TTAF	NUMBER(6,1)
AC_TTEL	NUMBER(6,1)
AC_TIER	NUMBER(6,1)

Relation Name: **CHARTER**

Attribute Name	Data Description
CTR_TRIP	NUMBER(5)
CTR_DATE	DATE
CTR_PILOT	NUMBER(3)
CTR_COPILOT	NUMBER(3)
AC_NUMBER	CHAR(5)
CTR_DESTINATION	CHAR(3)
CTR_DISTANCE	NUMBER(4)
HRS_FLOWN	NUMBER(3,1)
HRS_WAIT	NUMBER(3,1)
FUEL_GALLONS	NUMBER(5,1)
CTR_OIL_QTS	NUMBER(l)
CODE	NUMBER(5)

Relation Name: **CUSTOMER**

Attribute Name	Data Description
CODE	NUMBER(5)
CLNAME	VARCHAR(15)
CFNAME	VARCHAR(15)
CAREACODE	NUMBER(3)
CPHONE	CHAR(8)
CBALANCE	NUMBER(7,2)

Relation Name: **MODEL**

Attribute Name	Data Description

MCODE	VARCHAR(10)
M MFGR	VARCHAR(15)
M NAME	VARCHAR(20)
M SEATS	NUMBER(2)
M-CHG-MILE	NUMBER (4, 2)

The sample table contents are summarized as below;

PILOT					
EN UM	**LICE NSE**	**RATING**	**MED _TYPE**	**MED_DAT E**	**PTI35_DAT E**
101	ATP	SEL/MEL/Instr/CFII	1	12-APR-1999	15-JUN1999
104	ATP	SEL/MEL/Instr	1	10-JUN-1999	23-MAR-1999
105	COM	SEL/MEL/Instr/ CFI	2	25-FEB-1999	12-FEB-1999
106	COM	SEL/MEL/Instr	2	02-APR-1999	24-MAY-1999
109	COM	SEL/MEL/ SES/ Instr/ CFII	1	14-APR-1999	21-APR-1999

EMPLOYEEE						
ENUM	**TIT LE**	**LNAME**	**FNAME**	**INITI AL**	**DOB**	**HIRE_DATE**
100	Mr.	Kolmycz	George	D	15-JUN-1942	15-MAR-1985
101	Ms.	Lewis	Rh0I1da	G	19-MAR-1965	25-APR-1986
102	Mr.	Vandam	Rhett		14-NOV-1958	18-MAY-1990
103	Ms.	Jones	Anne	M	Il-MAY-1974	26-JUL-1996
104	Mr.	Lange	John	P	12-JUL-1971	20-AUG-1990
104	Mr.	Williams	Robert	D	14-MAR-1975	19-JUN-1999
106	Ms.	Duzak	Jeanine	K	12-FEB-1968	13-MAR-1989
107	Mr.	Diante	Jorge	D	0I-MAY-1975	02-JUL-1994
108	Mr.	Wiesenba ch	Paul	R	14-FEB-1966	03-JUN-1990
109	Ms.	Travis	Elizabeth	K	18-JUN-1961	14-APR-1989
110	Ms.	Genkazl	Leighla	W	19-MAY-1970	29-JUN-199o

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CUSTOMER

CODE	CLNAME	CFNAME	CINITIAL	CAREACODE	CPHONE	CBALANCE
10010	Ramas	Alfred	A	615	844-2573	0.00
10011	Dunne	Leona	K	713	894-1238	0.00
10012	Smith	Kathy	W	615	894-2285	896.54
10013	Olowski	Paul	F	615	894-2180	1285.19
10014	Orlando	Myron		615	222-1672	673.21
10015	O'Brian	Amy	B	713	442-3381	1014.56
10016	Brown	James	G	615	297-1228	0.00
10017	Williams	George		615	290-2556	0.00
10018	Farriss	Anne	G	713	382-7185	0.00
10019	Smith	Olette	K	615	297-3809	453.98

AIRCRAFT

AC_NUMBER	MOD-CODE	AC_TTAF	AC_TTEL	AC_TTER
1484P	PA23-250	1833.1	1833.1	101.8
2289L	C-90A	4213.8	768.9	1123.4
2778V	PA31-350	7992.9	1513.1	789.5
4278Y	PA31-350	2147.3	622.1	243.2

MODEL

MCODE	M_MFGR	M_NAME	M_SEATS	M_CHG_MILE
PA23-250	Piper	Aztec	6	1.93
C-90A	Beechcraft	KingAir	8	2.67
PA31-350	Piper	Navajo Chieftain	10	2.35

CHARTER (continued..)						
CTR-TRIP	HRS FLOWN	HRS-WAIT	FUEL-GALLONS	CTR_OIL_QTS	CODE	CTR-DISTANCE
10001	5.1	2.2	354.1	1	10011	936
10002	1.6	0	72.6	0	10016	320
10003	7.8	0	339.8	2	10014	1574
10004	2.9	4.9	97.2	1	10019	472
10005	5.7	3.5	397.7	2	10011	1023
10006	2.6	5.2	117.1	0	10017	472
10007	7.9	'0	348.4	2	10012	1574
10008	4.1	0	140.6	1	10014	644
10009	6.6	23.4	459.9	0	10017	1574
10010	6;2	3.2	279.7	0	10016	998
10011	1.9	5.3	66.4	1	10012	352
10012	4.8	4.2	215.1	0	10010	884
10013	3.9	4.5	174.3	1	10011	644
10014	6.1	2.1	302.6	0	10017	936
10015	6.7	0	459.5	2	10016	1645
10016	1.5	0	67.2	0	10011	312
10017	3.1	. 0	105.5	0	10014	508
10018	3.8	4.5	167.4	0	10017	644

Table Design Considerations:

1) The entity integrity in CHARTER is maintained over the CTR_TRIP attribute which can take the values below 10099 with the base value starting at 10001.
2) The entity integrity in AIRCRAFT is maintained over the AC_NUMBER attribute.
3) The entity integrity in MODEL is maintained over the MCODE attribute.
4) The entity integrity in PILOT is maintained over the ENUM attribute that can take values starting at 101.
5) The entity integrity in CUSTOMER is maintained over the CODE attribute that starts at 10010.
6) The entity integrity in EMPLOYEE is maintained over the ENUM attribute that starts at 101.
7) CTR_PILOT and CTR_COPILOT are the employees with the aviation company.

8) Apply domain constraints to the attributes, namely LICENSE, M_MFGR, CTR_DESTINATION, MED_TYPE and CAREACODE.
9) Assume the implicit considerations on the NULL constraints and the referential integrity.

Steps in Creation:

1. Use CREATETABLE command to create the relations specified in the conceptual schemata of the CH2 AVIA database.
2. While creating the database relations using CREATETABLE, carefully analyze and enforce the domain constraints using the CHECK clause, NOT NULL clause or the UNIQUE clause.
3. Enforce the entity integrity on the table by specifying the attribute (or a group of attributes) of interest as a PRIMARY KEY.
4. Enforce the referential integrity on the table by specifying the attribute (or a group of attributes)of interest as a FOREIGN KEY.
5. After the schemata creations save the table definitions using COMMIT command. Then view the database table structure through DESCRIBE at the SQL prompt.
6. Insert into the database the tuples specified through the specimen table contents.
7. List the contents of the database in the presentable way.
8. Save your database for future query implementation using COMMIT command.

Queries:

1. Using the contents of CHARTER, write the SQL code that will list the attributes CTR_DATE, AC_NUMBER,CTR_DESTINATION, CTR_DIST ANCE, and HRS_FLOWN as output for aircraft number 2778V.
2. Create a virtual table (namedAC2778V) containing the output presented in Query-I.
3. Using CHARTER and CUSTOMER, write the SQL code that will list the attributes CTR_DATE, CPHONE,AC_NUMBER,CAREACODE,CTR_DESTINATION, CODE, and output.
4. Using CHARTER, MODEL and AIRCRAFT, write the SQL code that will list the attributes CTR_DATE, AC_NUMBER, M_NAME, and LNAME as output for the aircraft 2778V.
5. Create the SQL query that will produce a list of customers who have an unpaid balance {in the descending order of balance).

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6. Find the average unpaid customer balance, the minimum balance, the maximum balances, and the total unpaid balance.
7. Using CHARTER as a source, group the aircraft data. Use the SQL functions to produce the output, which. will list the attributes AC_NUMBER, Number_of_Trips, Total_Distance, Average_Distance, Total_Hours and Average_Hours for each of the aircraft.
8. Write the SQL code to generate the listing that includes selected CHARTER attributes CTR_DATE, AC_NUMBER, M_NAME, CTR_PILOT, LNAME and HRS_FLOWN for all flights that did not include a co-pilot.
9. Write the SQL code that will update the AIRCRAFT table's airplane and engine hours by adding to them the total hours flown by each aircraft in the CHARTER table. (To preserve the original AIRCRAFT table's values, use ROLLBACK after execution of this problem).
10. Create a trigger named TRG_CTR_HRS that will automatically update the AIRCRAFT table when a new CHARTER row is added. Use HRS FLOWN to add to the AIRCRAFT table's AC_TTAF, AC_TTEL and AC_TTER- values.