AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH

(AIUB)

Faculty of Science & Technology

INTRODUCTION TO DATABASE

Project Title

Bank Database Management System

Submitted to

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Introduction:

A Bank management system is to automate day to day activity of a bank. Bank is a business that serves people all over the world with their service. In the Bank database management system, Bank will be uniquely identified by Reg_ID, Reg_Password. The bank has several branches throughout the country. Every branch has B_Name and Location. Bank has department, which is uniquely identified by id, name Bank access user. User has name and id also. By using user id several login detected. Login also identified by user id and password. A company supervised by employee who will be identified by E_Name, E_ID. Customers are identified by C_name, a unique C_ID. Customer has Bank Account. Bank Account has unique Acc_ID, Acc_Name. A Bank Account needs registration to registered has Acc_ID and it will also store C_ID and Acc_Name different Acc_Types_Code. These different Acc_Types_Code has Account_Types. Bank Account also have Account transactions, which is identified by unique Trans_ID, E_ID and C_ID and also have been money transactions history. Account transactions also have Reports, which is identified by unique Report_ID, Report_Name, Trans_ID and ACC_ID and also have been transactions id and account id notes.

List OF Tables:

1. BANK
2. DEPARTMENTS
3. USERS
4. REGISTRATION
5. LOG_IN
6. EMPLOYEES
7. CUSTOMERS
8. CONTACT_INFO
    - CONTACT_INFO_EMPLOYEES
    - CONTACT_INFO_CUSTOMERS
9. ACCOUNTS
10. ACCOUNT_TYPES
11. TRANSACTIONS
12. TRANSACTION_TYPES
13. REPORTS

NORMALIZATION:

BANK Has DEPARTMENTS:

UNF:

Dept_No, B_Name, User_ID, Branch_Name, B_Code, Dept_No, D_Name, Location

1NF:

Dept_No, Dept_No, B_Name, User_ID, Branch_Name, B_Code, D_Name, Location

2NF:

1st: Dept_No, D_Name, Location

2nd: Dept_No, B_Name, User_ID, Branch_Name, B_Code, Dept_No

3rd: Dept_No, Dept_No

3NF:

1st: Dept_No, D_Name, Location

2nd: Dept_No, B_Name, User_ID, Branch_Name, B_Code, Dept_No

3rd: Dept_No, Dept_No

BANK Has USERS:

UNF:

User_ID, B_Name, Dept_No, Branch_Name, B_Code, User_ID, User_Name, User_Address

1NF:

User_ID, User_ID, B_Name, Dept_No, Branch_Name, B_Code, User_Name, User_Address

2NF:

1st: User_ID, B_Name, Dept_No, Branch_Name, B_Code, User_ID

2nd: User_ID, User_Name, User_Address

3rd: User_ID, User_ID

3NF:

1st: User_ID, B_Name, Dept_No, Branch_Name, B_Code, User_ID

2nd: User_ID, User_Name, User_Address

3rd: User_ID, User_ID

TABLE CREATION:

1. BANK Table:

B_NAME	USER_ID	DEPT_NO	BRANCH_NAME	B_CODE
ARA BANK	557722	10	Rampura_Branch	110236
ARA BANK	557822	20	Malibagh_Branch	110236
ARA BANK	557922	10	Rampura_Branch	110236
ARA BANK	222018	-	-	110236
ARA BANK	222118	-	-	110236
ARA BANK	222218	-	-	110236

```
Create table BANK
(
  B_Name Varchar2(30) not null,
  User_ID Number primary key,
  Dept_No Number references DEPARTMENTS(Dept_No),
  Branch_Name Varchar2(30) not null,
  B_Code Number(6) not null

);

DESC BANK;

insert into BANK values('ARA BANK', 557722, 10, 'Rampura_Branch', 110236);
insert into BANK values('ARA BANK', 557822, 20, 'Malibagh_Branch', 110236);
insert into BANK values('ARA BANK', 557922, 10, 'Rampura_Branch', 110236);
insert into BANK values('ARA BANK', 222018, NULL, '-', 110236);
insert into BANK values('ARA BANK', 222118, NULL, '-', 110236);
insert into BANK values('ARA BANK', 222218, NULL, '-', 110236);

SELECT *
FROM BANK;
```

2. DEPARTMENTS TABLE:

DEPT_NO	D_NAME	LOCATION
10	Accounting	Rampura
20	Research	Malibagh

```
Create table DEPARTMENTS
(
  Dept_No Number primary key,
  D_Name Varchar2(16) not null,
  Location Varchar2(16) not null

);

DESC DEPARTMENTS;

insert into DEPARTMENTS values(10, 'Accounting', 'Rampura');
insert into DEPARTMENTS values(20, 'Research', 'Malibagh');

SELECT *
FROM DEPARTMENTS;
```

3. USERS TABLE:

USER_ID	USER_NAME	USER_ADDRESS
557722	A	300/B Rampura
557822	B	400/B Banasree
557922	C	200/B Malibagh
222018	D	100/B Khilgaon
222118	E	500/B Mohammadpur
222218	F	600/B Mirpur

```
Create table USERS
(
  User_ID Number references BANK(User_ID),
  User_Name Varchar2(30) not null,
  User_Address Varchar2(30) not null

);

DESC USERS;

insert into USERS values(557722, 'A', '300/B Rampura');
insert into USERS values(557822, 'B', '400/B Banasree');
insert into USERS values(557922, 'C', '200/B Malibagh');
insert into USERS values(222018, 'D', '100/B Khilgaon');
insert into USERS values(222118, 'E', '500/B Mohammadpur');
insert into USERS values(222218, 'F', '600/B Mirpur');

SELECT *
FROM USERS;
```

4. REGISTRATION TABLE:

REG_ID	REG_PASSWORD
557722	www256
557822	wwe790
557922	wwf567
222018	aaa893
222118	bbb657
222218	aew789

```
Create table REGISTRATION
(
  Reg_ID Number primary key,
  Reg_Password Varchar2(30) unique

);

DESC REGISTRATION;

insert into REGISTRATION values(557722, 'www256');
insert into REGISTRATION values(557822, 'wwe790');
insert into REGISTRATION values(557922, 'wwf567');
insert into REGISTRATION values(222018, 'aaa893');
insert into REGISTRATION values(222118, 'bbb657');
insert into REGISTRATION values(222218, 'aew789');

SELECT *
FROM REGISTRATION;
```

5. LOG_IN TABLE:

LOGIN_USERNAME	LOGIN_ID	LOGIN_PASSWORD
A	557722	www256
B	557822	wwe790
C	557922	wwf567
D	222018	aaa893
E	222118	bbb657
F	222218	aew789

```
Create table LOGIN
(
  Login_Username Varchar2(30),
  Login_ID Number primary key,
  Login_Password Varchar2(30) unique

);

DESC LOGIN;

insert into LOGIN values('A', 557722, 'www256');
insert into LOGIN values('B', 557822, 'wwe790');
insert into LOGIN values('C', 557922, 'wwf567');
insert into LOGIN values('D', 222018, 'aaa893');
insert into LOGIN values('E', 222118, 'bbb657');
insert into LOGIN values('F', 222218, 'aew789');

SELECT *
FROM LOGIN;
```

6. EMPLOYEES TABLE:

E_NAME	E_ID	E_PASSWORD	DEPT_NO
Rakib	557722	www256	10
Helal	557822	wwe790	20
Shifat	557922	wwf567	10

```
Create table EMPLOYEES
(
  E_Name Varchar2(30) not null,
  E_ID Number primary key,
  E_Password Varchar2(30) unique,
  Dept_No Number references DEPARTMENTS(Dept_No)

);

DESC EMPLOYEES;

insert into EMPLOYEES values('Rakib', 557722, 'www256', 10);
insert into EMPLOYEES values('Helal', 557822, 'wwe790', 20);
insert into EMPLOYEES values('Shifat', 557922, 'wwf567', 10);

SELECT *
FROM EMPLOYEES;
```

7. CUSTOMERS TABLE:

C_NAME	C_ID	C_PASSWORD
Rahim	222018	aaa893
Karim	222118	bbb657
Jasim	222218	aew789

```
Create table CUSTOMERS
(
  C_Name Varchar2(30) not null,
  C_ID Number primary key,
  C_Password Varchar2(30) unique

);

DESC CUSTOMERS;


insert into CUSTOMERS values('Rahim', 222018, 'aaa893');
insert into CUSTOMERS values('Karim', 222118, 'bbb657');
insert into CUSTOMERS values('Jasim', 222218, 'aew789');

SELECT *
FROM CUSTOMERS;
```

8. CONTACT_INFO:

- CONTACT_INFO_EMPLOYEES TABLE:

USER_ID	MOBILE_NUMBER	EMAIL_ID
557722	1556784400	Rakib@gmail.com
557722	1556784411	Rakibhossain@gmail.com
557822	1666784400	Helal@gmail.com
557922	1576784400	Shifat@gmail.com

```
Create table CONTACT_INFO_EMPLOYEES
(
  User_ID Number references EMPLOYEES(E_ID),
  Mobile_Number Number primary key,
  Email_ID Varchar2(60) unique

);

DESC CONTACT_INFO_EMPLOYEES;

insert into CONTACT_INFO_EMPLOYEES values(557722, 01556784400, 'Rakib@gmail.com');
insert into CONTACT_INFO_EMPLOYEES values(557722, 01556784411, 'Rakibhossain@gmail.com');
insert into CONTACT_INFO_EMPLOYEES values(557822, 01666784400, 'Helal@gmail.com');
insert into CONTACT_INFO_EMPLOYEES values(557922, 01576784400, 'Shifat@gmail.com');

SELECT *
FROM CONTACT_INFO_EMPLOYEES;
```

- CONTACT_INFO_CUSTOMERS TABLE:

USER_ID	MOBILE_NUMBER	EMAIL_ID
222018	1556784412	Rahim@gmail.com
222018	1556784413	Rahimhossain@gmail.com
222118	1556784414	Karim@gmail.com
222218	1556784415	Jasim@gmail.com

```
Create table CONTACT_INFO_CUSTOMERS
(
  User_ID Number references CUSTOMERS(C_ID),
  Mobile_Number Number primary key,
  Email_ID Varchar2(60) unique

);

DESC CONTACT_INFO_CUSTOMERS;


insert into CONTACT_INFO_CUSTOMERS values(222018, 01556784412, 'Rahim@gmail.com');
insert into CONTACT_INFO_CUSTOMERS values(222018, 01556784413,
'Rahimhossain@gmail.com');
insert into CONTACT_INFO_CUSTOMERS values(222118, 01556784414, 'Karim@gmail.com');
insert into CONTACT_INFO_CUSTOMERS values(222218, 01556784415, 'Jasim@gmail.com');

SELECT *
FROM CONTACT_INFO_CUSTOMERS;
```

9. ACCOUNTS TABLE:

ACC_NAME	ACC_ID	C_ID	ACC_TYPES_CODE
RAHIM	650789	222018	SA
KARIM	657890	222118	FA
JASIM	445566	222218	SA

```
Create table ACCOUNTS
(
  Acc_Name Varchar2(30) not null,
  Acc_ID Number primary key,
  C_ID Number references CUSTOMERS(C_ID),
  Acc_Types_Code Varchar2(12) references ACCOUNT_TYPES(Acc_Types_Code)

);

DESC ACCOUNTS;

insert into ACCOUNTS values('RAHIM', 650789, 222018, 'SA');
insert into ACCOUNTS values('KARIM', 657890, 222118, 'FA');
insert into ACCOUNTS values('JASIM', 445566, 222218, 'SA');

SELECT *
FROM ACCOUNTS;
```

10. ACCOUNT_TYPES TABLE:

ACC_TYPES_CODE	ACC_TYPES_DESCRIPTION
SA	Savings_Account
FA	Fixed_Account

```
Create table ACCOUNT_TYPES
(
  Acc_Types_Code Varchar2(12) primary key,
  Acc_Types_Description Varchar2(30) not null

);

DESC ACCOUNT_TYPES;

insert into ACCOUNT_TYPES values('SA', 'Savings_Account');
insert into ACCOUNT_TYPES values('FA', 'Fixed_Account');

SELECT *
FROM ACCOUNT_TYPES;
```

11. TRANSACTIONS TABLE:

TRANS_ID	E_ID	C_ID	TRANS_TYPES_CODE
Xxxghik7654	557722	222018	DM
Xxxghik7554	557822	222118	DM
Xxxghik7577	557922	222218	WM

```
Create table TRANSACTIONS
(
  Trans_ID Varchar2(30) primary key,
  E_ID Number references EMPLOYEES(E_ID),
  C_ID Number references CUSTOMERS(C_ID),
  Trans_Types_Code Varchar2(12) references TRANSACTION_TYPES(Trans_Types_Code)

);

DESC TRANSACTIONS;

insert into TRANSACTIONS values('Xxxghik7654', 557722, 222018, 'DM');
insert into TRANSACTIONS values('Xxxghik7554', 557822, 222118, 'DM');
insert into TRANSACTIONS values('Xxxghik7577', 557922, 222218, 'WM');

SELECT *
FROM TRANSACTIONS;
```

12. TRANSACTIONS_TYPES TABLE:

TRANS_TYPES_CODE	TRANS_TYPES_DESCRIPTION
DM	Deposit_Money
WM	Withdraw_Money

```
Create table TRANSACTION_TYPES
(
  Trans_Types_Code Varchar2(12) primary key,
  Trans_Types_Description Varchar2(30) not null

);

DESC TRANSACTION_TYPES;

insert into TRANSACTION_TYPES values('DM', 'Deposit_Money');
insert into TRANSACTION_TYPES values('WM', 'Withdraw_Money');
SELECT *
FROM TRANSACTION_TYPES;
```

13. REPORTS TABLE:

ACC_ID	TRANS_ID	REPORT_ID	REPORT_NAME
650789	Xxxghik7654	100	AAA
657890	Xxxghik7554	101	BBB
445566	Xxxghik7577	102	CCC

```
Create table REPORTS
(
  Acc_ID Number references ACCOUNTS(Acc_ID),
  Trans_ID Varchar2(30) references TRANSACTIONS(Trans_ID),
  Report_ID Number primary key,
  Report_Name Varchar2(30)

);

DESC REPORTS;

insert into REPORTS values(650789, 'Xxxghik7654', 100, 'AAA');
insert into REPORTS values(657890, 'Xxxghik7554', 101, 'BBB');
insert into REPORTS values(445566, 'Xxxghik7577', 102, 'CCC');

SELECT *
FROM REPORTS;
```

- JOINING:

BANK Has DEPARTMENTS:

B_NAME	USER_ID	BRANCH_NAME	B_CODE	DEPT_NO	D_NAME	LOCATION
ARA BANK	557722	Rampura_Branch	110236	10	Accounting	Rampura
ARA BANK	557822	Malibagh_Branch	110236	20	Research	Malibagh
ARA BANK	557922	Rampura_Branch	110236	10	Accounting	Rampura

```
SELECT b.B_Name, b.User_ID, b.Branch_Name, b.B_Code, d.Dept_no, d.D_Name, d.Location
FROM BANK b, DEPARTMENTS d
WHERE b.Dept_No  =  d.Dept_No;
```

BANK Has USERS:

B_NAME	BRANCH_NAME	B_CODE	DEPT_NO	USER_ID	USER_NAME	USER_ADDRESS
ARA BANK	Rampura_Branch	110236	10	557722	A	300/B Rampura
ARA BANK	Malibagh_Branch	110236	20	557822	B	400/B Banasree
ARA BANK	Rampura_Branch	110236	10	557922	C	200/B Malibagh
ARA BANK	-	110236	-	222018	D	100/B Khilgaon
ARA BANK	-	110236	-	222118	E	500/B Mohammadpur
ARA BANK	-	110236	-	222218	F	600/B Mirpur

```
SELECT b.B_Name, b.Branch_Name, b.B_Code, b.Dept_No, u.User_ID, u.User_Name,
u.User_Address
FROM BANK b, USERS u
WHERE b.User_ID  =  u.User_ID;
```

QUERY:

1. Write a query to display the employee name, employee id and department number for all employees?

Ans:
```
SELECT E_Name, E_ID, Dept_No
 FROM EMPLOYEES;
```

2. Write a query to display the departments table?

Ans:
```
SELECT *
 FROM DEPARTMENTS;
```

3. Create a unique listing of all employees name that are in department 10. Include the location of department 10 in the output?

Ans:
```
SELECT EMPLOYEES.E_Name, DEPARTMENTS.Location
 FROM EMPLOYEES, DEPARTMENTS
WHERE EMPLOYEES.Dept_No = DEPARTMENTS.Dept_No
AND DEPARTMENTS.Dept_No = 10;
```

4. Select all the employees who work in RAMPURA?

Ans:
```
SELECT *
 FROM EMPLOYEES
WHERE Dept_No IN
                (SELECT Dept_No
                 FROM DEPARTMENTS
                 WHERE Location = 'Rampura');
```

5. Write a query to display the customer name, customer id for all customers?

Ans:
```
SELECT C_Name, C_ID
 FROM CUSTOMERS;
```

6. Display all the employee names who work in Accounts and Research departments?

Ans:
```
SELECT EMPLOYEES.E_Name
 FROM EMPLOYEES, DEPARTMENTS
WHERE EMPLOYEES.Dept_No = DEPARTMENTS.Dept_No
AND Departments.D_Name IN ('Accounting','Research');
```

7. Write a query that will display the employee's name with the first letter capitalized and all other letters lowercase and the length of their name, for all employees whose name starts with R, H, or S Give each column an appropriate label?

Ans: SELECT INITCAP(E_Name) "Name", LENGTH(E_Name) "Length of Name"
FROM EMPLOYEES
WHERE E_Name LIKE 'R%' or E_Name LIKE 'H%' or E_Name LIKE 'S%';

8. Create a table named CUSTOMERS from the following structure using SQL commands (use the constraints while making the table):

Column Name	Data Type
C_Name	Varchar2(30)
C_ID	Number
C_Password	Varchar2(30)

Ans: Create table CUSTOMERS
(
C_Name Varchar2(30) not null,
C_ID Number primary key,
C_Password Varchar2(30) unique

);

DESC CUSTOMERS;

9. Display the employee id of the employee and order the result by ascending order?

Ans: SELECT E_ID
FROM EMPLOYEES
ORDER BY E_ID;

10. Display the employee id of the customer names which having names start with K?

Ans: SELECT C_Name
FROM CUSTOMERS
WHERE C_Name LIKE 'K%';

VIEWS AND SEQUENCES:

VIEWS:

1. Create a view called **EMP_VU** based on the employee id, employee name, and department number from the EMPLOYEES table?

Ans: CREATE VIEW EMP_VU
AS SELECT E_ID, E_Name, Dept_No
FROM EMPLOYEES;

2. Display **EMP_VU**?

Ans: SELECT *
FROM EMP_VU;

3. Create a view named **DEPT20** that contains the employee id, employee name, and department number for all employees in department 20. Label the view column EMPLOYEE_ID, EMPLOYEE, and DEPARTMENT_ID. Do not allow an employee to be reassigned to another department through the view?

Ans: CREATE VIEW DEPT20
AS SELECT E_ID EMPLOYEE_ID, E_Name EMPLOYEE, Dept_No DEPARTMENT_ID
FROM EMPLOYEES
WHERE Dept_NO = 20;

4. Create a view called DEPT_VU based on the employee name, department name, location for all employees in department 10?

Ans: CREATE VIEW DEPT10
AS SELECT e.E_Name, d.D_Name, d.Location
FROM EMPLOYEES e, DEPARTMENTS d
WHERE e.Dept_No = d.Dept_No
And d.Dept_No = 10;

5. Create a view called **CUS_VU** based on the customer id and customer name from the CUSTOMERS table?

Ans: CREATE VIEW CUS_VU
AS SELECT C_ID, C_Name
FROM CUSTOMERS;

SEQUENCES:

1. Create a sequence to be used with the primary key column of the DEPARTMENTS table. The sequence should start at 10 and have a maximum value of 100. Have your sequence increment by one numbers. Name the sequence DEPT_ID_SEQ?

Ans: CREATE SEQUENCE DEPT_ID_SEQ
INCREMENT BY 1
START WITH 10
MAXVALUE 100
NOCACHE
NOCYCLE;

2. Write a script to display the following information about your sequences: sequence name, maximum value, increment size, and last number?

Ans: SELECT sequence_name, max_value, increment_by, last_number
FROM user_sequences;

3. Insert a new department named “MARKETING” in Rampura?

Ans: INSERT INTO DEPARTMENTS(Dept_No, D_Name, Location)
VALUES (DEPT_ID_SEQ.NEXTVAL, 'MARKETING', 'Rampura');

4. View the current value for the DEPT_ID_SEQ sequence?

Ans: SELECT DEPT_ID_SEQ.CURRVAL
FROM dual;

5. Change the increment value, maximum value, minimum value, cycle option, or cache option?

Ans: ALTER SEQUENCE DEPT_ID_SEQ
INCREMENT BY 2
MAXVALUE 70
NOCACHE
NOCYCLE;

CONTRIBUTIONS:

NAME	CONTRIBUTED TASKS	PERCENTAGE
MD. AMINUR RAHMAN ASIF	TABLE CREATION, QUERY, VIEWS AND SEQUENCES	60%
MEHEDI HASAN MIM	INTRODUCTION, NORMALIZATION	40%