INTRODUCTION TO DATABASE [K]

FINAL-TERM PROJECT

PROJECT NAME: BANK MANAGEMENT SYSTEM

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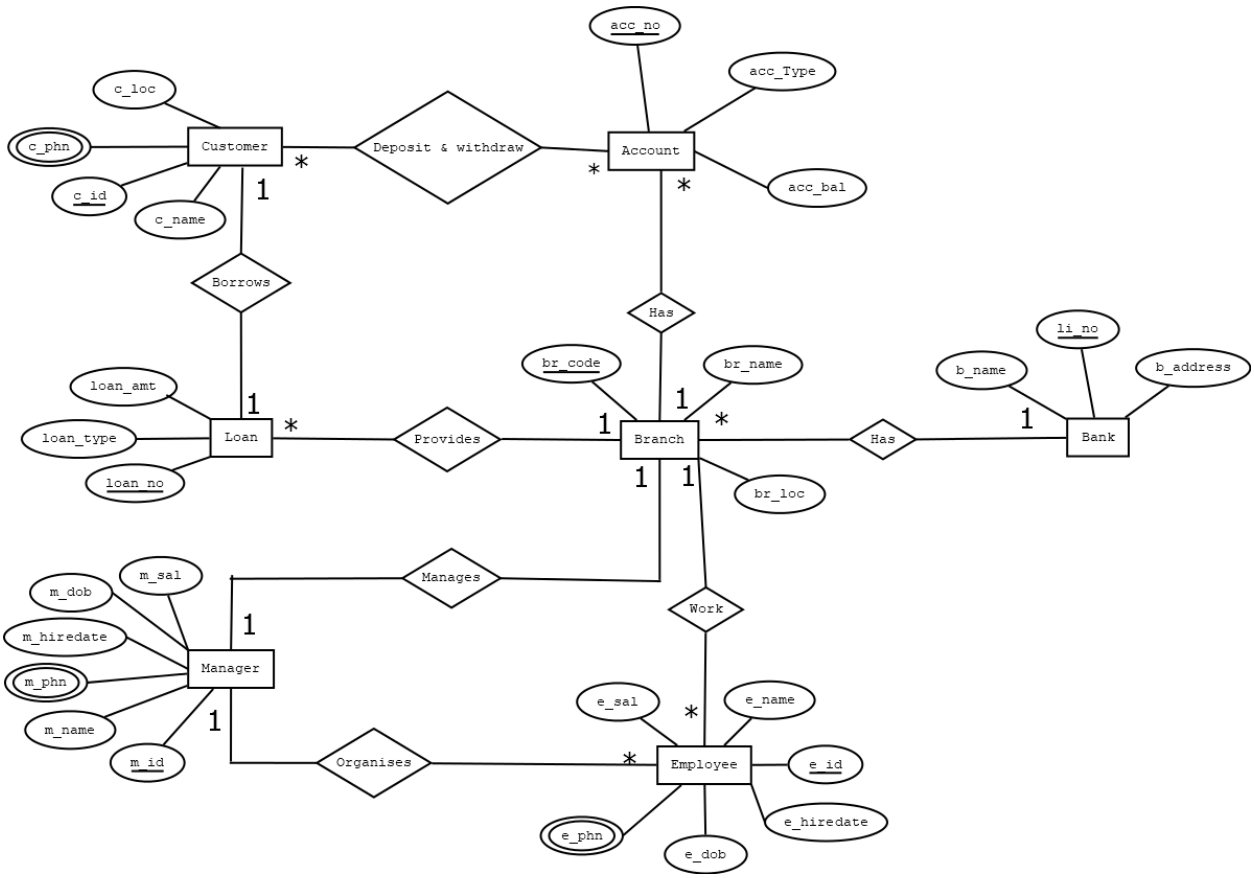
ER Diagram



Scenario

- Bank are identified by License No and Bank Name, Address are recorded.
- Employees are identified by Employee ID and Employee Name, Date of Birth, Employee Name, Salary, Joining Date, Phone No are recorded. Each Branch has many Employees.
- Customers are identified by Customer ID and Customer Name, Address, Phone No are recorded.
- Each customer has one or more Account / Accounts which is/are identified by Account No and Account Type, Balance are recorded. Many Customers can also deposit and withdraw from many Accounts.

- Accounts must be created on a specific Branch of the Bank. So, there is a many to one relationship between Account and Branch. So, Branch are identified by Branch Code and Branch Name, Location are recorded.
- Each Branch has a Manager (one to one) which is identified by Manager ID and Manager Name, Salary, Phone No , Date of Birth, Hire Date are recorded. Manager organizes many Employees. The cardinality of Manager and Employee is one to many.
- Each Branch provides many Loan (One to many) which is identified by Loan No and Loan Type, Amount are recorded.
- A Customer can borrow Loan (one to one) from a specific Branch. So, there is one to one relationship.

Normalization:

Has- (li_no, b_name, b_address, br_code, br_name, br_loc)

1NF- No multivalued attribute

2NF- li_no, b_name, b_address

br_code, br_name, br_loc

3NF- No transitive dependency

li_no, b_name, b_address

br_code, br_name, br_loc

Table for Has-

1. li_no, b_name, b_address
2. br_code, br_name, br_loc, li_no

Create- (acc_no, acc_type, acc_bal, br_code, br_name, br_loc)

1NF- No multivalued attribute

2NF- acc_no, acc_type, acc_bal

br_code, br_name, br_loc

3NF- No transitive dependency

acc_no, acc_type, acc_bal

br_code, br_name, br_loc

Table for Create-

1. acc_no, acc_type, acc_bal, br_code
2. br_code, br_name, br_loc

Deposit & Withdraw- (acc_no, acc_type, acc_bal, c_id, c_name, c_phn, c_loc)

1NF- c_phn is a multivalued attribute

2NF- acc_no, acc_type, acc_bal

c_id, c_name, c_phn, c_loc

3NF- No transitive dependency

acc_no, acc_type, acc_bal

c_id, c_name, c_phn, c_loc

Table for Deposit & Withdraw-

1. acc_no, acc_type, acc_bal
2. c_id, c_name, c_loc
3. n_id, acc_no, c_id
4. c_id, c_phn – Composite primary key

Borrow- (c_id, c_name, c_phn, c_loc, loan_no, loan_type, loan_amt)

1NF- c_phn is a multivalued attribute

2NF- c_id, c_name, c_phn, c_loc

loan_no, loan_type, loan_amt

3NF- No transitive dependency

c_id, c_name, c_phn, c_loc

loan_no, loan_type, loan_amt

Table for Borrow-

1. c_id, c_name, c_loc, loan_no
2. loan_no, loan_type, loan_amt
3. c_id, c_phn – Composite primary key

Provides- (br_code, br_name, br_loc, loan_no, loan_type, loan_amt)

1NF- No multivalued attribute

2NF- br_code, br_name, br_loc

loan_no, loan_type, loan_amt

3NF- No transitive dependency

br_code, br_name, br_loc

loan_no, loan_type, loan_amt

Table for Provides-

1. loan_no, loan_type, loan_amt, br_code
2. br_code, br_name, br_loc

Manages- (m_id, m_name, m_sal, m_dob, m_hiredate, m_phn, br_code, br_name, br_loc)

1NF- m_phn is a multivalued attribute

2NF- m_id, m_name, m_sal, m_dob, m_hiredate, m_phn

br_code, br_name, br_loc

3NF- No transitive dependency

m_id, m_name, m_sal, m_dob, m_hiredate, m_phn

br_code, br_name, br_loc

Table for Manages-

1. m_id, m_name, m_sal, m_dob, m_hiredate, br_code
2. br_code, br_name, br_loc
3. m_id, m_phn – Composite primary key

Organizes- (m_id, m_name, m_sal, m_dob, m_hiredate, m_phn, e_id, e_name, e_sal, e_dob, e_hiredate, e_phn)

1NF- m_phn & e_phn are multivalued attributes

2NF- m_id, m_name, m_sal, m_dob, m_hiredate, m_phn

e_id, e_name, e_sal, e_dob, e_hiredate, e_phn

3NF- No transitive dependency

m_id, m_name, m_sal, m_dob, m_hiredate, m_phn

e_id, e_name, e_sal, e_dob, e_hiredate, e_phn

Table for Organises-

1. m_id, m_name, m_sal, m_dob, m_hiredate
2. e_id, e_name, e_sal, e_dob, e_hiredate, m_id
3. m_id, m_phn – Composite primary key
4. e_id, e_phn – Composite primary key

Work- (e_id, e_name, e_sal, e_dob, e_hiredate, e_phn, br_code, br_name, br_loc)

1NF- e_phn is a multivalued attribute

2NF- br_code, br_name, br_loc

e_id, e_name, e_sal, e_dob, e_hiredate, e_phn

3NF- No transitive dependency

br_code, br_name, br_loc

e_id, e_name, e_sal, e_dob, e_hiredate, e_phn

Table for Work-

1. br_code, br_name, br_loc
2. e_id, e_name, e_sal, e_dob, e_hiredate, br_code
3. e_id, e_phn – Composite primary key

Final table list-

1. li_no, b_name, b_address - bank
2. br_code, br_name, br_loc, li_no - branch
3. acc_no, acc_type, acc_bal, br_code -account
4. n_id, acc_no, c_id -customerinfo
5. c_id, c_phn -customer_phn
6. c_id, c_name, c_loc, loan_no - customer
7. loan_no, loan_type, loan_amt, br_code -loan
8. m_id, m_name, m_sal, m_dob, m_hiredate, br_code - manager
9. m_id, m_phn – manager_phn
10. e_id, e_name, e_sal, e_dob, e_hiredate, m_id, br_code -employee
11. e_id, e_phn - employee_phn

Table Screenshots-

1. bank-

Description-

Object Type **TABLE** Object **BANK**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
BANK	LI_NO	Number	-	10	0	1	-	-	-
	B_NAME	Varchar2	20	-	-	-	-	-	-
	B_ADDRESS	Varchar2	25	-	-	-	-	-	-

1 - 3

*** not null constraint added in bank_name, b_address

Select * from bank -

LI_NO	B_NAME	B_ADDRESS
12345678	VOID Bank	Kuratoli

2. branch-

Description-

Object Type **TABLE** Object **BRANCH**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
BRANCH	BR_CODE	Number	-	10	0	1	-	-	-
	BR_NAME	Varchar2	20	-	-	-	-	-	-
	BR_LOC	Varchar2	20	-	-	-	-	-	-
	LI_NO	Number	-	10	0	-	-	-	-

1 - 4

*** not null constraint added in br_name, br_loc, li_no

Select * from branch –

BR_CODE	BR_NAME	BR_LOC	LI_NO
1111	Dhaka Branch	Dhaka	12345678
1114	Jamalpur Branch	Jamalpur	12345678
1112	Tangail Branch	Tangail	12345678
1113	Natore Branch	Natore	12345678

4 rows returned in 0.00 seconds CSV Export

3. account-

Description –

Object Type **TABLE** Object **ACCOUNT**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
ACCOUNT	ACC_NO	Number	-	20	0	1	-	-	-
	ACC_TYPE	Varchar2	8	-	-	-	-	-	-
	ACC_BAL	Number	-	12	0	-	✓	500	-
	BR_CODE	Number	-	10	0	-	-	-	-

1 - 4

*** default constraint added in acc_bal and not null constraint added in acc_type, br_code

Select * from account –

ACC_NO	ACC_TYPE	ACC_BAL	BR_CODE
4561	Savings	10000	1111
4562	Fixed	57570	1112
4563	Savings	300500	1113
4564	Savings	20290	1114
4565	Fixed	125000	1114

5 rows returned in 0.00 seconds CSV Export

4. customer-

Description-

Object Type **TABLE** Object **CUSTOMER**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CUSTOMER	C_ID	Number	-	10	0	1	-	-	-
	C_NAME	Varchar2	20	-	-	-	✓	-	-
	C_LOC	Varchar2	25	-	-	-	✓	-	-
	LOAN_NO	Number	-	10	0	-	✓	-	-

1 - 4

Select * from customer –

C_ID	C_NAME	C_LOC	LOAN_NO
42409	Tisha	Dhaka	2341
42451	Shifat	Jamalpur	2344
42460	Meraz	Natore	2343
42352	Moon	Tangail	2342

4 rows returned in 0.00 seconds CSV Export

5. customer_phn –

Description-

Object Type **TABLE** Object **CUSTOMER_PHN**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CUSTOMER_PHN	C_ID	Number	-	10	0	1	-	-	-
	C_PHN	Number	-	14	0	2	-	-	-

1 - 2

Select * from customer_phn –

C_ID	C_PHN
42409	19777
42451	17544
42460	16912
42352	13210
42451	19102

5 rows returned in 0.00 seconds

6. customerinfo-

Description-

Object Type **TABLE** Object **CUSTOMERINFO**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CUSTOMERINFO	N_ID	Number	-	15	0	1	-	-	-
	ACC_NO	Number	-	20	0	-	✓	-	-
	C_ID	Number	-	10	0	-	✓	-	-
									1 - 3

Select * from customerinfo-

N_ID	ACC_NO	C_ID
90001	4561	42409
90002	4562	42352
90003	4563	42460
90004	4564	42451

4 rows returned in 0.00 seconds

7. loan-

Description-

Object Type **TABLE** Object **LOAN**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
LOAN	LOAN_NO	Number	-	10	0	1	-	-	-
	LOAN_TYPE	Varchar2	20	-	-	-	-	-	-
	LOAN_AMT	Number	-	10	0	-	-	-	-
	BR_CODE	Number	-	10	0	-	-	-	-

1 - 4

*** not null constraint added in loan_type, loan_amt, br_code

Select * from loan –

LOAN_NO	LOAN_TYPE	LOAN_AMT	BR_CODE
2341	House Loan	2000000	1111
2342	Business Loan	1050000	1112
2343	House Loan	5070000	1113
2344	Business Loan	5170000	1114

4 rows returned in 0.00 seconds CSV Export

8. manager –

Description-

Object Type **TABLE** Object **MANAGER**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
MANAGER	M_ID	Number	-	10	0	1	-	-	-
	M_NAME	Varchar2	20	-	-	-	-	-	-
	M_SAL	Number	-	7	0	-	✓	-	-
	M_DOB	Date	7	-	-	-	✓	-	-
	M_HIREDATE	Date	7	-	-	-	✓	-	-
	BR_CODE	Number	-	10	0	-	-	-	-

1 - 6

*** not null constraint added in m_name, br_code

Select * from manager –

M_ID	M_NAME	M_SAL	M_DOB	M_HIREDATE	BR_CODE
101	Pritom	50000	01-JAN-81	05-MAR-10	1113
102	Sadia	47000	15-MAR-80	01-FEB-09	1114
103	Rima	40501	09-OCT-79	10-FEB-07	1112
104	Prithy	30750	15-APR-82	20-SEP-10	1111

4 rows returned in 0.00 seconds CSV Export

9. manager_phn –

Description-

Object Type **TABLE** Object **MANAGER_PHN**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
MANAGER_PHN	M_ID	Number	-	10	0	1	-	-	-
	M_PHN	Number	-	14	0	2	-	-	-
									1 - 2

Select * from manager_phn –

M_ID	M_PHN
101	17546
102	19447
103	16346
104	15126

4 rows returned in 0.00 seconds

10. employee-

Description-

Object Type **TABLE** Object **EMPLOYEE**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
EMPLOYEE	E_ID	Number	-	10	0	1	-	-	-
	E_NAME	Varchar2	20	-	-	-	-	-	-
	E_SAL	Number	-	7	0	-	✓	-	-
	E_DOB	Date	7	-	-	-	✓	-	-
	E_HIREDATE	Date	7	-	-	-	✓	-	-
	M_ID	Number	-	10	0	-	-	-	-
	BR_CODE	Number	-	10	0	-	-	-	-

1 - 7

*** not null constraint added in e_name, m_id, br_code

Select * from employee-

E_ID	E_NAME	E_SAL	E_DOB	E_HIREDATE	M_ID	BR_CODE
201	Gopal	15000	11-APR-80	01-JAN-11	101	1113
202	Rahim	17000	17-MAR-81	05-MAY-10	101	1113
203	Rifat	16500	09-DEC-80	01-MAR-10	102	1114
204	Piash	17500	19-FEB-82	11-DEC-09	102	1114
205	Fatema	15750	29-JUN-79	18-DEC-08	103	1112
206	Tareq	20750	27-OCT-77	01-DEC-07	103	1112
207	Abrar	12550	13-NOV-83	01-JAN-12	104	1111
208	Raihan	18000	14-APR-80	10-JAN-10	104	1111

8 rows returned in 0.00 seconds CSV Export

11. Employee_phn

Description-

Object Type **TABLE** Object **EMPLOYEE_PHN**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
EMPLOYEE_PHN	E_ID	Number	-	10	0	1	-	-	-
	E_PHN	Number	-	14	0	2	-	-	-

1 - 2

Select * from employee_phn –

E_ID	E_PHN
201	17555
202	19655
203	17445
204	16912
205	13531
206	16333
207	19545
208	17115

8 rows returned in 0.00 seconds

Questions –

1. Find nid, account no and account balance of these person who have Savings account. (Join)
2. Find the manager id, manager name and manager dob of that employees who earn more than 17000. (Multiple Row Sub query)
3. Display those employee name, employee id and employee working years (Rounded) as Working Years whose manager get salary more than 39000. (Date, Join, Multiple Row Sub query)
4. Display branch name where loan amount is minimum of Business Loan Type . (Group Function, Sub Query)
5. Create sequence named Bankdata. Increment by 1,Max value 999,starts with 101,no min value,no cycle & no cache.(Sequence)
6. Create a view named CustomerLoanDetails which contains all customer id, customer name, customer location, loan no, loan type, loan amount.(view)
7. Display all the details employee whose name start with ‘R’ or the second letter is ‘a’.(like operator)

8. Display the minimum average salary of employee group by branch code. (group by)
9. Display the phone no of those customer whose name length is 5.(length, sub query)

10 . Display all the employees name and hiredate who joined after the manager. (Date, subquery)

Answers –

1. select c.n_id , c.acc_no, a.acc_bal from customerinfo c, account a where a.acc_no=c.acc_no and a.acc_type='Savings'

2. select m_id, m_name, m_dob from manager where m_id in(select m_id from employee where e_sal>17000)

3. select e.e_name,e.e_id,round(months_between(sysdate,e.e_hiredate)/12) "Working Years" from employee e,manager m where e.m_id=m.m_id and m.m_sal>39000

4. select br_name from branch where br_code in(select br_code from loan where loan_type='Business Loan' and loan_amt in (select min(loan_amt) from loan group by loan_type))

5. Create sequence Bankdata start with 101 increment by 1 maxvalue 999 nocache nocycle

6. create view customerloandetails as select c_id,c_name,c_loc, loan.loan_no, loan_type, loan_amt from customer,loan where customer.loan_no=loan.loan_no

7. select * from employee where e_name like 'R%' or e_name like '_a%'

8. select min(avg(e_sal)) from employee,branch where employee.br_code=branch.br_code group by employee.br_code

9. select c_phn from customer_phn where c_id in (select c_id from customer where length(c_name)=5)

10. select e_name, e_hiredate from employee where e_hiredate > all(select m_hiredate from manager)