SYRACUSE UNIVERSITY

Rashika Singh

Syracuse University

School of Information Studies

IST 659-Project Implementation Report

12/07/2019

1. Project Summary

The project is on designing a centralized database for Syracuse University Students for Community Safety (SCS) which handles the security of the residential halls. The RSA is responsible to monitor public halls by checking student ID cards and ensuring that an unauthorized person cannot enter residential halls. It keeps a track of visitors who enter the residential halls by recording their details.

There are students who work in RSA employed by the SCS for shifts. However, there are certain times when a student wants to drop a particular shift, in this case, they have to come to the SCS office and inform them in advance. A book is maintained in which every week, the shifts which are put for substitution are entered. Another student who wishes to take up the shift can visit the SCS office and pick up shifts. However, this entire process is done manually and consumes time, also, in times where a person might be ill or is unable to visit the office faces problems. In order to solve this problem, an automated system for maintaining shifts can be adopted which will be efficient for the entire process.

There is a vast amount of data which is difficult to maintain as the records include numerous students, shift of halls and time schedule. Students maintain a schedule of their shifts that they have to maintain and thus there is need for a structured format to maintain the records. The information fields include employee details, their type, schedule and payroll. This will help to reduce the time required for the manual storage and make the system easier to use.

As mentioned, a centralized solution for maintaining a database for all the employees, locations and shifts will be beneficial. Another person who wants to pick up a shift can access this system and pick up a shift as per his requirement. It will also be useful for the SCS who can keep a track of the employees. The proposed solution will be called subitup and will include functions for dropping shifts along with specifying the reason for the same. It will also have option to pick up the shift for another employee. It does not include a function for registering for the RSA and giving the exam online as physical verification of the employee is essential. The proposed solution is a centralized repository containing information about all the employees, their shifts, halls, payroll, managers.

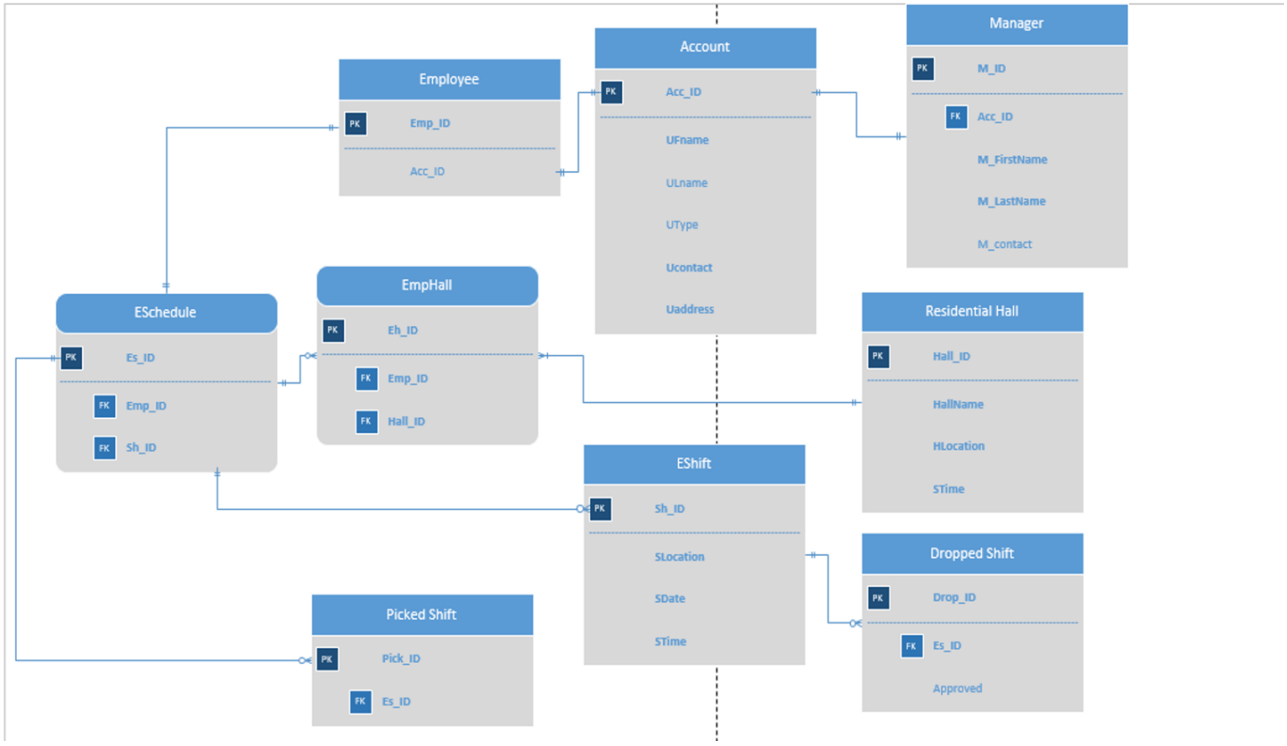
The report has design modules which specifies the summary report, entity tables, relational data model, business rules and data questions which are necessary for the development of any module. It includes entity relationship diagram (ERD) including all the entities, attributes and relation between the participating entities and the major issues. It also answers all the major data questions and the business rules

2. Entity and Attribute Glossary and Relational Data Model:

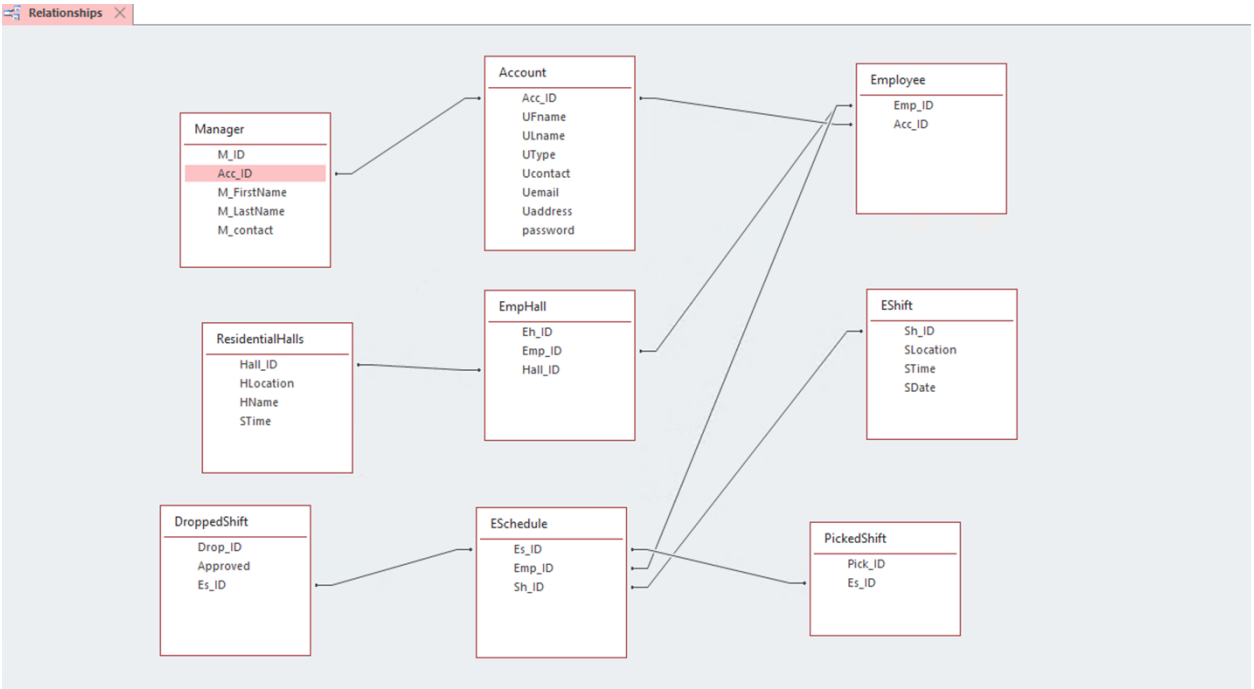
Objects	Description
Account	Specifies whether employee or manager
Acc_ID	Primary key for identification of user
UFName	Name of user
Utype	Type of the user
Ucontact	Contact of the user
Uaddress	Address of the user
Residential Halls	Specifies the hall in the university
Hall_ID	Primary key for the hall
HallName	Name of the hall
HLocation	Location of the hall
STime	Time of the Shift
Employee	
Emp_ID	Primary key for employee
Acc_ID	Foreign key for identifying employee
ESchedule	Schedule of the employee
Es_ID	Surrogate key for employee schedule
Emp_ID	Foreign key identifies employee
Sh_ID	Foreign key identifies shift
Manager	The manager who supervises the shifts
M_ID	Primary key for identifying managers
Acc_ID	Foreign key specifies user
M_FirstName	Name of the employer
M_contact	Contact of the manager
EShift	The shift of the employees
Sh_ID	Primary key for shift
SLocation	Location of shift
STime	Time of the shift
SDate	Date of the shift
EmpHall	The hall where employees work
Eh_ID	Surrogate key for employee hall
Emp_ID	Foreign key specifies employee
Hall_ID	Foreign key specifies hall

Picked Shift	The shifts which are picked
Pick_ID	Primary key for picked shift
Es_ID	Surrogate key specifies Employee schedule
Dropped Shift	The shifts which are dropped
Drop_ID	Primary key for dropped shift
Es_ID	Surrogate key specifies Employee schedule
Approved	Specifies if approved or not by manager

3. ERD Diagram



4. Relationship Diagram



5. Business Rules:

1) An employee needs to pick one-night shift.
2) Every user must be a student, employee or manager.
3) Once a shift has been dropped, the same student cannot pick it.
4) A student cannot be free of the shift till someone else picks it.
5) It is allowed to drop a shift till a week prior to the shift day.
6) A student is allowed to work a maximum of 20 hours per week.
7) Whatever maybe the job of the student, the hours worked for a student is maintained in a single database.
8) It is allowed to have a sick call prior to four hours of the shift.
9) An employee is not allowed to have a no-show without informing the managers in any situation.

6. Major data questions:

1) How many employees are working at a particular hall?
2) What are the shift timings for a particular employee?
3) How many employees are working at a hall at a particular time?
4) What are the number of hours a particular employee is working?
5) Is the reason for dropping a shift valid?
6) Has the student arrived for his shift?
7) Is the student receiving the pay for the number of hours he is working?
8) Has the person who picked up the shift arrived for the shift?

7. Database system infrastructure

The project uses a front end and back end approach. The infrastructure used is a client-server model that uses a MS-SQL Server as the database engine. All the insert, update, deleted and update queries and triggers are written in SQL from the SQL server. The database is connected with Open Database Connectivity (ODBC) with MS Access. The forms of the login page, employee pages among others are created with MS Access. I have also created the reports using Access and Front-end reports about employees and another database information through MS Access.

8. SQL script for creating tables and inserting sample data

Account table:

```
create table Account
(
Acc_ID Char(5) Not Null,
UFname Varchar(10) Not Null,
ULname Varchar(10) Not Null,
UType Char(8) Not Null,
Constraint PrAccount_PK Primary Key(Acc_ID),
Ucontact Char(10) Not Null,
Uemail Varchar(20) Not Null,
Uaddress Varchar(20) Not Null
);

Insert into Account Values
('A1000','Rashika','Singh','Employee','3158802081','rsingh37@syr.edu','118 Concord', 'rsingh');
Insert into Account Values
('A1001','Alex','Shaw','Employee','3158802568','ashaw@syr.edu','103 Trinity', 'alex12');
Insert into Account Values
('A1002','Kareen','John','Manager','3156759021','karen55@syr.edu','1021 Harvard', 'karjoh');
```

```
Insert into Account Values
('A1003','Sue','Hopkins','Employee','3158651244','suehop@syr.edu','159 Westcott', 'sue123');
Insert into Account Values
('A1004','Rahul','Rathod','Manager','3156799859','rnrathod@syr.edu','100 Comstock', 'rahul_');
```

Residential Halls table:

```
create table ResidentialHalls
(
Hall_ID Char(4) Not Null,
HLocation Varchar(10) Not Null,
HName Varchar(10) Not Null,
STime Varchar(10) Not Null,
Constraint ReHall_PK Primary Key(Hall_ID)
);

Insert into ResidentialHalls Values('H001','Van Buren','Brockway','4:45pm-8pm');
Insert into ResidentialHalls Values('H002','College Pl','Walnut','1:30am-6am');
Insert into ResidentialHalls Values('H003','Comstock','Haven','4:45pm-8pm');
Insert into ResidentialHalls Values('H004','Waverly','Kimmel','4:45pm-8pm');
Insert into ResidentialHalls Values('H005','Euclid','Watson','7:45pm-1am');
```

Employee table:

```
create table Employee
(
Emp_ID Char(4) Not Null,
Acc_ID Char(5) Not Null,
Constraint PrEmp_PK Primary Key(Emp_ID),
Constraint PrEmployee_FK Foreign Key (Acc_ID) References Account(Acc_ID)
);

Insert into Employee Values('Em00','A1000');
Insert into Employee Values('Em01','A1001');
Insert into Employee Values('Em04','A1003');
Insert into Employee Values('Em03','A1010');
```

EShift table:

```
create table EShift
(
Sh_ID Char(4) Not Null,
SLocation varchar(10) Not Null,
STime varchar(10) Not Null,
SDate date Not Null,
```

```
Constraint PrEShift_PK Primary Key(Sh_ID)
);

insert into EShift Values('S100','Walnut','4:45pm-8pm','05/10/2019');
insert into EShift Values('S101','Waverly','7:45-1am','07/22/2019');
insert into EShift Values('S111','Ernie','4:45pm-8pm','11/10/2019');
insert into EShift Values('S103','Kimmel','1:15am-6am','01/19/2019');
insert into EShift Values('S104','Haven','7:45pm-1am','04/12/2019');
```

ESchedule table:

```
create table ESchedule
(
Es_ID Char(5) Not Null,
Emp_ID Char(4) Not Null,
Sh_ID Char(4) Not Null,
Constraint PrSchedule_PK Primary Key(Es_ID),
Constraint PrSchedule_FK Foreign Key(Sh_ID) references EShift(Sh_ID),
Constraint PrSchedule_FK2 Foreign Key(Emp_ID) references Employee(Emp_ID)
);

Insert into ESchedule Values('Sc01','Em00','S100');
Insert into ESchedule Values('Sc03','Em01','S111');
Insert into ESchedule Values('Sc05','Em04','S104');
```

Manager table:

```
create table Manager
(
M_ID Char(4) Not Null,
Acc_ID Char(5) Not Null,
M_FirstName Varchar(10) Not Null,
M_LastName Varchar(10) Not Null,
M_contact char(10) Not Null,
Constraint PrManager_PK Primary Key(M_ID),
Constraint PrManager_FK Foreign Key(Acc_ID) references Account(Acc_ID)
);

insert into Manager Values('M100','A1002','Kareen','John','3156759021');
insert into Manager Values('M101','A1004','Rahul','Rathod','3156799859');
```

EmpHall table:

```
create table EmpHall
 (
```

```
Eh_ID char(4) Not Null,
Emp_ID char(4) Not Null,
Hall_ID char(4) Not Null,
Constraint PrEmpHall_PK Primary Key(Eh_ID),
Constraint PrEmpHall_FK Foreign Key(Hall_ID) references ResidentialHalls(Hall_ID),
Constraint PrEmpHall_FK2 Foreign Key(Emp_ID) references Employee(Emp_ID)
);


insert into EmpHall Values('Eh1','Em00','H001');
insert into EmpHall Values('Eh2','Em01','H002');
insert into EmpHall Values('Eh3','Em04','H003');
```

PickedShift table:

```
create table PickedShift
(
Pick_ID char(4) Not Null,
Es_ID Char(5) Not Null,
Constraint PrPickedShift_PK Primary Key(Pick_Id),
Constraint PrPickedShift_FK Foreign Key(Es_ID) references ESchedule(Es_ID)
);

insert into PickedShift Values('P200','Sc01');
insert into PickedShift Values('P201','Sc03');
insert into PickedShift Values('P202','Sc05');
```

DroppedShift table:

```
create table DroppedShift
(
Drop_ID char(4) Not Null,
Approved char(3) Not Null,
Es_ID Char(5) Not Null,
Constraint PrDroppedShift_FK Foreign Key(Es_ID) references ESchedule(Es_ID)
);

insert into DroppedShift Values('D258','Yes','Sc01');
insert into DroppedShift Values('D259','No','Sc03');
insert into DroppedShift Values('D260','Yes','Sc05');
```

9. SQL statement for answering major data questions

a. Display the account table showing all the user information

Select * from Account

Results Messages

	Acc_ID	UFname	ULname	UType	Ucontact	Uemail	Uaddress	password
1	A1000	Rashika	Singh	Employee	3158802081	rsingh37@syr.edu	118 Concord	rsingh
2	A1001	Alex	Shaw	Employee	3158802568	ashaw@syr.edu	103 Trinity	alex12
3	A1002	Kareen	John	Manager	3156759021	karen55@syr.edu	1021 Harvard	karjoh
4	A1003	Sue	Hopkins	Employee	3158651244	suehop@syr.edu	159 Westcott	sue123
5	A1004	Rahul	Rathod	Manager	3156799859	mrathod@syr.edu	100 Comstock	rahul_

b. Display the Dropped Shift table which contains information about the shifts an employee has dropped and whether it is approved or not

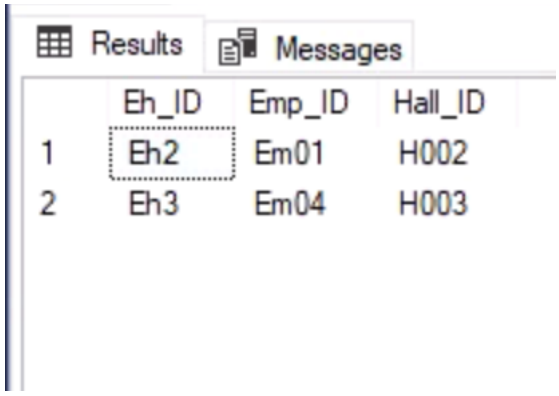
Select * from DroppedShift

Results Messages

	Drop_ID	Approved	Es_ID
1	D258	Yes	Sc01
2	D259	No	Sc03
3	D260	Yes	Sc05

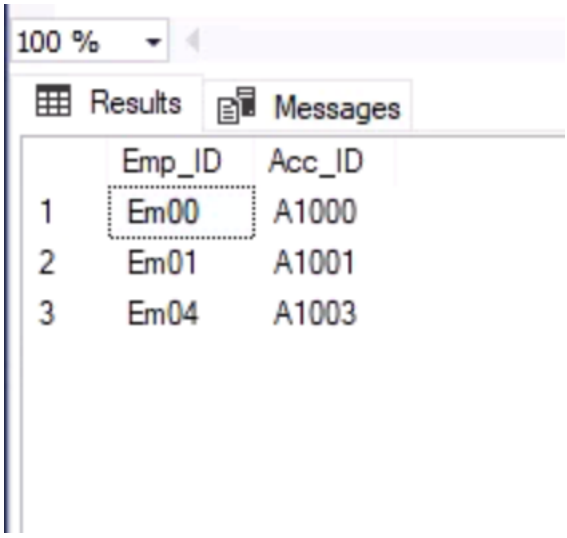
c. To show which employees are working in which halls

Select * from EmpHall



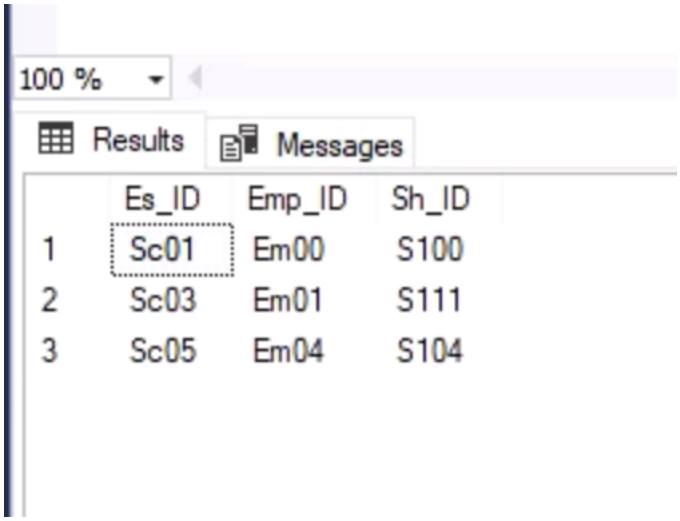
d. Information about employee's ID associated with the account

Select * from Employee



e. Display the Shift ID associated with employee shifts

Select * from ESchedule



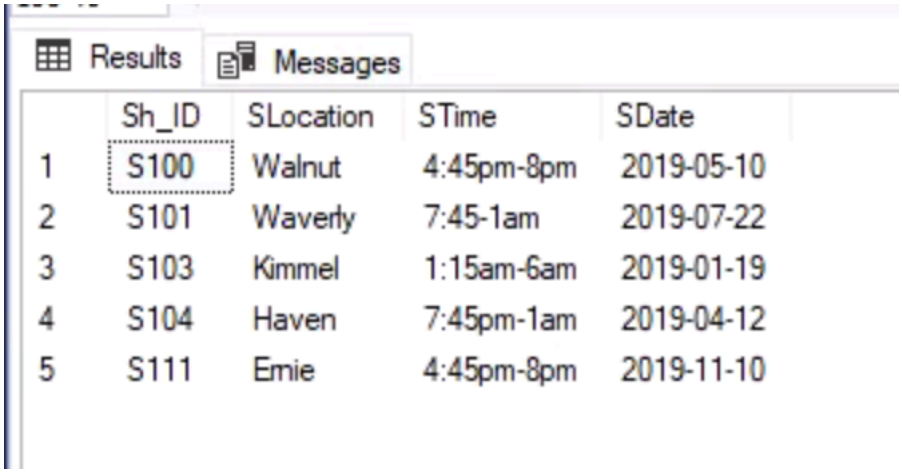
100 %

Results Messages

	Es_ID	Emp_ID	Sh_ID
1	Sc01	Em00	S100
2	Sc03	Em01	S111
3	Sc05	Em04	S104

f. Information about which shift is at which hall, its timings and date

Select * from EShift

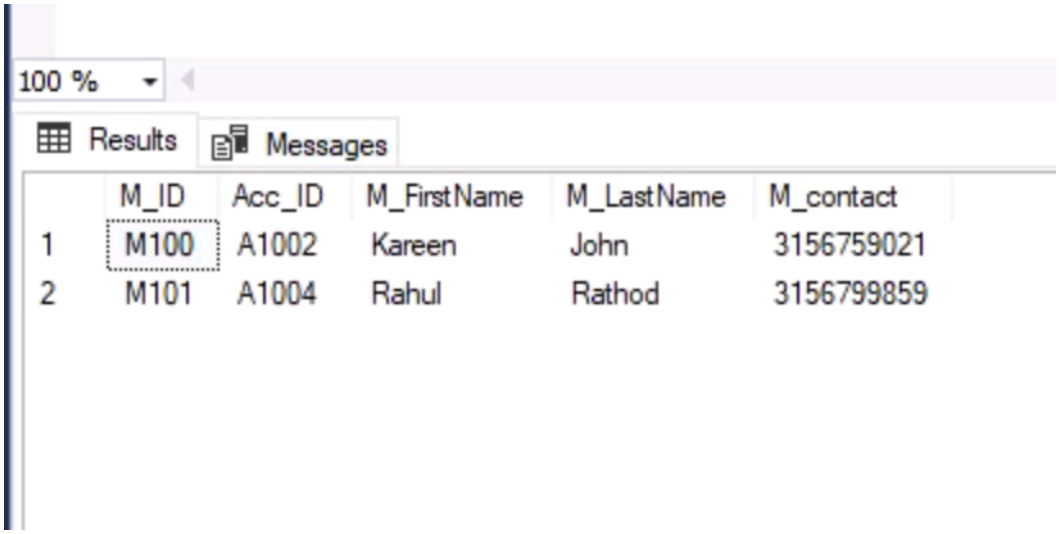


Results Messages

	Sh_ID	SLocation	STime	SDate
1	S100	Walnut	4:45pm-8pm	2019-05-10
2	S101	Waverly	7:45-1am	2019-07-22
3	S103	Kimmel	1:15am-6am	2019-01-19
4	S104	Haven	7:45pm-1am	2019-04-12
5	S111	Emie	4:45pm-8pm	2019-11-10

g. Display the details of managers

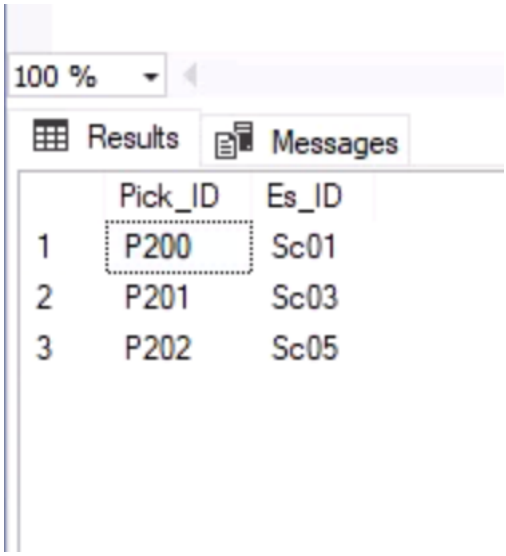
Select * from Manager



	M_ID	Acc_ID	M_FirstName	M_LastName	M_contact
1	M100	A1002	Kareen	John	3156759021
2	M101	A1004	Rahul	Rathod	3156799859

h. Show information about the dropped shifts which have been approved by manager

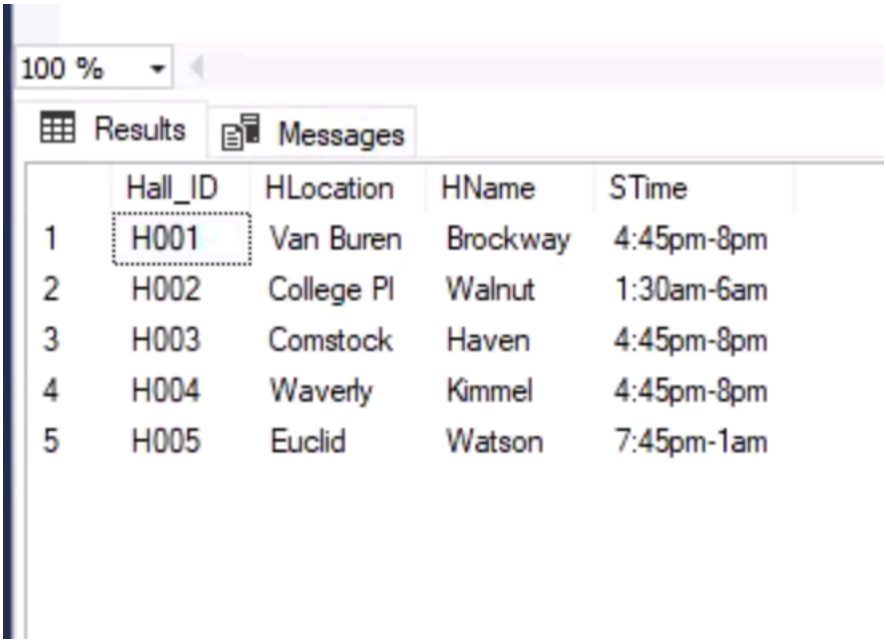
Select * from PickedShift



	Pick_ID	Es_ID
1	P200	Sc01
2	P201	Sc03
3	P202	Sc05

i. Display information about residential halls

Select * from Residential Halls



	Hall_ID	HLocation	HName	STime
1	H001	Van Buren	Brockway	4:45pm-8pm
2	H002	College Pl	Walnut	1:30am-6am
3	H003	Comstock	Haven	4:45pm-8pm
4	H004	Waverly	Kimmel	4:45pm-8pm
5	H005	Euclid	Watson	7:45pm-1am

j. Which employee is working at which location and at which time?

SQLQuery1.sql - IST...(AD\rsingh37 (64))* | Projet2.sql - IST-S-...7 (AD\rsingh37 (60))

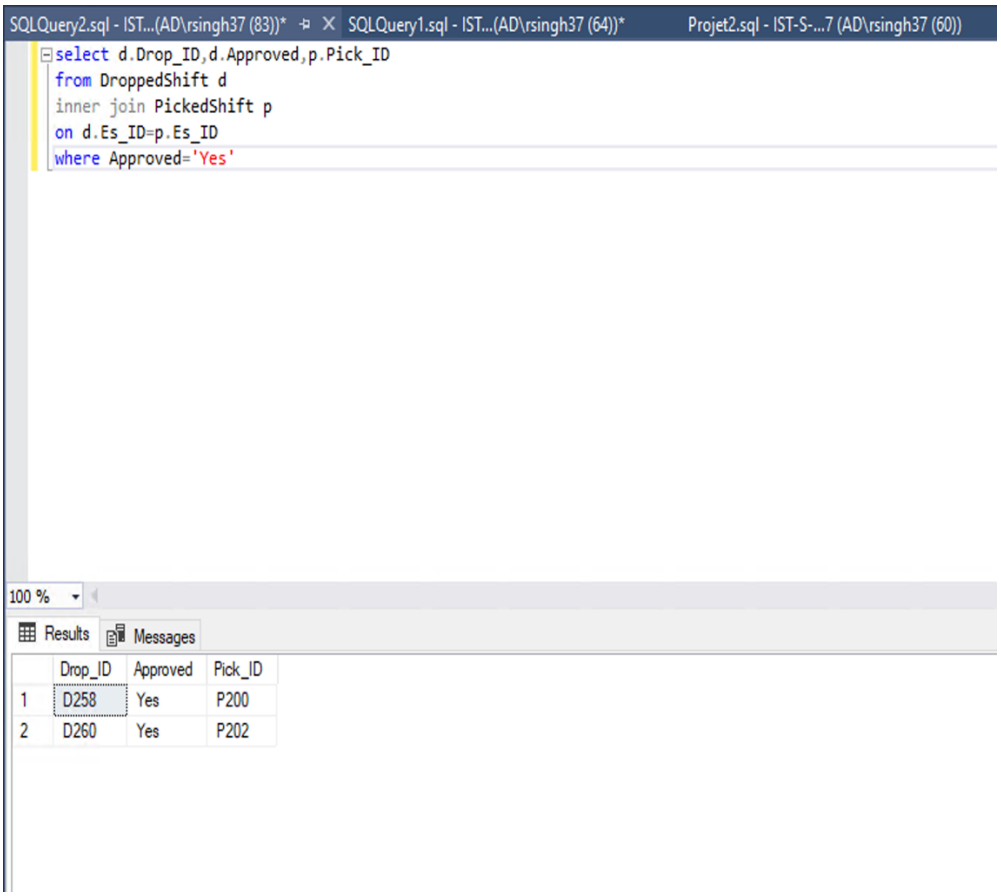
```
select es.Emp_ID, es.Es_ID,esh.SLocation,esh.STime,esh.SDate
from ESchedule es
inner join EShift esh
on es.Sh_ID=esh.Sh_ID
```

100 %

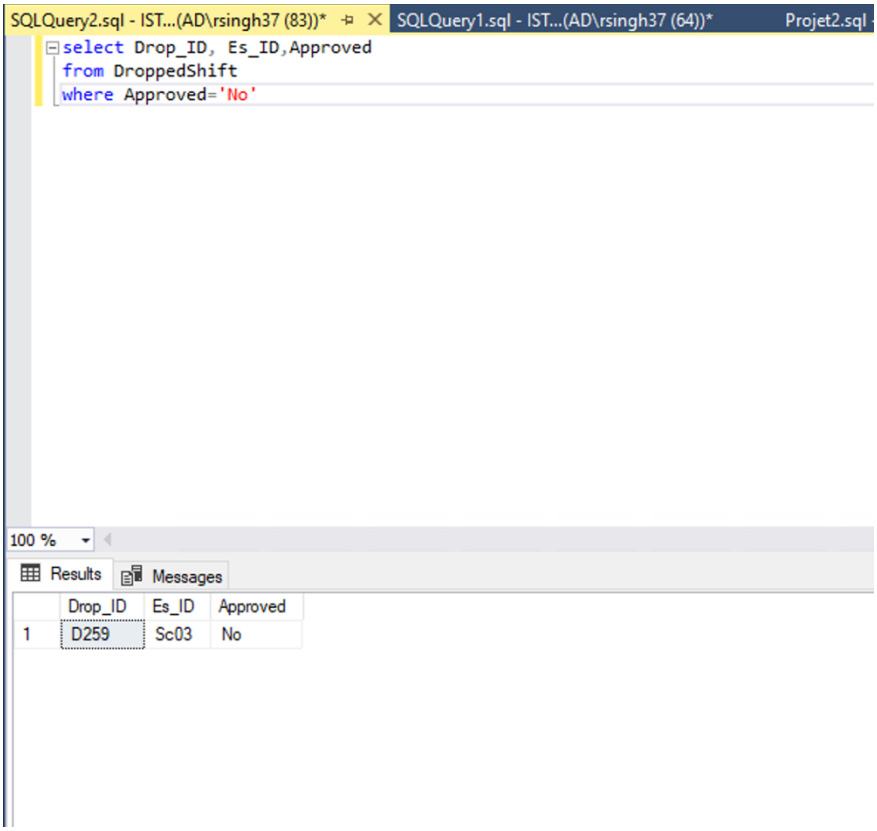
Results | Messages

	Emp_ID	Es_ID	SLocation	STime	SDate
1	Em00	Sc01	Walnut	4:45pm-8pm	2019-05-10
2	Em01	Sc03	Emie	4:45pm-8pm	2019-11-10
3	Em04	Sc05	Haven	7:45pm-1am	2019-04-12

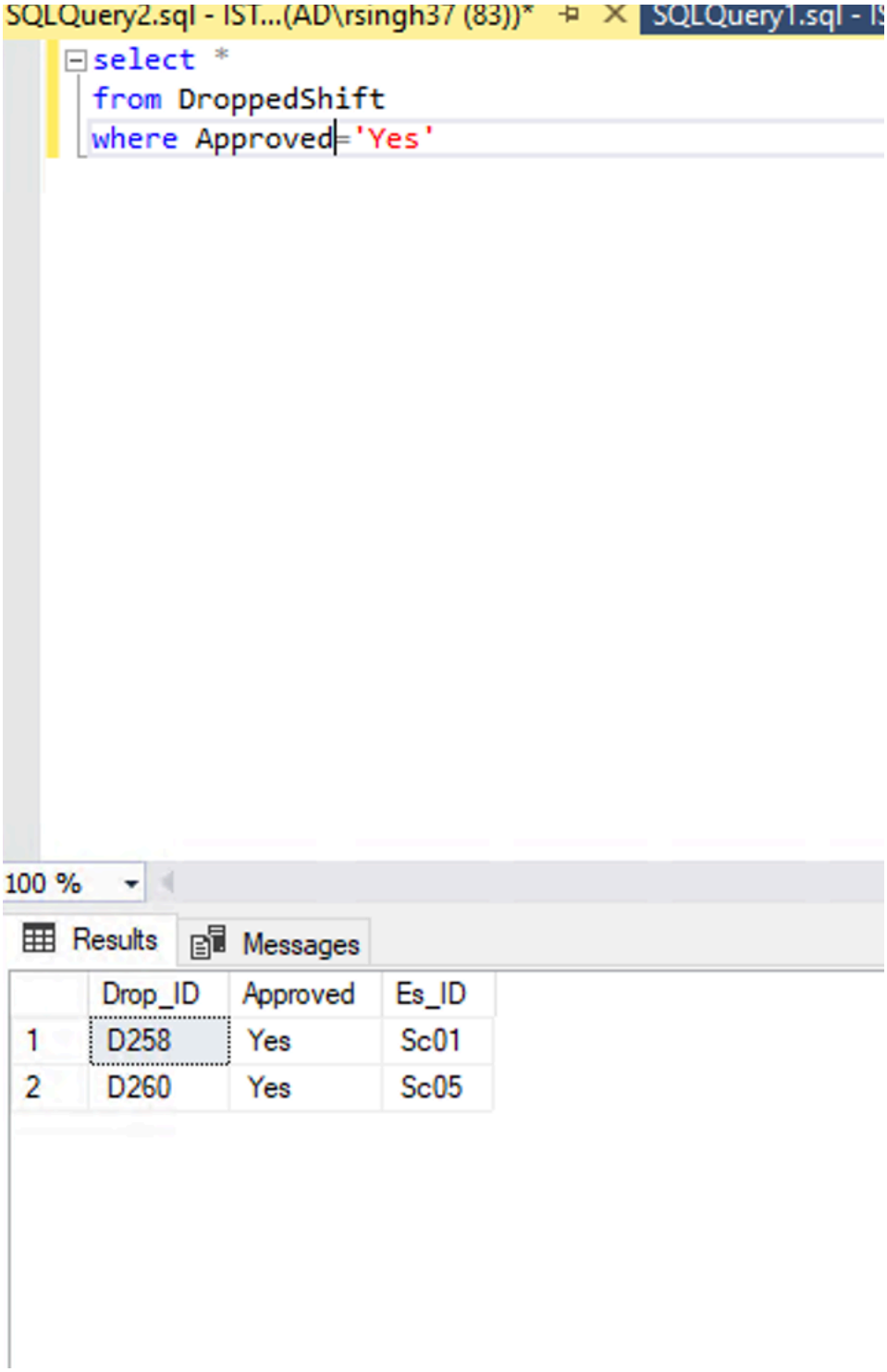
k. Show details of the shift for which manager has given approval



l. Show details of the shift for which the manager rejected the approval for shift drop



m. The picked shift shows details only about those shifts for which approval is given by the manager



n. Ordering by Employee names

```
select a.UFname,a.ULname ,e.Emp_ID
from Account a inner join Employee e
on e.Acc_ID=a.Acc_ID
Order By UFname
```

100 %

Results | Messages

	UFname	ULname	Emp_ID
1	Alex	Shaw	Em01
2	Rashika	Singh	Em00
3	Sue	Hopkins	Em04

o. Filtering the shifts by location

```
select Sh_ID,STime,SDate
from EShift
where SLocation='Kimmel'
```

100 %

Results | Messages

	Sh_ID	STime	SDate
1	S103	1:15am-6am	2019-01-19

p. Trigger

- Created a trigger to add a shift to the picked shift schedule only after it is approved by manager

Results | Messages

	Drop_ID	Approved	ES_ID	Pick_ID	ES_ID
1	D258	Yes	Sc01	P200	Sc01
2	D260	Yes	Sc05	P202	Sc05

q. View for displaying the employee and shift details

```
create view v1 as
select es.Emp_ID, es.Es_ID,esh.SLocation,esh.STime,esh.SDate
from ESchedule es
inner join EShift esh
on es.Sh_ID=esh.Sh_ID
```

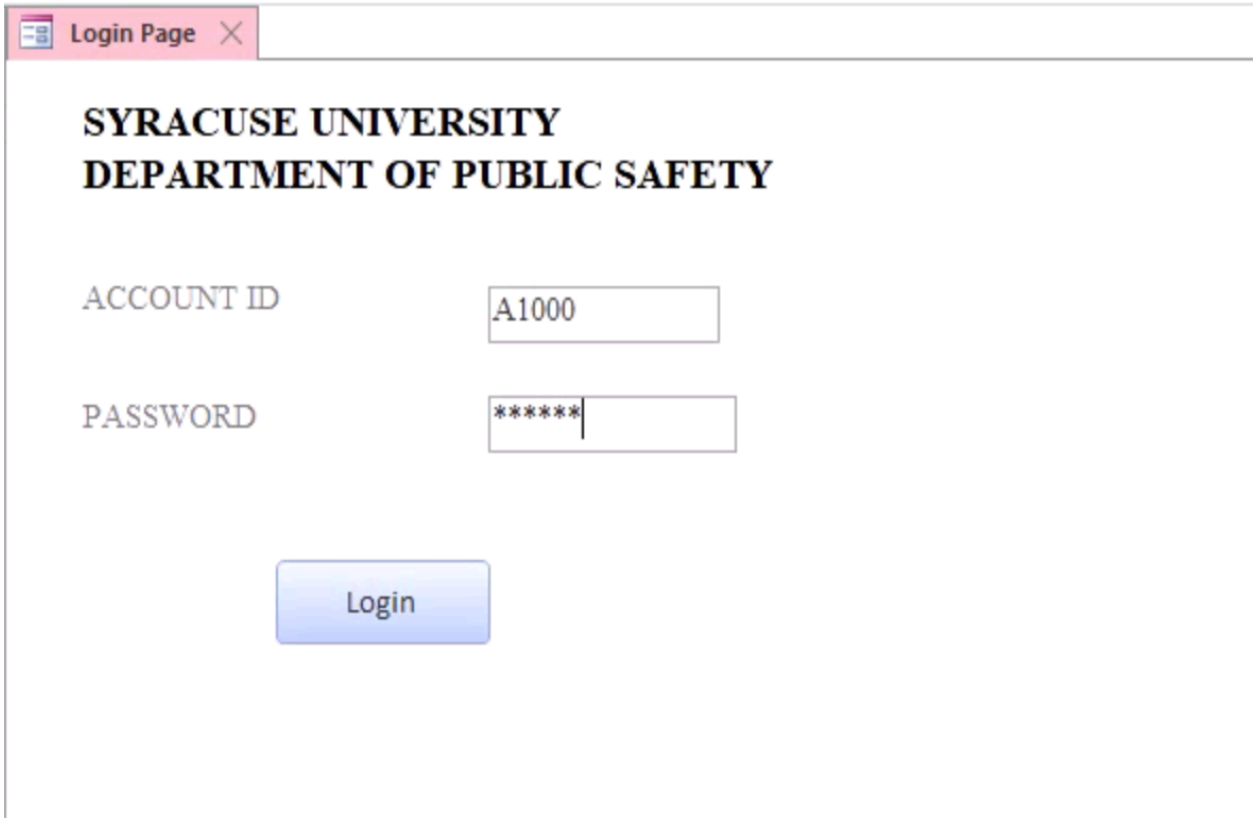
100 %

Results | Messages

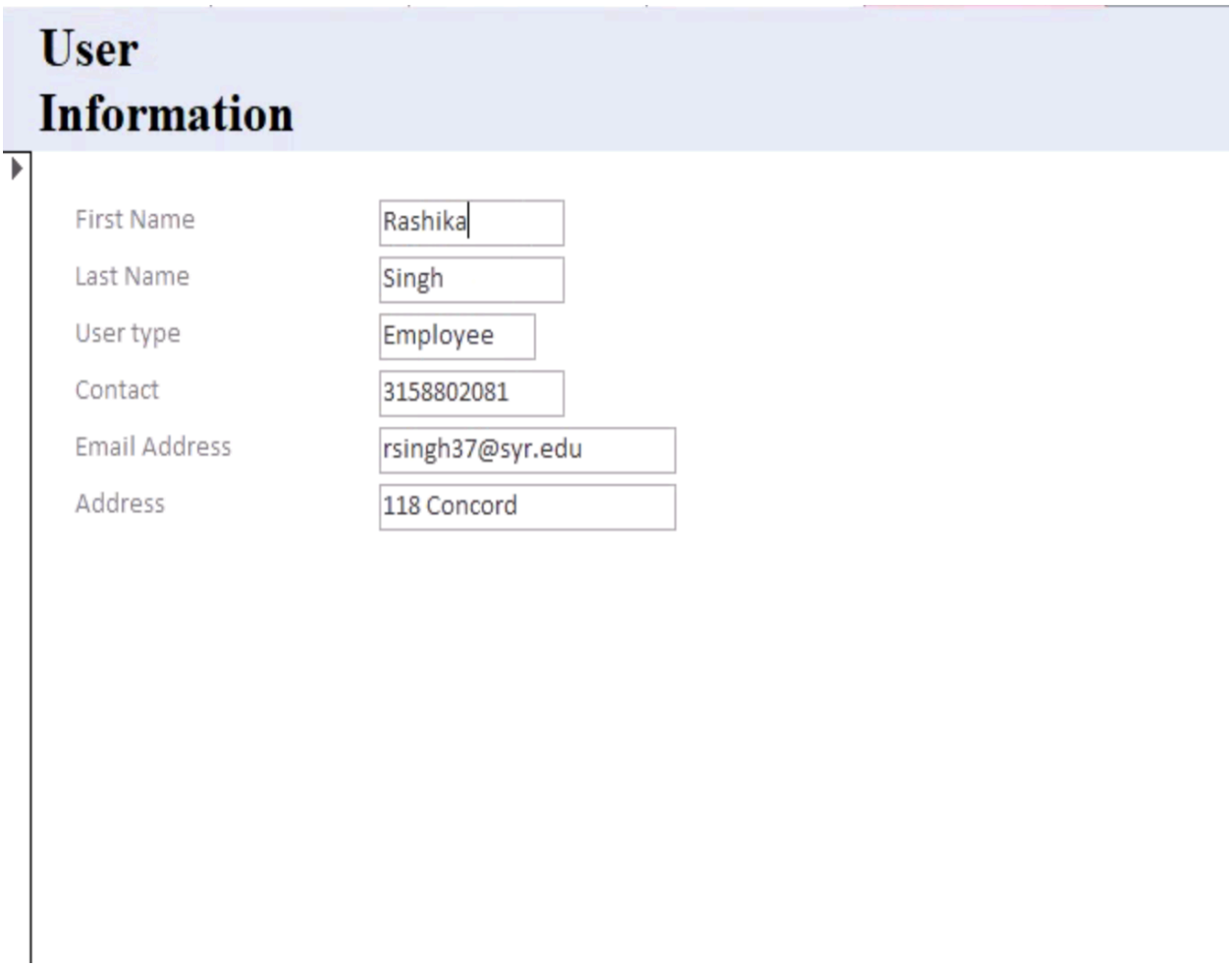
	Emp_ID	Es_ID	SLocation	STime	SDate
1	Em00	Sc01	Walnut	4:45pm-8pm	2019-05-10
2	Em01	Sc03	Emie	4:45pm-8pm	2019-11-10
3	Em04	Sc05	Haven	7:45pm-1am	2019-04-12

10.Input Forms

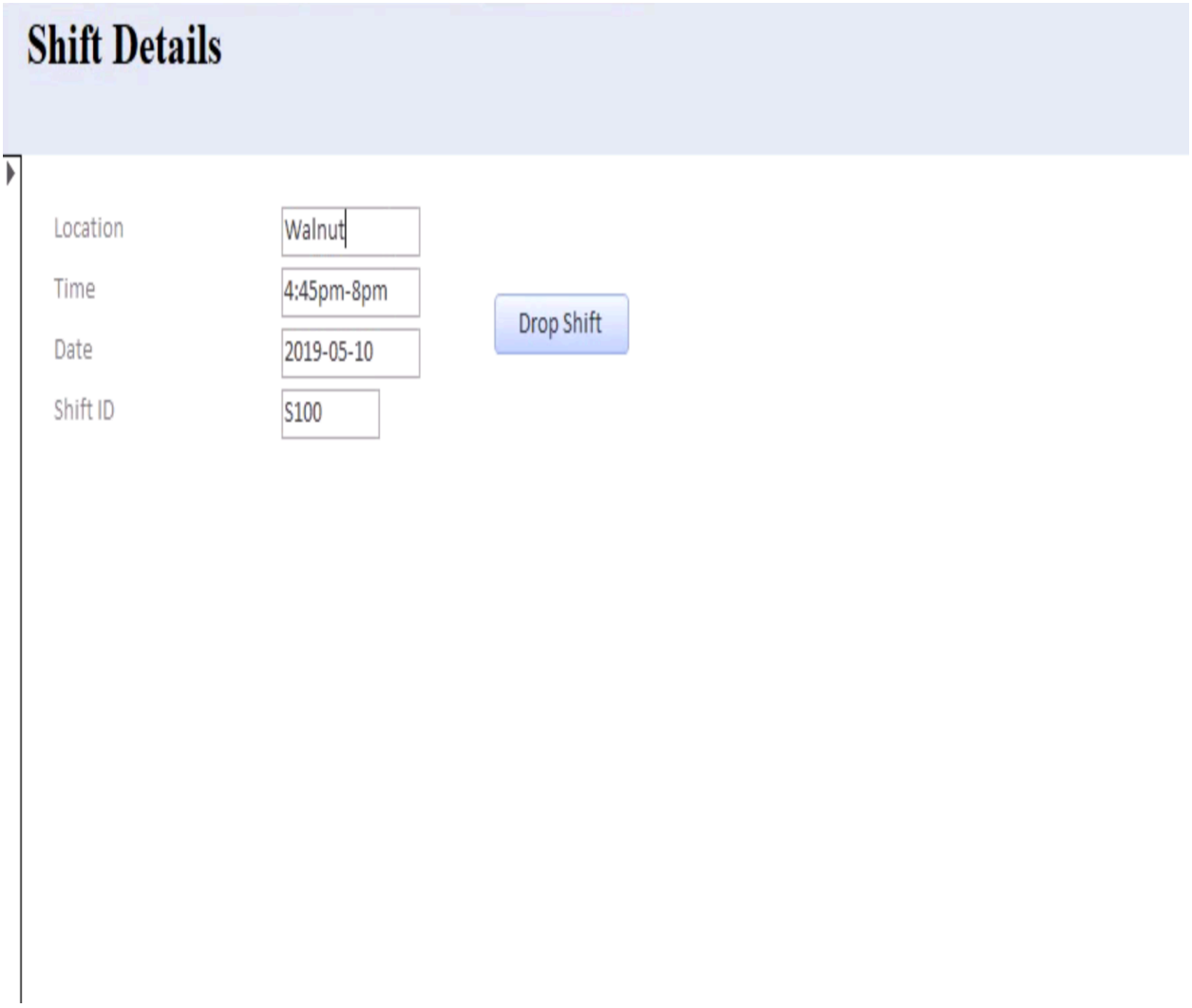
- Login Page



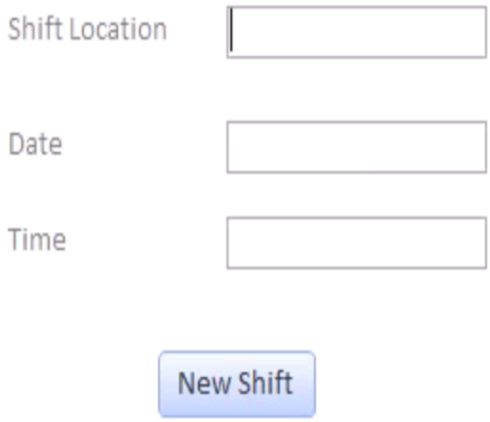
- User Information



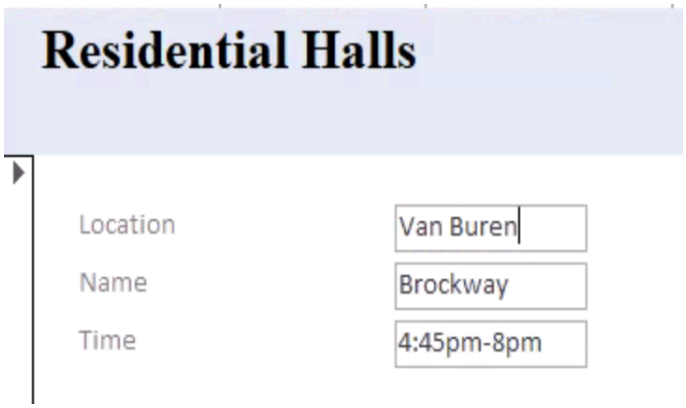
- Shift Details and dropping shift button



- Add new shift

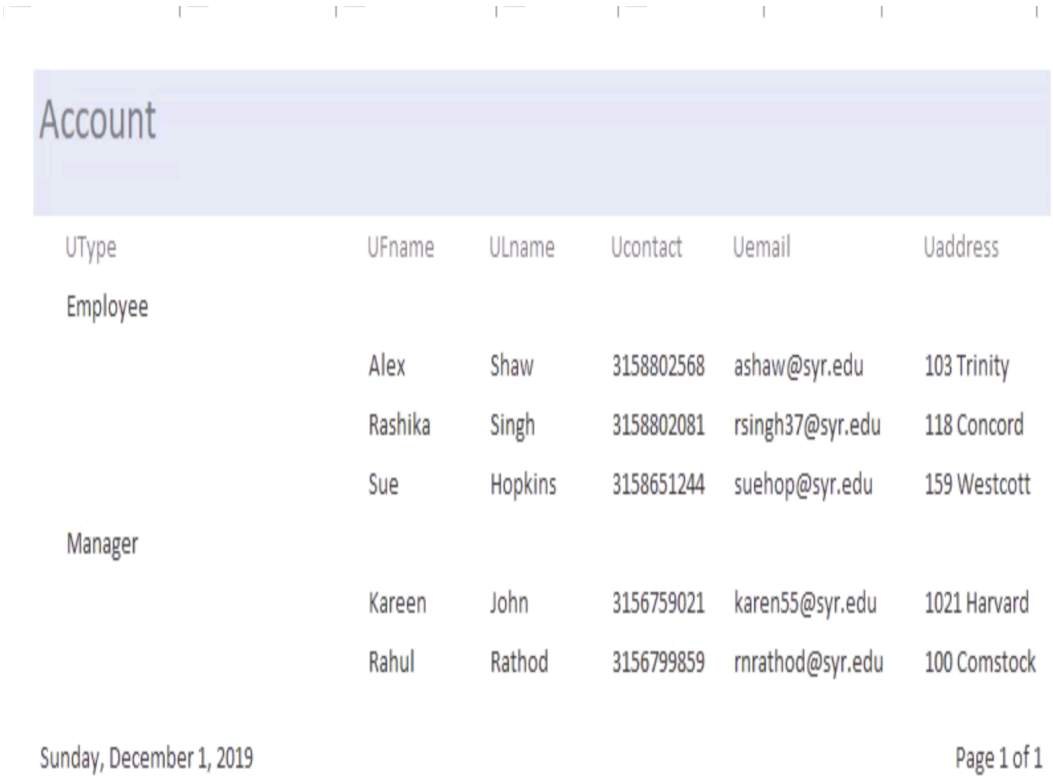


- Residential Halls details



11.Reports

- Report for displaying grouping by managers and employees

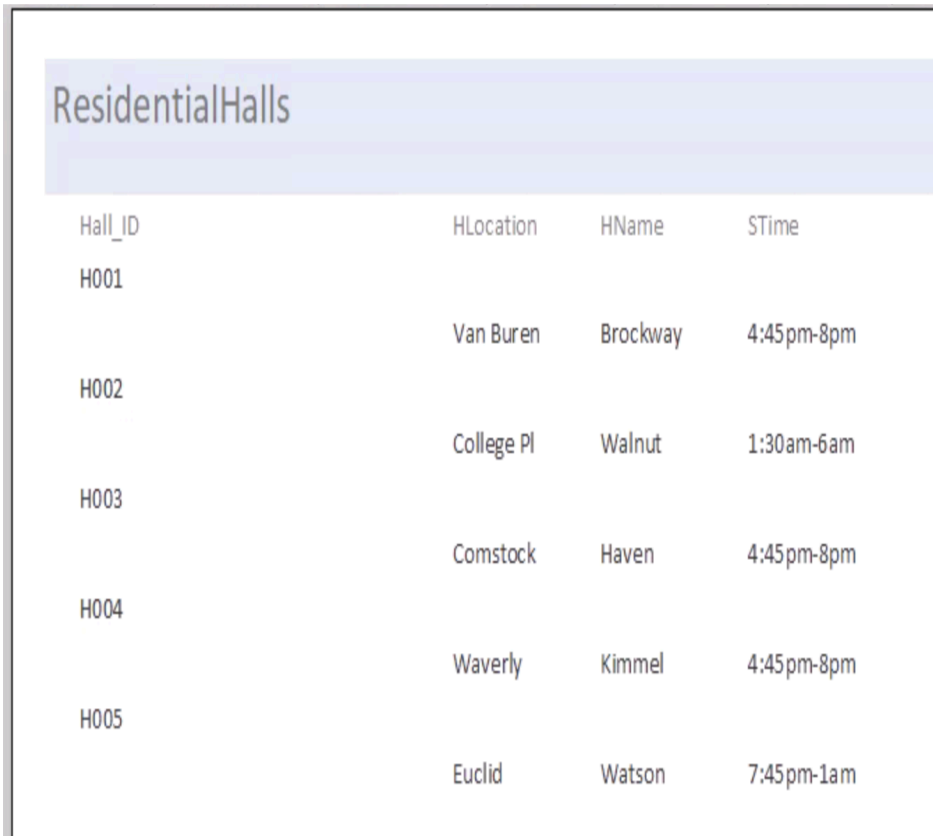


Account

UType	UFname	ULname	Ucontact	Uemail	Uaddress
Employee					
	Alex	Shaw	3158802568	ashaw@syr.edu	103 Trinity
	Rashika	Singh	3158802081	rsingh37@syr.edu	118 Concord
	Sue	Hopkins	3158651244	suehop@syr.edu	159 Westcott
Manager					
	Kareen	John	3156759021	karen55@syr.edu	1021 Harvard
	Rahul	Rathod	3156799859	rnrathod@syr.edu	100 Comstock

Sunday, December 1, 2019 Page 1 of 1

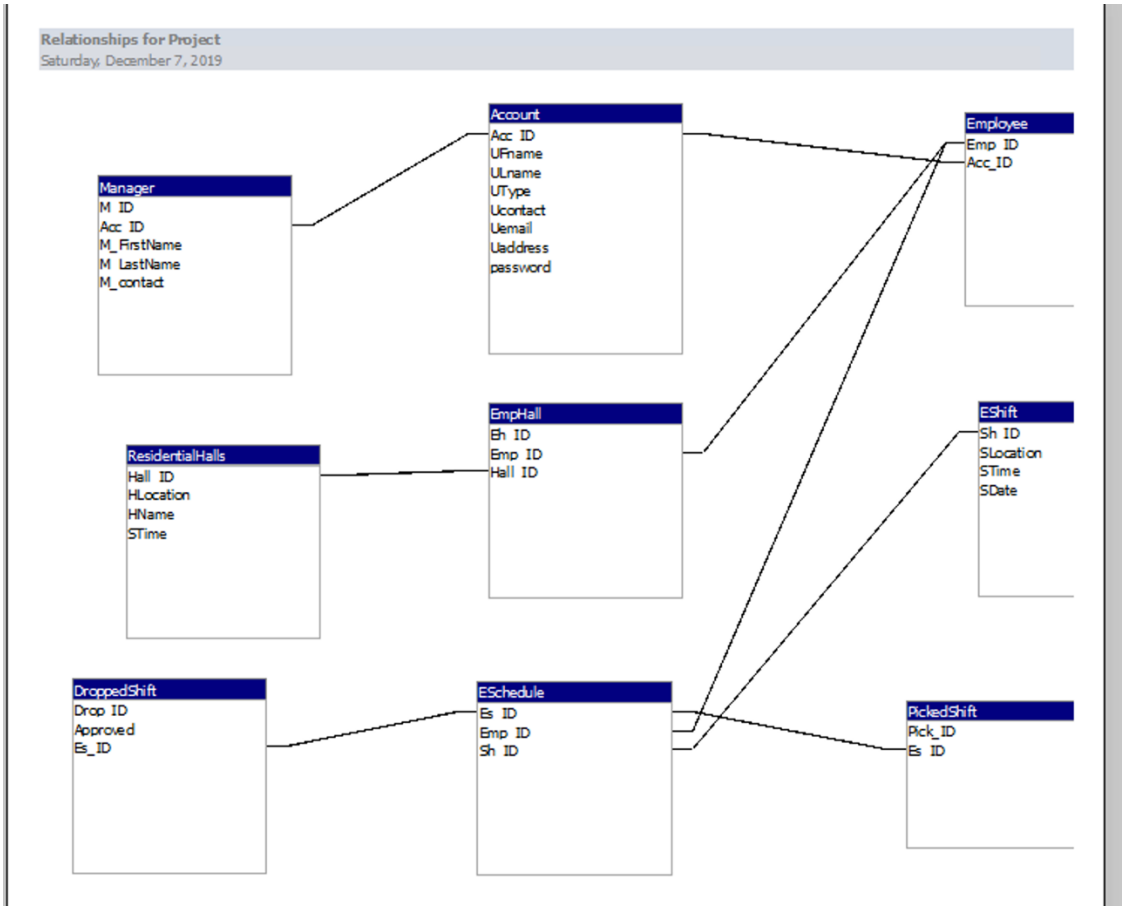
- Report for displaying the list of shifts arranged by hall ID



ResidentialHalls

Hall_ID	HLocation	HName	STime
H001			
	Van Buren	Brockway	4:45pm-8pm
H002			
	College Pl	Walnut	1:30am-6am
H003			
	Comstock	Haven	4:45pm-8pm
H004			
	Waverly	Kimmel	4:45pm-8pm
H005			
	Euclid	Watson	7:45pm-1am

- Report showing the relationship diagram between entities



12.Conclusion

- The project is a centralized database which can be accessed by both the managers and employees.
- The manager can supervise over all the employees and the employee can use the application to drop the shifts and pick shifts which are dropped if he is free.
- The entire process of management of shifts can be done efficiently using the database.
- The report shows and ERD diagram which shows relationships between the different entities, its attributes and the relationship constraints between various attributes.
- The relationship constraints are also shown in the ERD Diagram.
- There is also a system for granting approval or rejecting the shift approval.
- There are forms which are used for authenticating the user information and only if valid given access to the database.
- The system forms allow the employee to drop shifts if he cannot attend that shift
- There is also a feature form for the manager to add new shifts.
- The trigger allows the shifts which are approved by manager into the dropped shift.
- There are reports which display the user details and the halls details at which the user has a shift.
- There is also a report which shows the relationships diagram between entities.