

NJIT CS 631
DATA MANAGEMENT SYSTEM DESIGN

THE WALLET PAYMENT NETWORK
DELIVERABLE 3

PROJECT GROUP 12

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Goal of this phase of the project

The goal of this part is to translating our Relational schema to a real-world database framework, populate the database, and create a website for Wallet.

Revisions made to the specifications described in Phase 2 Deliverable.

We added the following additional fields to the Relational Schema of Deliverable 2.

1. Bank balance for each of the additional bank accounts linked to a Wallet User.
2. is_primary flag for emails, to differentiate between a primary email and others in case a user has multiple emails linked.
3. Status attribute was added to Send and Request transactions table to record the status of the transaction (Completed, Pending or Failed).

Description of Implementation

Using Java programming language, we implemented frontend with the help of HTML, CSS, JavaScript and JSP, backend with the help of Servlets.

Tools that we use:

1. JDK 11.0.5
2. Eclipse IDE for Java EE Developers
3. Apache-tomcat v.9.0
4. Microsoft SQL Server Management Studio 18
5. Database Hosted – Microsoft Azure Cloud Services

Problems faced

1. We faced problem for making login sessions, as we needed to render SSN value of the login user at every page to execute queries for that particular person. As a solution, we used HTTP sessions.
2. While creating the table structures, cascade functionality couldn't be used to all foreign keys, since the tables were interlinked and using cascade for all foreign keys caused cascade operation to enter into an infinite loop. As a solution, we implemented cascade to all foreign keys possible and for the rest we made manual updates based on the requirement.

SQL command to create tables.

-- Elec_address Table--

```
SET ANSI_NULLS ON
GO
```

```
SET QUOTED_IDENTIFIER ON
GO
```

```
CREATE TABLE [dbo].[elec_address](
    [identifier] nvarchar(30) NOT NULL,
    [verified] bit NOT NULL

    PRIMARY KEY (identifier)
) ON [PRIMARY]
GO
```

-- Phone Table --

```
SET ANSI_NULLS ON
GO
```

```
SET QUOTED_IDENTIFIER ON
GO
```

```
CREATE TABLE [dbo].[phone](
    [phone_no] nvarchar(30) NOT NULL

    PRIMARY KEY (phone_no)
    FOREIGN KEY (phone_no) REFERENCES elec_address(identifier)
    ON DELETE CASCADE ON UPDATE CASCADE
) ON [PRIMARY]
GO
```

--Bank Account Table--

```
SET ANSI_NULLS ON
GO
```

```
SET QUOTED_IDENTIFIER ON
GO
```

```
CREATE TABLE [dbo].[bank_account](
    [bank_id] varchar(20) NOT NULL,
    [ba_number] varchar(20) NOT NULL
    PRIMARY KEY (bank_id,ba_number)
) ON [PRIMARY]
GO
```

--User Account Table--

SET ANSI_NULLS ON
GO

SET QUOTED_IDENTIFIER ON
GO

```
CREATE TABLE [dbo].[user_account](
    [SSN] numeric(10,0) NOT NULL,
    [first_name] varchar(50) NOT NULL,
    [last_name] varchar(50) NULL,
    [phone_number] nvarchar(30) NULL,
    [balance] numeric(20,2) NULL,
    [bank_id] varchar(20) NULL,
    [ba_number] varchar(20) NULL,
    [ba_verified] bit NULL,
    [username] varchar(20) NOT NULL,
    [password] varchar(20) NOT NULL
    PRIMARY KEY (SSN),
    FOREIGN KEY (phone_number) REFERENCES phone(phone_no)
    ON DELETE SET NULL ON UPDATE CASCADE,
    FOREIGN KEY (bank_id,ba_number) REFERENCES bank_account(bank_id,ba_number)
    ON DELETE CASCADE ON UPDATE CASCADE
) ON [PRIMARY]
GO
```

--HAS Additional Table--

SET ANSI_NULLS ON
GO

SET QUOTED_IDENTIFIER ON
GO

```
CREATE TABLE [dbo].[has_additional](
    [SSN] numeric(10,0) NOT NULL,
    [bank_id] varchar(20) NOT NULL,
    [ba_number] varchar(20) NOT NULL,
    [balance] numeric(20,2) NULL,
    [verified] bit NULL
    PRIMARY KEY (SSN,bank_id,ba_number)
    FOREIGN KEY (SSN) REFERENCES user_account(SSN)
    ON DELETE CASCADE ON UPDATE CASCADE,
    FOREIGN KEY (bank_id,ba_number) REFERENCES bank_account(bank_id,ba_number)
) ON [PRIMARY]
GO
```

--EMAIL Table--

SET ANSI_NULLS ON
GO

```
SET QUOTED_IDENTIFIER ON
GO
```

```
CREATE TABLE [dbo].[email](
    [email_address] nvarchar(30) NOT NULL,
    [SSN] numeric(10,0) NOT NULL,
    [is_primary] bit NULL

    PRIMARY KEY (email_address)
    FOREIGN KEY (email_address) REFERENCES elec_address(identifier),
    FOREIGN KEY (SSN) REFERENCES user_account(SSN)
    ON DELETE CASCADE ON UPDATE CASCADE
) ON [PRIMARY]
GO
```

```
-----
--Send Transaction Table--
```

```
SET ANSI_NULLS ON
GO
```

```
SET QUOTED_IDENTIFIER ON
GO
```

```
CREATE TABLE [dbo].[send_transaction](
    [STid] int identity(10000000, 1),
    [amount] numeric(10,2) NOT NULL,
    [datetime] datetime NOT NULL,
    [memo] nvarchar(50) NULL,
    [cancel_reason] nvarchar(50) NULL,
    [identifier] nvarchar(30) NOT NULL,
    [SSN] numeric(10,0) NOT NULL,
    [status] nvarchar(100) NULL

    PRIMARY KEY (STid),
    FOREIGN KEY (SSN) REFERENCES user_account(SSN)
    ON DELETE CASCADE ON UPDATE CASCADE
) ON [PRIMARY]
GO
```

```
-----
--Request Transaction Table--
```

```
SET ANSI_NULLS ON
GO
```

```
SET QUOTED_IDENTIFIER ON
GO
```

```
CREATE TABLE [dbo].[request_transaction](
    [RTid] int identity(20000000, 1),
    [amount] numeric(10,2) NOT NULL,
    [datetime] datetime NOT NULL,
    [memo] nvarchar(50) NULL,
    [SSN] numeric(10,0) NOT NULL,
```

```

        [status] nvarchar(100) NULL

        PRIMARY KEY (RTid),
        FOREIGN KEY (SSN) REFERENCES user_account(SSN)
        ON DELETE CASCADE ON UPDATE CASCADE
    ) ON [PRIMARY]
GO

```

--Request Transaction Multiple Table--

```

SET ANSI_NULLS ON
GO

```

```

SET QUOTED_IDENTIFIER ON
GO

```

```

CREATE TABLE [dbo].[request_transaction_multiple](
    [RTid] int NOT NULL,
    [identifier] nvarchar(30) NOT NULL,
    [percentage] numeric(10,2) NOT NULL

    PRIMARY KEY (RTid,identifier)
) ON [PRIMARY]
GO

```

SQL command to populate tables.

- Adding New User

```

DECLARE
@SSN numeric(10,0) = '236744256',
@phone nvarchar(30) = '9734388344',
@email nvarchar(30) = 'sanjay.sajjan@gmail.com',
@fname nvarchar(30) = 'Sanjay',
@lname nvarchar(30) = 'Sajjan',
@username nvarchar(30) = 'sanjay',
@password nvarchar(30) = 'sanjay@123'

insert into [dbo].[elec_address](identifier,verified)
values(@phone,1),(@email,1)

insert into [dbo].[phone](phone_no)
values(@phone)

insert into
[dbo].[user_account](SSN,first_name,last_name,phone_number,balance,bank_id,ba_number,ba_verified,us
ername,password)
values(@SSN,@fname,@lname,@phone,NULL,NULL,NULL,NULL,@username,@password)

```

```
insert into [dbo].[email](email_address,SSN,is_primary)
values(@email,@SSN,1)
```

- Adding a New Bank Account

```
DECLARE
@SSN numeric(10,0)= '160532258',
@bank_id varchar(20) = '6045789',
@ba_number varchar(20) = '214523698',
@balance numeric(20,2) = 6000,
@count1 numeric(10,0),
@count2 numeric(10,0)

select @count1 = count(1) from bank_account

insert into [dbo].[bank_account](bank_id,ba_number)
values(@bank_id,@ba_number)

select @count2 = count(1) from bank_account

if((@count2 - @count1) > 0)
BEGIN
    if((select bank_id from user_account where SSN = @SSN) is NULL)
        update user_account
        set bank_id = @bank_id,
            ba_number = @ba_number,
            ba_verified = 1,
            balance = @balance
        where SSN = @SSN
    else
        insert into has_additional(SSN,bank_id,ba_number,balance,verified)
        values(@SSN,@bank_id,@ba_number,@balance,1)
END
```

- Adding Additional Email

```
--Adding Additional email to a user's account

insert into [dbo].[elec_address](identifier,verified)
values('dh23@njit.edu',1)

insert into [dbo].[email](email_address,SSN,is_primary)
values('dh23@njit.edu',845247856,0)
```

- Modify Personal Details

```
-- Modify personal details --

update user_account
set SSN = 123456789, --new SSN if change is required. Otherwise retain old value
    first_name = 'Akilesh R', -- new first name if change is required. Otherwise retain old value
    last_name = 'Kannamukkala', -- new last name if change is required. Otherwise retain old value
    username = 'akil' -- new username if change is required. Otherwise retain old value
where SSN = 852365794 --existing SSN number
```

- Phone Number Related Queries

-- Adding a phone number

```
insert into [dbo].[elec_address](identifier,verified)
values('6467521957',1)
```

```
insert into [dbo].[phone](phone_no)
values('6467521957')
```

```
update [dbo].[user_account]
set phone_number = '6467521957'
where SSN = 123456789
```

-- Removing a phone number

```
delete from [dbo].[elec_address]
where identifier = '6467521957'
```

-- Updating a phone number

```
update [dbo].[elec_address]
set identifier = '8088182888'
where identifier = '6467521957'
```

```
update [dbo].[send_transaction]
set identifier = '8088182888'
where identifier = '6467521957'
```

```
update [dbo].[request_transaction_multiple]
set identifier = '8088182888'
where identifier = '6467521957'
```

- Removing Bank Account

DECLARE

```
@SSN numeric(10,0)= '123456789',
@bank_id varchar(20) = '124567',
@ba_number varchar(20) = '99883322'
```

```
if((select bank_id from [dbo].[user_account] where SSN = @SSN) = @bank_id and
(select ba_number from [dbo].[user_account] where SSN = @SSN) = @ba_number)
BEGIN
    if((select count(1) from [dbo].[has_additional] where SSN = @SSN) > 0)
        BEGIN
            update user_account
            set bank_id = (select top 1 bank_id from has_additional where SSN = @SSN),
                ba_number = (select top 1 ba_number from has_additional where SSN = @SSN),
                balance = (select top 1 balance from has_additional where SSN = @SSN)
            where SSN = @SSN
            delete from has_additional where bank_id = (select bank_id from user_account where SSN
= @SSN) and
```



```

ba_number =
(select ba_number from user_account where SSN = @SSN)
delete from bank_account where bank_id = @bank_id and ba_number = @ba_number
END
else
BEGIN
update user_account
set bank_id = NULL,
    ba_number = NULL,
    balance = 0
where SSN = @SSN
delete from bank_account where bank_id = @bank_id and ba_number = @ba_number
END
END
else
BEGIN
delete from has_additional where SSN = @SSN and bank_id = @bank_id and ba_number =
@ba_number
delete from bank_account where bank_id = @bank_id and ba_number = @ba_number
END

```

- Removing Email

--Removing an email from a user's account

```

DECLARE
@email nvarchar(50) = 'ark72@njit.edu',
@SSN numeric(10,0),
@new_email nvarchar(50)

select @SSN = SSN from email where email_address = @email
drop table if exists #t
select top 1 email_address into #t from email where SSN = @SSN and is_primary=0
select @new_email = email_address from #t

if((select is_primary from email where email_address = @email) = 1)
BEGIN
delete from [dbo].[email]
where email_address = @email

update email
set is_primary = 1
where email_address = @new_email
END
else
delete from [dbo].[email]
where email_address = @email

delete from [dbo].[elec_address]
where identifier = @email

```

- Request Transaction

-- Request Money Transaction

```

DECLARE
@Requester_SSN numeric(10,0) = '322474129',
@amount numeric(10,2) = 130,
@Sender_phone nvarchar(30) = '6467521957',
@Sender_email nvarchar(30) = 'akilesh.5050@gmail.com',
@Memo nvarchar(50) = 'Headphones'

if exists (select * from elec_address where identifier = @Sender_phone)
BEGIN
    if ((select balance from user_account where phone_number = @Sender_phone) >= @amount)
    BEGIN
        insert into [dbo].[request_transaction](amount,datetime,memo,SSN,status)
        values(@amount,SYSDATETIME(),@Memo,@Requester_SSN,'Completed')

        insert into [dbo].[request_transaction_multiple](RTid,identifier,percentage)
        values((select max(RTid) from request_transaction),@Sender_phone,100)

        update user_account
        set balance = balance - @amount
        where phone_number = @Sender_phone

        update user_account
        set balance = balance + @amount
        where SSN = @Requester_SSN
    END
    else
    BEGIN
        insert into [dbo].[request_transaction](amount,datetime,memo,SSN,status)
        values(@amount,SYSDATETIME(),@Memo,@Requester_SSN,'Failed')

        insert into [dbo].[request_transaction_multiple](RTid,identifier,percentage)
        values((select max(RTid) from request_transaction),@Sender_phone,100)
    END
END
else
BEGIN
    insert into [dbo].[request_transaction](amount,datetime,memo,SSN,status)
    values(@amount,SYSDATETIME(),@Memo,@Requester_SSN,'Pending')

    insert into [dbo].[request_transaction_multiple](RTid,identifier,percentage)
    values((select max(RTid) from request_transaction),@Sender_phone,100)
END

```

- Search Transactions

-----Search Transactions - Without filters-----

```

DECLARE
@SSN numeric(10,0) = 160532258

select a.STid as Transaction_ID,
       b.first_name+' '+b.last_name as Name,
       a.amount Amount,
       a.datetime "Date & Time",
       a.identifier as PhoneNumber,

```

```

        c.email_address as Email,
        a.status Status,
        'Send Transaction' as Transaction_Type,
        a.memo Memo
    from send_transaction a
    left join user_account b on a.identifier = b.phone_number
    left join email c on b.SSN = c.SSN and c.is_primary = 1
    where a.SSN = @SSN

union
select a.RTid as Transaction_ID,
       c.first_name+' '+c.last_name as Name,
       a.amount Amount,
       a.datetime "Date & Time",
       b.identifier as PhoneNumber,
       d.email_address as Email,
       a.status Status,
       'Request Transaction' as Transaction_Type,
       a.memo Memo
    from request_transaction a
    join request_transaction_multiple b on a.RTid = b.RTid
    left join user_account c on b.identifier = c.phone_number
    left join email d on c.SSN = d.SSN and d.is_primary = 1
    where a.SSN = @SSN

```

-----Search Transactions - Email Address-----

DECLARE

@email nvarchar(50) = 'akilesh@gmail.com',

@SSN numeric(10,0) = 485697523

```

select a.STid as Transaction_ID,
       b.first_name+' '+b.last_name as Name,
       a.amount Amount,
       a.datetime "Date & Time",
       a.identifier as PhoneNumber,
       c.email_address as Email,
       a.status Status,
       'Send Transaction' as Transaction_Type,
       a.memo Memo
    from send_transaction a
    left join user_account b on a.identifier = b.phone_number
    left join email c on b.SSN = c.SSN and c.is_primary = 1
    where c.email_address = @email and
           a.SSN = @SSN

```

union

```

select a.RTid as Transaction_ID,
       c.first_name+' '+c.last_name as Name,
       a.amount Amount,
       a.datetime "Date & Time",
       b.identifier as PhoneNumber,
       d.email_address as Email,
       a.status Status,
       'Request Transaction' as Transaction_Type,
       a.memo Memo
    from request_transaction a

```

```

join request_transaction_multiple b on a.RTid = b.RTid
left join user_account c on b.identifier = c.phone_number
left join email d on c.SSN = d.SSN and d.is_primary = 1
where d.email_address = @email and
      a.SSN = @SSN

```

-----Search Transactions - Phone Number-----

DECLARE

```

@phone nvarchar(50) = '6467521957',
@SSN numeric(10,0) = 485697523

```

```

select a.STid as Transaction_ID,
      b.first_name+' '+b.last_name as Name,
      a.amount Amount,
      a.datetime "Date & Time",
      a.identifier as PhoneNumber,
      c.email_address as Email,
      a.status Status,
      'Send Transaction' as Transaction_Type,
      a.memo Memo
from send_transaction a
left join user_account b on a.identifier = b.phone_number
left join email c on b.SSN = c.SSN and c.is_primary = 1
where b.phone_number = @phone and
      a.SSN = @SSN

```

union

```

select a.RTid as Transaction_ID,
      c.first_name+' '+c.last_name as Name,
      a.amount Amount,
      a.datetime "Date & Time",
      b.identifier as PhoneNumber,
      d.email_address as Email,
      a.status Status,
      'Request Transaction' as Transaction_Type,
      a.memo Memo
from request_transaction a
join request_transaction_multiple b on a.RTid = b.RTid
left join user_account c on b.identifier = c.phone_number
left join email d on c.SSN = d.SSN and d.is_primary = 1
where c.phone_number = @phone and
      a.SSN = @SSN

```

-----Search Transactions - Type of Transaction-----

--for send transaction run the below query

DECLARE

```

@SSN numeric(10,0) = 485697523

```

```

select a.STid as Transaction_ID,
      b.first_name+' '+b.last_name as Name,
      a.amount Amount,
      a.datetime "Date & Time",

```

```

a.identifier as PhoneNumber,
c.email_address as Email,
a.status Status,
'Send Transaction' as Transaction_Type,
a.memo Memo
from send_transaction a
left join user_account b on a.identifier = b.phone_number
left join email c on b.SSN = c.SSN and c.is_primary = 1
where a.SSN = @SSN

```

--for request transaction run the below query

```

select a.RTid as Transaction_ID,
       c.first_name+' '+c.last_name as Name,
a.amount Amount,
a.datetime "Date & Time",
b.identifier as PhoneNumber,
d.email_address as Email,
a.status Status,
'Request Transaction' as Transaction_Type,
a.memo Memo
from request_transaction a
join request_transaction_multiple b on a.RTid = b.RTid
left join user_account c on b.identifier = c.phone_number
left join email d on c.SSN = d.SSN and d.is_primary = 1
where a.SSN = @SSN

```

-----Search Transactions - Date Range-----

DECLARE

```

@start_date date = '2020-05-04',
@end_date date = '2020-05-04',
@SSN numeric(10,0) = 485697523

```

```

select a.STid as Transaction_ID,
       b.first_name+' '+b.last_name as Name,
a.amount Amount,
a.datetime "Date & Time",
a.identifier as PhoneNumber,
c.email_address as Email,
a.status Status,
'Send Transaction' as Transaction_Type,
a.memo Memo
from send_transaction a
left join user_account b on a.identifier = b.phone_number
left join email c on b.SSN = c.SSN and c.is_primary = 1
where a.datetime >= @Start_date and
       a.datetime <= DATEADD(DAY,1,@End_date) and
       a.SSN = @SSN

```

union

```

select a.RTid as Transaction_ID,
       c.first_name+' '+c.last_name as Name,
a.amount Amount,
a.datetime "Date & Time",

```

```

b.identifier as PhoneNumber,
d.email_address as Email,
a.status Status,
'Request Transaction' as Transaction_Type,
a.memo Memo
from request_transaction a
join request_transaction_multiple b on a.RTid = b.RTid
left join user_account c on b.identifier = c.phone_number
left join email d on c.SSN = d.SSN and d.is_primary = 1
where a.datetime >= @Start_date and
a.datetime <= DATEADD(DAY,1,@End_date) and
a.SSN = @SSN

```

- Send Transaction

-- Send Money Transaction

DECLARE

```

@Sender_SSN numeric(10,0) = 160532258,
@amount numeric(10,2) = 1120 ,
@Receiver_phone nvarchar(30) = '9886524022',
@Receiver_email nvarchar(30) = 'anupbk.bk3@gmail.com',
@Sender_bank_id nvarchar(20) = '6045789',
@Sender_ba_number nvarchar(20) = '214523698',
@Memo nvarchar(50) = 'Electricity Bill'

```

if exists (select * from elec_address where identifier = @Receiver_phone)

BEGIN

```

insert into [dbo].[send_transaction](amount,datetime,memo,identifier,SSN,status)
values(@amount,SYSDATETIME(),@Memo,@Receiver_phone,@Sender_SSN,'Completed')
if((select bank_id from [dbo].[user_account] where SSN = @Sender_SSN) = @Sender_bank_id and
(select ba_number from [dbo].[user_account] where SSN = @Sender_SSN) =
@Sender_ba_number)

```

BEGIN

```

update user_account
set balance = balance - @amount
where SSN = @Sender_SSN

```

END

else

BEGIN

```

update has_additional
set balance = balance - @amount
where SSN = @Sender_SSN and
bank_id = @Sender_bank_id and
ba_number = @Sender_ba_number

```

END

```

update user_account
set balance = balance + @amount
where phone_number = @Receiver_phone

```

END

else

BEGIN

```

insert into [dbo].[send_transaction](amount,datetime,memo,identifier,SSN,status)
values(@amount,SYSDATETIME(),@Memo,@Receiver_phone,@Sender_SSN,'Pending')

```

END

- Statement Functions

-- Statement Functions

-- Total amount of money sent/received by a user in a range of dates.

DECLARE

@SSN numeric(10,0) = 123456789,

@Start_date date = '2020-05-04',

@End_date date = '2020-05-04'

--Total amount sent

select

(select ISNULL(SUM(amount),0) from send_transaction

where SSN = @SSN and

status = 'Completed' and

datetime >= @Start_date and

datetime <= DATEADD(DAY,1,@End_date))

+

(select ISNULL(SUM(amount),0) from request_transaction A

join request_transaction_multiple B on A.RTid = B.RTid

where B.identifier = (select phone_number from user_account where SSN = @SSN) and

A.status = 'Completed' and

datetime >= @Start_date and

datetime <= DATEADD(DAY,1,@End_date)) as Total_Amount_Sent

--Total amount received

select

(select ISNULL(SUM(amount),0) from request_transaction

where status = 'Completed' and

SSN = @SSN and

datetime >= @Start_date and

datetime <= DATEADD(DAY,1,@End_date))

+

(select ISNULL(SUM(amount),0) from send_transaction

where identifier = (select phone_number from user_account where SSN = @SSN) and

status = 'Completed' and

datetime >= @Start_date and

datetime <= DATEADD(DAY,1,@End_date)) as Total_Amount_Received

--Total/average amount of money sent and received by a user per month.

DECLARE

@SSN numeric(10,0) = 123456789,

@month int = 5

--Total/average amount sent

select

(select ISNULL(SUM(amount),0) from send_transaction

```

where SSN = @SSN and
      status = 'Completed' and
      MONTH(datetime) = @month)
+
(select ISNULL(SUM(amount),0) from request_transaction A
join request_transaction_multiple B on A.RTid = B.RTid
where B.identifier = (select phone_number from user_account where SSN = @SSN) and
      A.status = 'Completed' and
      MONTH(datetime) = @month) as Total_Amount_Sent,

((select ISNULL(CAST(AVG(amount) as numeric(10,2)),0) from send_transaction
where SSN = @SSN and
      status = 'Completed' and
      MONTH(datetime) = @month)
+
(select ISNULL(CAST(AVG(amount) as numeric(10,2)),0) from request_transaction A
join request_transaction_multiple B on A.RTid = B.RTid
where B.identifier = (select phone_number from user_account where SSN = @SSN) and
      A.status = 'Completed' and
      MONTH(datetime) = @month))/2 as Average_Amount_Sent

```

--Total amount received

```

select
(select ISNULL(SUM(amount),0) from request_transaction
where status = 'Completed' and
      SSN = @SSN and
      MONTH(datetime) = @month)
+
(select ISNULL(SUM(amount),0) from send_transaction
where identifier = (select phone_number from user_account where SSN = @SSN) and
      status = 'Completed' and
      MONTH(datetime) = @month) as Total_Amount_Received,

(select ISNULL(CAST(AVG(amount) as numeric(10,2)),0) from request_transaction
where status = 'Completed' and
      SSN = @SSN and
      MONTH(datetime) = @month)
+
(select ISNULL(CAST(AVG(amount) as numeric(10,2)),0) from send_transaction
where identifier = (select phone_number from user_account where SSN = @SSN) and
      status = 'Completed' and
      MONTH(datetime) = @month) as Average_Amount_Received

```

--The transactions with the maximum amount of money per month.

```

DECLARE
@month int = 5,
@SSN numeric(10,0) = 334455667

```

--Send Transactions


```

select a.STid,a.amount,a.datetime,a.memo,a.identifier,a.status, b.first_name+' '+b.last_name as Sent_to
from send_transaction a
join user_account b on a.identifier = b.phone_number
where amount = (select max(amount) from send_transaction
                where MONTH(datetime) = @month and
                      status = 'Completed') and
      MONTH(datetime) = @month and
      status = 'Completed' and
      a.SSN = @SSN

```

--Request Transactions

```

select a.RTid,a.amount,a.datetime,a.memo,b.identifier,a.status, c.first_name+' '+c.last_name as
Requested_from from request_transaction a
join request_transaction_multiple b on a.RTid = b.RTid
join user_account c on b.identifier = c.phone_number
where amount = (select MAX(amount) from request_transaction
                where MONTH(datetime) = @month and
                      status = 'Completed') and
      MONTH(datetime) = @month and
      status = 'Completed' and
      a.SSN = @SSN

```

--The best users (users who have sent/received the maximum total amount of money)

DECLARE

@SSN numeric(10,0) = 160532258

--User who has received the maxium amount of money

```

select top 1 b.first_name+' '+b.last_name Name,sum(amount) Total_Amount_Received from
send_transaction a
left join user_account b on a.identifier = b.phone_number
where a.SSN = @SSN and status = 'Completed'
group by b.first_name+' '+b.last_name
order by sum(amount) desc

```

--User who has sent the maximum amount of money

```

select top 1 c.first_name+' '+c.last_name Name, sum(amount) Total_Amount_sent from request_transaction
a
join request_transaction_multiple b on a.RTid=b.RTid
left join user_account c on b.identifier = c.phone_number
where a.SSN = @SSN and status = 'Completed'
group by c.first_name+' '+c.last_name
order by sum(amount) desc

```

- Statements

-- Statements(total amount sent and received per month)

DECLARE

@SSN numeric(10,0) = 123456789,

@month int = 5

--Total amount sent

select

(select ISNULL(SUM(amount),0) from send_transaction

where SSN = @SSN and

status = 'Completed' and

MONTH(datetime) = @month)

+

(select ISNULL(SUM(amount),0) from request_transaction A

join request_transaction_multiple B on A.RTid = B.RTid

where B.identifier = (select phone_number from user_account where SSN = @SSN) and

A.status = 'Completed' and

MONTH(datetime) = @month) as Total_Amount_Sent

--Total amount received

select

(select ISNULL(SUM(amount),0) from request_transaction

where status = 'Completed' and

SSN = @SSN and

MONTH(datetime) = @month)

+

(select ISNULL(SUM(amount),0) from send_transaction

where identifier = (select phone_number from user_account where SSN = @SSN) and

status = 'Completed' and

MONTH(datetime) = @month) as Total_Amount_Received

Source Code

```
Java Resources
└─ src
   └─ (default package)
      ├── adrm_email.java
      ├── amountmonth.java
      ├── bstur.java
      ├── dis_bankacc.java
      ├── dis_bankbal.java
      ├── dis_email.java
      ├── dis_phn.java
      ├── login.java
      ├── lrgtrans.java
      ├── reqmonbank.java
      ├── reqmoney.java
      ├── searchtrans.java
      ├── sendmon.java
      ├── signout.java
      ├── signup.java
      ├── sortdate.java
      ├── unlk_bankacc.java
      ├── upd_phn.java
      ├── userinfo.java
      ├── valibank.java
      └── valibank2.java
```

```
WEB-INF
├── accinfo.jsp
├── amtmonth.jsp
├── bankacc.jsp
├── bestuser.jsp
├── homepage.jsp
├── largetrans.jsp
├── loginpage.jsp
├── modemail.jsp
├── modphn.jsp
├── requestmoney.jsp
├── search.jsp
├── sendmoney.jsp
├── signup.html
├── sortdaterange.jsp
└── style.css
```

Glimpse of our Code for Wallet Application

Homepage.jsp

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>

<!doctype html>
<html lang="en">
<head>
<link rel="stylesheet" href="style.css">
<meta name='viewport' content='width=device-width, initial-scale=1'>
<script src='https://kit.fontawesome.com/a076d05399.js'></script>

    <!-- IE6-8 support of HTML5 elements --> <!--[if lt IE 9]>
    <script src="//html5shim.googlecode.com/svn/trunk/html5.js"></script>
    <![endif]-->

</head>
<body>
<div class="wallet homepage">
    <div class="container">
        <%
            out.println("<nav id=\"nav\">");
            out.println("    <ul id=\"navigation\">");
            out.println("        <li><a href=\"#\" class=\"active\">Home</a></li>");
            out.println("        <li><a href=\"#\">Profile and Settings
&raquo;</a>");
            out.println("            <ul>");
            out.println("                <li><a
href=\"http://localhost:8080/project/userinfo\">Account Information</a></li>");
            out.println("                <li><a href=\"#home\">Modify Personal Details
&raquo;</a>");
            out.println("            <ul>");
            out.println("                <li><a
href=\"http://localhost:8080/project/dis_bankacc\">Link/Unlink Bank
Account</a></li>");
            out.println("                <li><a
href=\"http://localhost:8080/project/dis_email\">Add/remove email address</a></li>");
            out.println("                <li><a
href=\"http://localhost:8080/project/dis_phn\">Update phone number</a></li>");
            out.println("            </ul>");
            out.println("        </li>");
            out.println("    </ul>");
            out.println("    </li>");
            out.println("    <li><a href=\"#\">Payments &raquo;</a>");
            out.println("        <ul> ");
            out.println("            <li><a
href=\"http://localhost:8080/project/valibank\">Send Money</a></li>");
            out.println("            <li><a
href=\"http://localhost:8080/project/valibank2\">Request Money</a></li>");
            out.println("            <li><a
href=\"search.jsp\">Search Transactions</a></li>");
            out.println("        </ul>");
            out.println("    </li>");
```

```

        out.println("                <li><a href=\"#\>Statement &raquo;</a>");
        out.println("                <ul>");
        out.println("                <li><a href=\"sortdaterange.jsp\">Sort
By Date Range</a></li>");
        out.println("                <li><a
href=\"amtmonth.jsp\">Transactions per month</a></li>");
        out.println("                <li><a href=\"largetrans.jsp\">Large
Transactions</a></li>");
        out.println("                <li><a href=\"bestuser.jsp\">Best
Users</a></li>");
        out.println("                </ul>");
        out.println("            </li>");
        out.println("<button class=\"signoutbtn\"
onclick=\"window.location.href='http://localhost:8080/project/signout'\">Sign Out <i
class='fas fa-sign-out-alt'></i></button>");
        out.println("            </ul>");
        out.println("</nav>");

%>
<%

String ssn = (String)request.getAttribute("ssn");
String name = (String)request.getAttribute("name");
String msg = (String)request.getAttribute("msg");
String msgerr = (String)request.getAttribute("msgerror");

        out.println("<div style=\"padding-left:16px;\">");
        out.println("<br><br><h2 style=\"text-align: center;\">Welcome
"+name+"</h2>");
        //System.out.print(msg);
        if(msg != null){
            out.println("<h3><font color=\"green\">"+msg+"</font></h3> ");
        }
        if(msgerr != null){
            out.println("<h3><font color=\"red\">"+msgerr+"</font></h3> ");
        }
        out.println("</div>");

%>

</div>
</div>

</body>
</html>

```

Login.java

```

import java.io.IOException;
import java.io.PrintWriter;
import java.sql.*;

import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.Cookie;

```

```

import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;

@WebServlet("/login")
public class login extends HttpServlet {
    private static final long serialVersionUID = 1L;
    public login() {
        super();
    }
    protected void doGet(HttpServletRequest request,
        HttpServletResponse response) throws ServletException, IOException {
        //response.getWriter().append("Served at: ").append(request.getContextPath());
    }

    protected void doPost(HttpServletRequest request,
        HttpServletResponse response) throws ServletException, IOException {
        //doGet(request, response);
        response.setContentType("text/html");
        PrintWriter out = response.getWriter();

        String user = request.getParameter("user");
        String pwd = request.getParameter("pwd");

        String userid = null;
        String password = null;
        String fname = null;
        String ssn = null;
        float bal = 0;

        try {
            Class.forName("com.microsoft.sqlserver.jdbc.SQLServerDriver");
            String connectionUrl = "jdbc:sqlserver://wallet.database.windows.net:1433;"
                + "database=wallet;"
                + "user=akilesh123@wallet;"
                + "password=DBMSproject123*;"
                + "encrypt=true;"
                + "trustServerCertificate=false;"
                + "hostNameInCertificate=*.database.windows.net;"
                + "loginTimeout=30";

```

```

        Connection con = DriverManager.getConnection(connectionUrl);
        Statement stmt = con.createStatement();

        String sql = "Select username, password, first_name,balance, SSN from
user_account where username ='" + (String)user + "'";
        ResultSet rs = stmt.executeQuery(sql);
        //System.out.println(sql);
        while ( rs.next()) {
            userid = (String)rs.getString(1);
            password = (String)rs.getString(2);
            fname = (String)rs.getString(3);
            bal = (float)rs.getFloat(4);
            ssn = (String)rs.getString(5);
        }

        con.close();

        if (user.equals(userid) && pwd.contentEquals(password)) {
            //System.out.println("user :: " + fname);
            //System.out.println("ssn ::"+ ssn);

            HttpSession session = request.getSession();
            session.setAttribute("name", fname);
            session.setAttribute("ssn", ssn);

            request.setAttribute("message","pass");
            request.setAttribute("name", fname);
            request.setAttribute("bal", bal);
            request.setAttribute("ssn", ssn);
            request.getRequestDispatcher("homepage.jsp").forward(request,
response);
        }else {
            request.setAttribute("loginmessage","fail");
            request.getRequestDispatcher("loginpage.jsp").forward(request,
response);

            out.println("<br> <h1> Error </h1>");
        }
    }catch (Exception ex) {System.out.println(ex);}
}
}

```

AccountInfo.jsp

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<%@ page import="java.util.*" %>

<!DOCTYPE html>
<html lang="en">
<head>
<link rel="stylesheet" href="style.css">
<meta name='viewport' content='width=device-width, initial-scale=1'>
<script src='https://kit.fontawesome.com/a076d05399.js'></script>

</head>
<body>
<div class="wallet homepage">
    <div class="container">
        <%
            out.println("<nav id=\"nav\">");
            out.println("    <ul id=\"navigation\">");
            out.println("        <li><a href=\"#\">Home</a></li>");
            out.println("        <li><a href=\"#\" class=\"active\">Profile and Settings
&raquo;</a>");
            out.println("            <ul>");
            out.println("                <li><a
href=\"http://localhost:8080/project/userinfo\">Account Information</a></li>");
            out.println("                <li><a href=\"#home\">Modify Personal Details
&raquo;</a>");
            out.println("            </ul>");
            out.println("            <li><a
href=\"http://localhost:8080/project/dis_bankacc\">Link/Unlink Bank
Account</a></li>");
            out.println("                <li><a
href=\"http://localhost:8080/project/dis_email\">Add/remove email address</a></li>");
            out.println("                <li><a
href=\"http://localhost:8080/project/dis_phn\">Update phone number</a></li>");
            out.println("            </ul>");
            out.println("        </li>");
            out.println("    </ul>");
            out.println("    </li>");
            out.println("    <li><a href=\"#\">Payments &raquo;</a>");
            out.println("        <ul>");
            out.println("            <li><a
href=\"http://localhost:8080/project/valibank\">Send Money</a></li>");
            out.println("            <li><a
href=\"http://localhost:8080/project/valibank2\">Request Money</a></li>");
            out.println("            <li><a href=\"search.jsp\">Search
Transactions</a></li>");
            out.println("        </ul>");
            out.println("    </li>");
            out.println("    <li><a href=\"#\">Statement &raquo;</a>");
            out.println("        <ul>");
```

```

        out.println("                <li><a href=\"sortdaterange.jsp\">Sort By
Date Range</a></li>");
        out.println("                <li><a href=\"amtmonth.jsp\">Transactions per
month</a></li>");
        out.println("                <li><a href=\"largetrans.jsp\">Large
Transactions</a></li>");
        out.println("                <li><a href=\"bestuser.jsp\">Best
Users</a></li>");
        out.println("                </ul>");
        out.println("            </li>");
        out.println("<button class=\"signoutbtn\"
onclick=\"window.location.href='http://localhost:8080/project/signout'\">Sign Out <i
class='fas fa-sign-out-alt'></i></button>");
        out.println("        </ul>");
        out.println("</nav>");
        %>
<div style="padding-left:16px;margin-top: 85px;">
<%
String name = (String)request.getAttribute("name");
Float bal = (Float)request.getAttribute("bal");
String phn = (String)request.getAttribute("phn");

        out.println("<h3 style=\"text-align: center;\">Name : "+name+"</h3>");
        out.println("    <h3 style=\"text-align: center;\">Current Account Balance :
"+bal+"</h3>");
        out.println("    <h3 style=\"text-align: center;\">Phone Number :
"+phn+"</h3>");

        ArrayList<String> myemail =
        (ArrayList<String>)request.getAttribute("arr_email");

        out.println("<fieldset>");
        out.println("<legend>Email Accounts Linked</legend>");
        out.println("<table id=\"email\">");
        out.println("    <tr>");
        out.println("        <th>Email Address</th>");
        out.println("    </tr>");

        for (int i=0; i<myemail.size(); i+=1) {
            out.println("    <tr>");
            out.println("        <td>"+ myemail.get(i) +"</td>");
            out.println("    </tr>");
        }

        out.println("</table>");
        out.println("</fieldset>");

        ArrayList<String> arr = (ArrayList<String>)request.getAttribute("arr");
        out.println("<fieldset style=\"margin: 15px 0;\">");
        out.println("<legend>Bank Accounts Linked</legend>");
        out.println("<table id=\"bankacc\">");
        out.println("    <tr>");
        out.println("        <th>Bank ID</th>");
        out.println("        <th>Bank Account Number</th>");
        out.println("        <th>Bank Balance</th> ");

```



```

        out.println("    </tr>");
        for (int i=0; i<arr.size(); i+=3) {
            out.println("<tr>");
            out.println("<td>"+ arr.get(i) + "</td>");
            out.println("<td>"+ arr.get(i+1) + "</td>");
            out.println("<td>"+ arr.get(i+2) + "</td>");
            out.println("</tr>");
        }
        out.println("</table>");
        out.println("</fieldset>");
        out.println("</div>");
    %>
</div>
</div>
</body>
</html>

```

UserInfo.java

```

import java.io.IOException;
import java.io.PrintWriter;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.Statement;
import java.util.ArrayList;

import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;

```

```

@WebServlet("/userinfo")

```

```

public class userinfo extends HttpServlet {
    private static final long serialVersionUID = 1L;
    public userinfo() {
        super();
    }
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
throws ServletException, IOException {
        //response.getWriter().append("Served at:
        ").append(request.getContextPath());
        response.setContentType("text/html");
    }
}

```

```

PrintWriter out = response.getWriter();
HttpSession session = request.getSession(false);

String ssn =(String)session.getAttribute("ssn");
String name= (String)session.getAttribute("name");

try {
    Class.forName("com.microsoft.sqlserver.jdbc.SQLServerDriver");
    String connectionUrl = "jdbc:sqlserver://wallet.database.windows.net:1433;"
        + "database=wallet;"
        + "user=akilesh123@wallet;"
        + "password=DBMSproject123*;"
        + "encrypt=true;"
        + "trustServerCertificate=false;"
        + "hostNameInCertificate=*.database.windows.net;"
        + "loginTimeout=30";
    Connection con = DriverManager.getConnection(connectionUrl);
    Statement stmt = con.createStatement(ResultSet.TYPE_SCROLL_INSENSITIVE,
        ResultSet.CONCUR_READ_ONLY,
        ResultSet.HOLD_CURSORS_OVER_COMMIT);

    ResultSet rs = null;

    float bal = 0;
    String phn = null;
    //System.out.println("Selecting bal, phn");
    String sql = "Select balance, phone_number from user_account where SSN =" +
ssn + """;
    rs = stmt.executeQuery(sql);
    //System.out.println(sql);
    while ( rs.next()) {
        bal = (float)rs.getFloat(1);
        phn = (String)rs.getString(2);
        //System.out.println("Selecting bal, phn");
    }

    //System.out.println("Selecting bankid");
    ArrayList<String> myarray = new ArrayList<String>();
    String sql2 = "select bank_id, ba_number, balance from user_account where SSN
= "" + ssn + """;

```

```

        String sql3 = "select bank_id, ba_number, balance from has_additional where
SSN = '"+ ssn +"'";
        String sql4 = sql2 + " union " + sql3;
        rs = null;
        rs = stmt.executeQuery(sql4);

        while ( rs.next()) {
            for(int q = 1; q < 4; q++) {
                myarray.add(rs.getString(q));
                //System.out.println("Selecting bankid");
            }
        }

        //System.out.println("selecting email");
        ArrayList<String> myemail = new ArrayList<String>();
        String s2 = "select email_address from email where SSN = '"+ ssn +"'";
        rs = null;
        rs = stmt.executeQuery(s2);

        while ( rs.next()) {
            myemail.add(rs.getString(1));
            //System.out.println("selecting email");
        }
        request.setAttribute("arr_email", myemail);
        request.setAttribute("arr", myarray);
        request.setAttribute("name", name);
        request.setAttribute("bal", bal );
        request.setAttribute("phn", phn );
        request.getRequestDispatcher("accinfo.jsp").forward(request,
response);
        con.close();

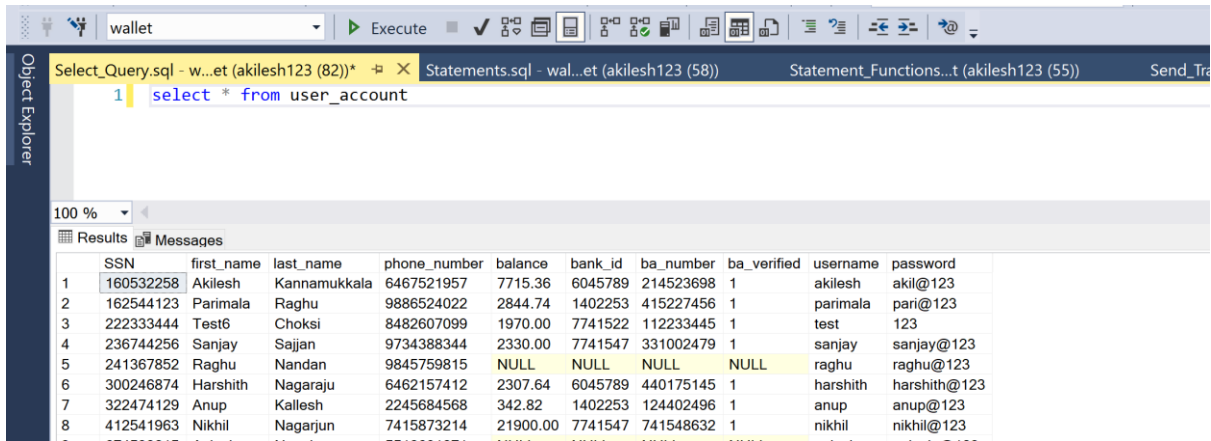
    }catch (Exception ex) {System.out.println(ex);}

    }

    protected void doPost(HttpServletRequest request, HttpServletResponse response)
throws ServletException, IOException {
        //doGet(request, response);
    }
}

```

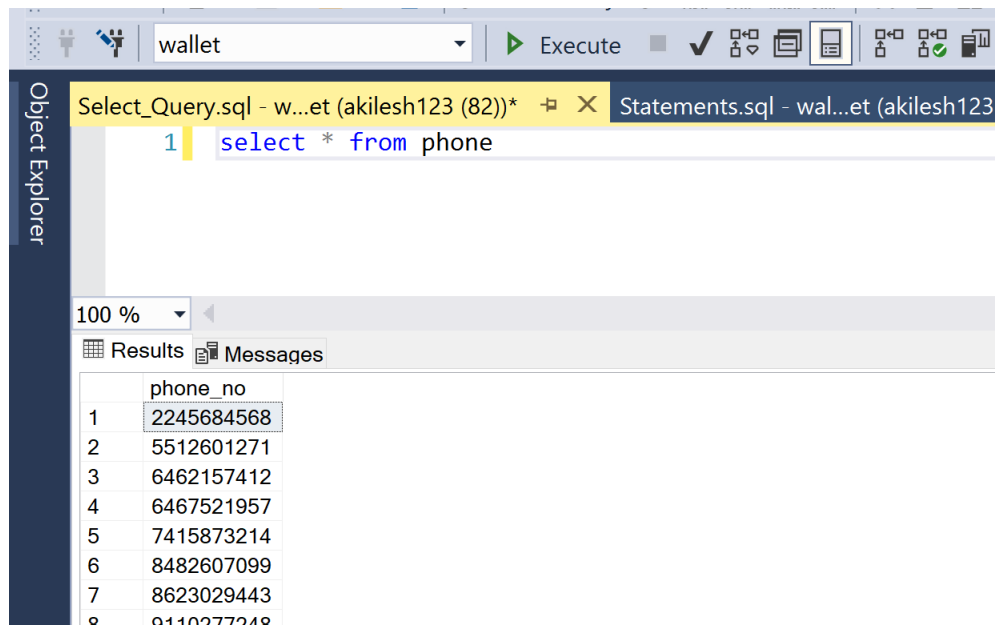
Screenshots of the Program



The screenshot shows the SQL Developer interface with the 'wallet' connection selected. The 'Object Explorer' on the left shows the 'user_account' table. The main window displays the SQL query 'select * from user_account' and the results of the query in a table format.

	SSN	first_name	last_name	phone_number	balance	bank_id	ba_number	ba_verified	username	password
1	160532258	Akilesh	Kannamukkala	6467521957	7715.36	6045789	214523698	1	akilesh	akil@123
2	162544123	Parimala	Raghu	9886524022	2844.74	1402253	415227456	1	parimala	pari@123
3	222333444	Test6	Choksi	8482607099	1970.00	7741522	112233445	1	test	123
4	236744256	Sanjay	Saijan	9734388344	2330.00	7741547	331002479	1	sanjay	sanjay@123
5	241367852	Raghu	Nandan	9845759815	NULL	NULL	NULL	NULL	raghu	raghu@123
6	300246874	Harshith	Nagaraju	6462157412	2307.64	6045789	440175145	1	harshith	harshith@123
7	322474129	Anup	Kallesh	2245684568	342.82	1402253	124402496	1	anup	anup@123
8	412541963	Nikhil	Nagarjun	7415873214	21900.00	7741547	741548632	1	nikhil	nikhil@123

Figure 1 User_account table with data



The screenshot shows the SQL Developer interface with the 'wallet' connection selected. The 'Object Explorer' on the left shows the 'phone' table. The main window displays the SQL query 'select * from phone' and the results of the query in a table format.

	phone_no
1	2245684568
2	5512601271
3	6462157412
4	6467521957
5	7415873214
6	8482607099
7	8623029443
8	9410277210

Figure 2 Phone table with data

Object Explorer

wallet

Execute

Select_Query.sql - w...et (akilesh123 (82))* Statements.sql - wal...et (aki

```
1 select * from email
```

100 %

Results Messages

	email_address	SSN	is_primary
1	akilesh.5050@gmail.com	160532258	0
2	anupbk.bk3@gmail.com	322474129	1
3	ark72@njit.edu	160532258	1
4	avn22@njit.edu	674593215	1
5	dh23@njit.edu	845247856	0
6	dheeraj.setty236@gmail.com	845247856	1
7	harshith.harsha@gmail.com	300246874	1
8	nikhilnagarjun@gmail.com	412541963	1

Figure 3 Email table with data

Object Explorer

wallet

Execute

Select_Query.sql - w...et (akilesh123 (82))* Statements

```
1 select * from bank_account
```

100 %

Results Messages

	bank_id	ba_number
1	1402253	124402496
2	1402253	236641027
3	1402253	415227456
4	6045789	125469856
5	6045789	214523698
6	6045789	440175145
7	7741522	112233445
8	7741547	236215222

Figure 4 Bank Account table with data

Object Explorer

wallet

Execute

Select_Query.sql - w...et (akilesh123 (82))* Statements.sql

1 select * from has_additional

100 %

Results Messages

	SSN	bank_id	ba_number	balance	verified
1	160532258	7741547	236215222	1200.00	1
2	236744256	6045789	125469856	200.00	1
3	322474129	7741547	741256321	1230000.00	1
4	741528963	7741547	412365211	2252.00	1
5	741528963	7741547	985436218	1200.00	1

Figure 5 Has Additional table with data

Object Explorer

wallet

Execute

Select_Query.sql - w...et (akilesh123 (82))* Statements.sql

1 select * from elec_address

100 %

Results Messages

	identifier	verified
1	2245684568	1
2	5512601271	1
3	6462157412	1
4	6467521957	1
5	7415873214	1
6	8482607099	1
7	8623029443	1
8	9110277248	1
9	9734388344	1
10	9845759815	1
11	9886524022	1
12	akilesh.5050@gmail.com	1
13	anupbk.bk3@gmail.com	1
14	ark72@njit.edu	1

Figure 6 Elec Address table with data

Object Explorer

Select_Query.sql - w...et (akilesh123 (82))* Statements.sql - wal...et (akilesh123 (58)) Statement_Functions...t (akilesh123 (58))

1 | select * from send_transaction

100 %

Results Messages

	STid	amount	datetime	memo	cancel_reason	identifier	SSN	status
1	10000000	1120.00	2020-05-06 19:02:25.737	For Dinner	NULL	6462157412	160532258	Completed
2	10000001	21.32	2020-05-06 19:04:58.690	For Cake	NULL	2245684568	160532258	Completed
3	10000002	400.00	2020-05-06 19:06:52.207	May Rent	NULL	2245684568	160532258	Completed
4	10000003	2.50	2020-05-06 19:07:04.253	Cab share	NULL	2245684568	160532258	Completed
5	10000004	1100.00	2020-05-06 19:08:23.753	Previous Balance	NULL	6467521957	845247856	Completed
6	10000005	30.22	2020-05-06 19:12:47.897	Brunch	NULL	6467521957	845247856	Completed
7	10000006	5.33	2020-05-06 19:13:19.927	Internet Bill	NULL	6467521957	845247856	Completed
8	10000007	21.20	2020-05-06 19:14:05.287	For Groceries	NULL	6467521957	845247856	Completed
9	10000008	22.25	2020-05-06 19:14:22.133	For Groceries	NULL	9886524022	845247856	Completed
10	10000009	120.00	2020-05-06 19:14:32.710	Birthday Gift	NULL	9886524022	845247856	Completed
11	10000010	11.77	2020-05-06 19:14:50.007	Electricity Bill	NULL	9886524022	845247856	Completed
12	10000012	35.36	2020-05-06 19:16:29.400	Electricity Bill	NULL	9886524022	160532258	Completed

Figure 7 Send Transaction table with data

Object Explorer

Select_Query.sql - w...et (akilesh123 (82))* Statements.sql - wal...et (akilesh123 (58)) Statement_Functions...t (akilesh123 (58))

1 | select * from request_transaction_multiple

100 %

Results Messages

	RTid	identifier	percentage
1	20000000	9110277248	100.00
2	20000001	9110277248	100.00
3	20000002	2245684568	100.00
4	20000003	2245684568	100.00
5	20000004	2245684568	100.00
6	20000005	2245684568	100.00
7	20000006	7415873214	100.00
8	20000007	7415873215	100.00
9	20000008	7415873215	100.00
10	20000009	6462157412	100.00

Figure 8 Request Transaction Multiple table with data

The screenshot shows a SQL IDE interface. At the top, there's a toolbar with icons for file operations and a dropdown menu showing 'wallet'. Below the toolbar, a status bar indicates the current file is 'Statements.sql - wal...et (akilesh123 (58))'. The main editor area contains a SQL query: `select * from request_transaction`. Below the editor, a 'Results' tab is active, displaying a table with 11 rows of transaction data. The table has columns: RTid, amount, datetime, memo, SSN, and status. The data includes transactions for rent, pizza, iPhone, and recharge.

	RTid	amount	datetime	memo	SSN	status
1	20000000	1200.00	2020-05-06 19:44:11.520	Rent for shop	160532258	Completed
2	20000001	12.00	2020-05-06 19:44:26.800	Pizza	160532258	Completed
3	20000002	120.00	2020-05-06 19:52:58.007	RENT	160532258	Completed
4	20000003	120.00	2020-05-06 19:57:17.477	RENT	160532258	Completed
5	20000004	120.00	2020-05-06 19:58:52.387	RENT	160532258	Completed
6	20000005	250.00	2020-05-06 20:00:58.247	Advance	160532258	Completed
7	20000006	1200.00	2020-05-06 20:01:23.713	iPhone	160532258	Completed
8	20000007	1200.00	2020-05-06 20:01:37.870	iPhone	160532258	Failed
9	20000008	1200.00	2020-05-06 20:03:14.870	iPhone	160532258	Pending
10	20000009	12.36	2020-05-06 20:03:41.433	Recharge	160532258	Completed
11	20000010	120.00	2020-05-06 20:04:01.310	RENT	160532258	Completed

Figure 9 Request Transaction table with data

The screenshot shows a web browser window with the address bar displaying 'localhost:8080/project/loginpage.jsp'. The main content area has a dark blue background. In the center, there's a white box containing the 'Wallet Login Form'. The form has two input fields: 'Username' with the value 'akilesh' and 'Password' with masked characters '.....'. Below these fields is a green 'Login' button. At the bottom of the form, there's a link that says 'Don't have an account? [Sign up](#)'.

Figure 10 Login Page

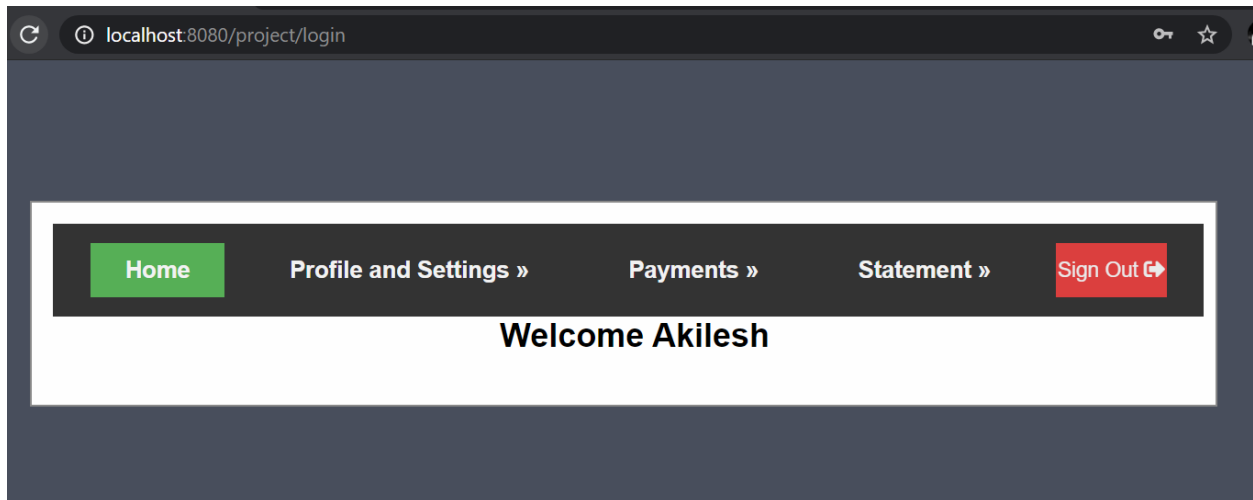


Figure 11 Home Page

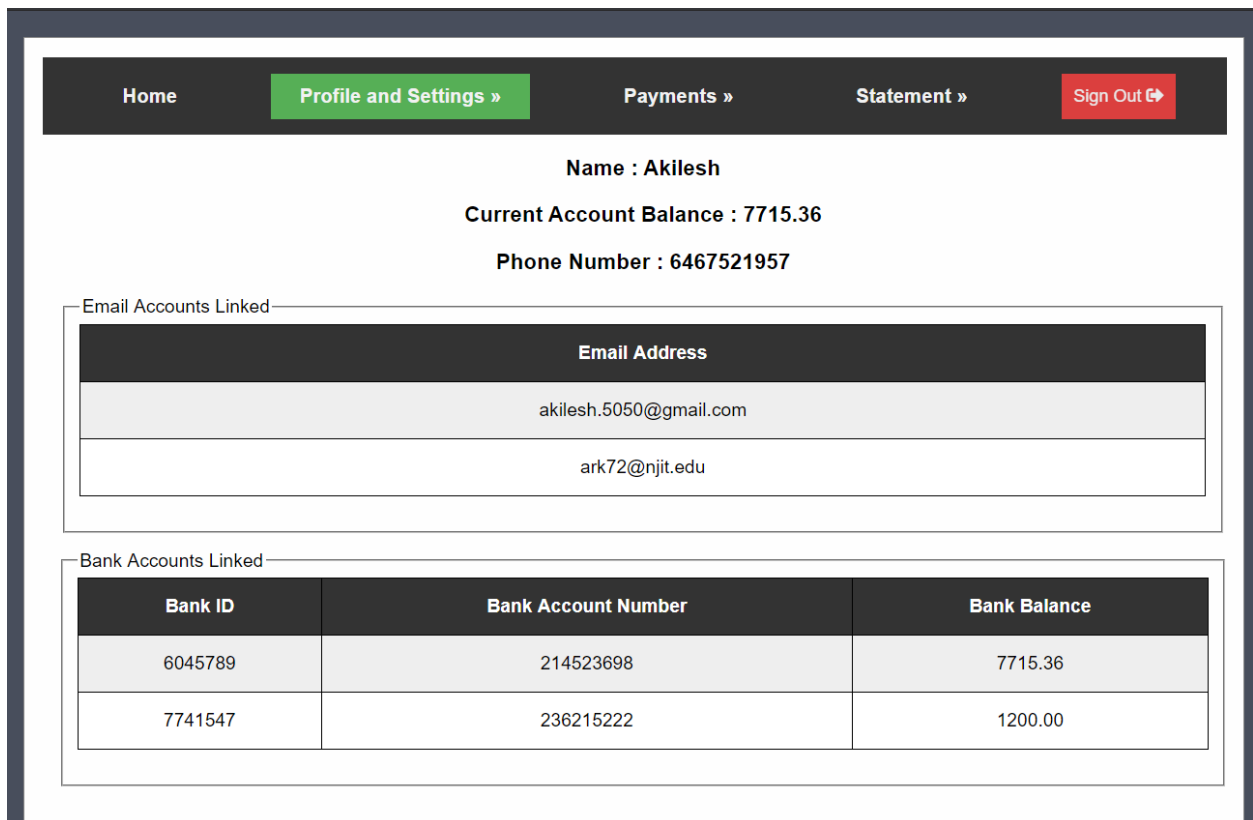


Figure 12 User Account Info

Home
Profile and Settings »
Payments »
Statement »
Sign Out

Existing Bank Account Details

Bank ID Number	Bank Account Number	Bank Balance
6045789	214523698	7715.36
7741547	236215222	1200.00

Link/ Unlink Bank Account

Bank ID Number

Please Enter your Bank ID here

Bank Account Number

Please Enter your Bank Account number which you need to Link/Unlink here

Bank Balance

Please Enter your Balance Amount

Account Type ☐ Saving ☐ Checking

UnlinkLink Button

Figure 13 Link/Unlink Bank Account

Home
Profile and Settings »
Payments »
Statement »
Sign Out

Email Accounts Linked

Email Address
akilesh.5050@gmail.com
ark72@njit.edu

Add or Verify Email Address

Email Address

Enter Email address you need to remove or add to the account.

RemoveAdd

Figure 14 Add/Remove Bank Account

Home

Profile and Settings »

Payments »

Statement »

Sign Out ↗

Update Your Phone Number

Phone Number

6467521957

Cancel

Update Number

Figure 15 Update Phone Number

Send Money through Wallet

Please fill in this form to send money.

Select your Bank Account

6045789 214523698 7715.36 ▼

Enter Recipient phone number

6467521966

Recipient Email Address

parimalaraghu123@gmail.com

Amount

1200

Memo

Phone Bill

Cancel

Send Money

Figure 16 Send Money

Request Money through Wallet

Please fill in this form to Request money.

Enter phone number

8482607099

User Email Address

saumyachoksi@gmail.com

Amount

200

Memo

Food Bill of last night dinner.

Cancel

Request Money

Figure 17 Request Money

The screenshot displays a web application interface for searching transactions. At the top, there is a navigation bar with links: Home, Profile and Settings », Payments », Statement », and a Sign Out button with a user icon. Below the navigation bar, the main section is titled "Transactions". It features a search bar with the placeholder text "Search Transactions based on:". To the right of the search bar is a green search button with a magnifying glass icon. A dropdown menu is open below the search bar, showing the following options: "Choose" (highlighted in blue), "Search All", "Email Address", "Phone Number", "Type Of Transactions", and "Date Range".

Figure 18 Search Transactions

Figure 19 Search All Transactions

Figure 20 Search Transaction by Email

Figure 21 Search Transaction by Phone Number

Figure 22 Search Transaction based on Sent/Receive Option

Home
Profile and Settings »
Payments »
Statement »
Sign Out

Transactions

Search Transactions based on:
Date Range
Start Date: 05/02/2020
End Date: 05/06/2020

Figure 23 Search Transaction based on Date Range

Home
Profile and Settings »
Payments »
Statement »
Sign Out

Transactions

Search Transactions based on:
Phone Number
2245684568

Search Transaction -- Phone Number

No	Transaction ID	Name	Amount	Date & Time	Phone No	Email	Status	Transaction Type	Memo
1	10000001	Anup Kallesh	21.32	2020-05-06 19:04:58.69	2245684568	anupbk.bk3@gmail.com	Completed	Send Transaction	For Cake
2	10000002	Anup Kallesh	400.00	2020-05-06 19:06:52.207	2245684568	anupbk.bk3@gmail.com	Completed	Send Transaction	May Rent
3	10000003	Anup Kallesh	2.50	2020-05-06 19:07:04.253	2245684568	anupbk.bk3@gmail.com	Completed	Send Transaction	Cab share
4	20000002	Anup Kallesh	120.00	2020-05-06 19:52:58.007	2245684568	anupbk.bk3@gmail.com	Completed	Request Transaction	RENT
5	20000003	Anup Kallesh	120.00	2020-05-06 19:57:17.477	2245684568	anupbk.bk3@gmail.com	Completed	Request Transaction	RENT
6	20000004	Anup Kallesh	120.00	2020-05-06 19:58:52.387	2245684568	anupbk.bk3@gmail.com	Completed	Request Transaction	RENT
7	20000005	Anup Kallesh	250.00	2020-05-06 20:00:58.247	2245684568	anupbk.bk3@gmail.com	Completed	Request Transaction	Advance
8	20000010	Anup Kallesh	120.00	2020-05-06 20:04:01.31	2245684568	anupbk.bk3@gmail.com	Completed	Request Transaction	RENT
9	20000012	Anup Kallesh	120.00	2020-05-06 20:05:05.857	2245684568	anupbk.bk3@gmail.com	Completed	Request Transaction	RENT
10	20000014	Anup Kallesh	120.00	2020-05-06 20:09:21.797	2245684568	anupbk.bk3@gmail.com	Completed	Request Transaction	RENT
11	20000018	Anup Kallesh	124.00	2020-05-06 20:12:21.36	2245684568	anupbk.bk3@gmail.com	Completed	Request Transaction	wednesday

Figure 24 Search Transaction by Phone number

Home
Profile and Settings »
Payments »
Statement »
Sign Out

Statements in Date Range Between

Start Date: mm/dd/yyyy
End Date: 05/06/2020
Select Option

Sort By Date Range
Transactions per month
Large Transactions
Best Users

Figure 25 View Statement Options

[Home](#)
[Profile and Settings »](#)
[Payments »](#)
[Statement »](#)
[Sign Out ↗](#)

Statements in Date Range Between

Start Date: 05/03/2020
End Date: 05/06/2020
Select Option ▼

Total amount based on range of dates

Total amount of money sent :: 3432.18

Figure 26 View Statement based on Date Range

[Home](#)
[Profile and Settings »](#)
[Payments »](#)
[Statement »](#)
[Sign Out ↗](#)

Statements in Month

May ▼
Amount Sent ▼

Total Amount based on Month

Total Amount sent	Average Amount sent
3432.18	279.065000

Figure 27 View Statement based on Month Range

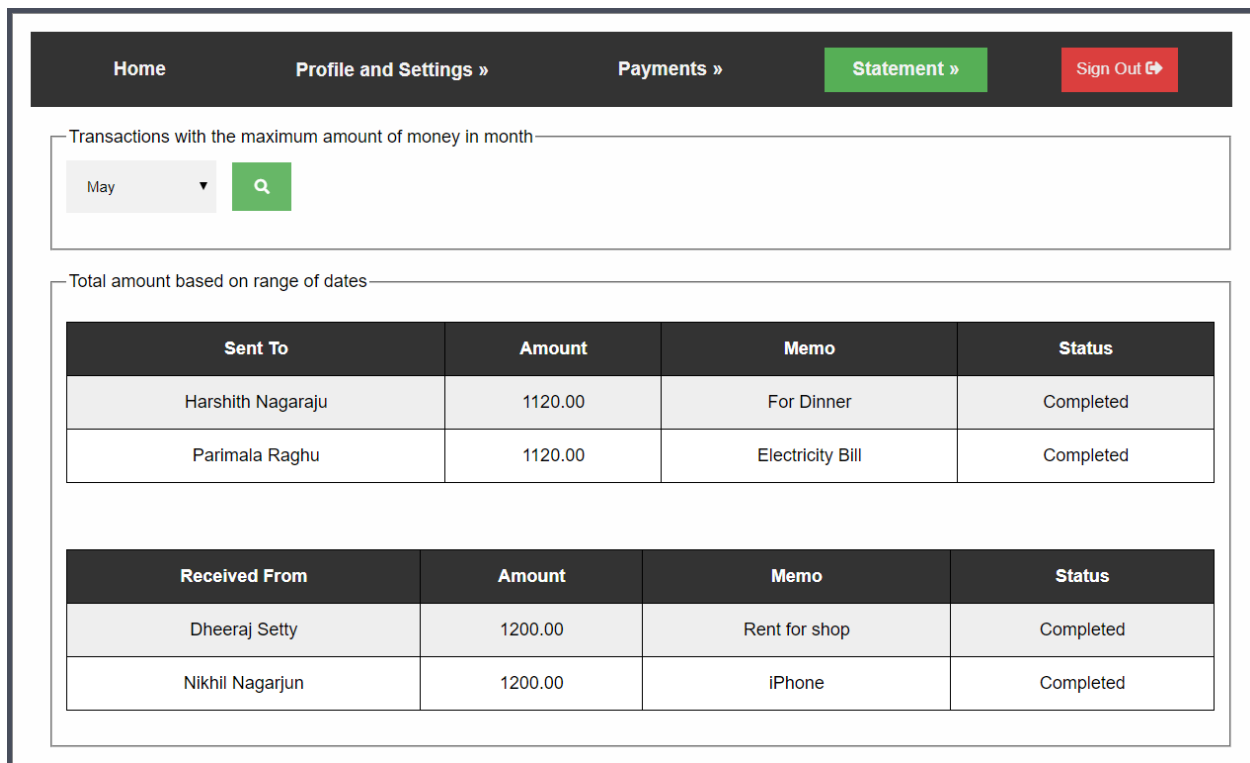


Figure 28 View Statement based on Maximum Amount Transaction

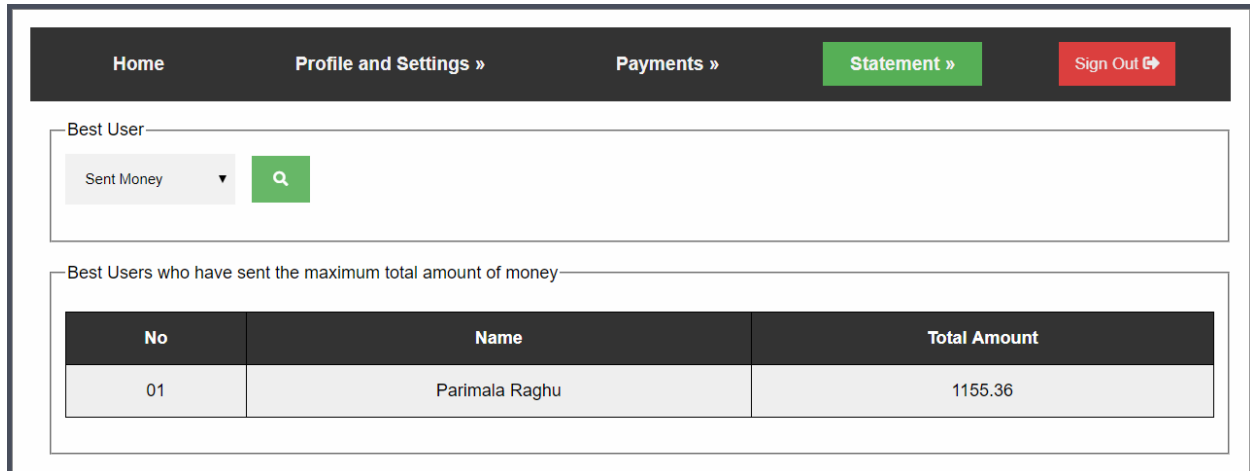


Figure 29 Best User