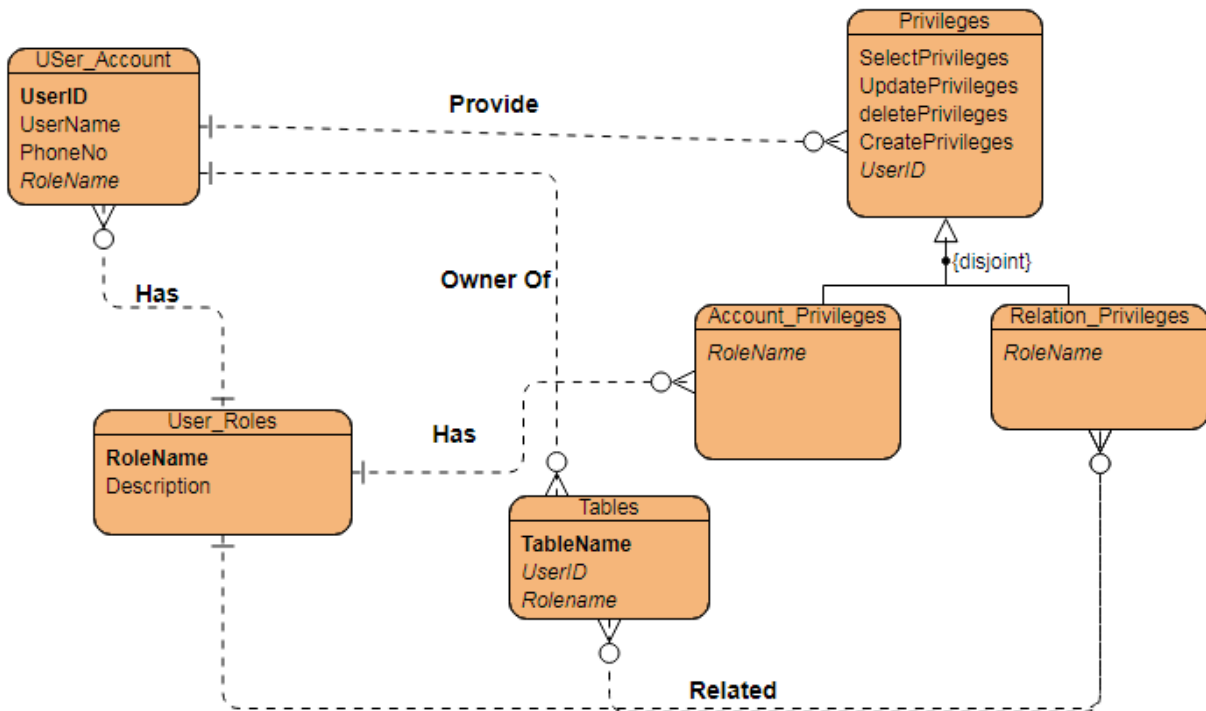
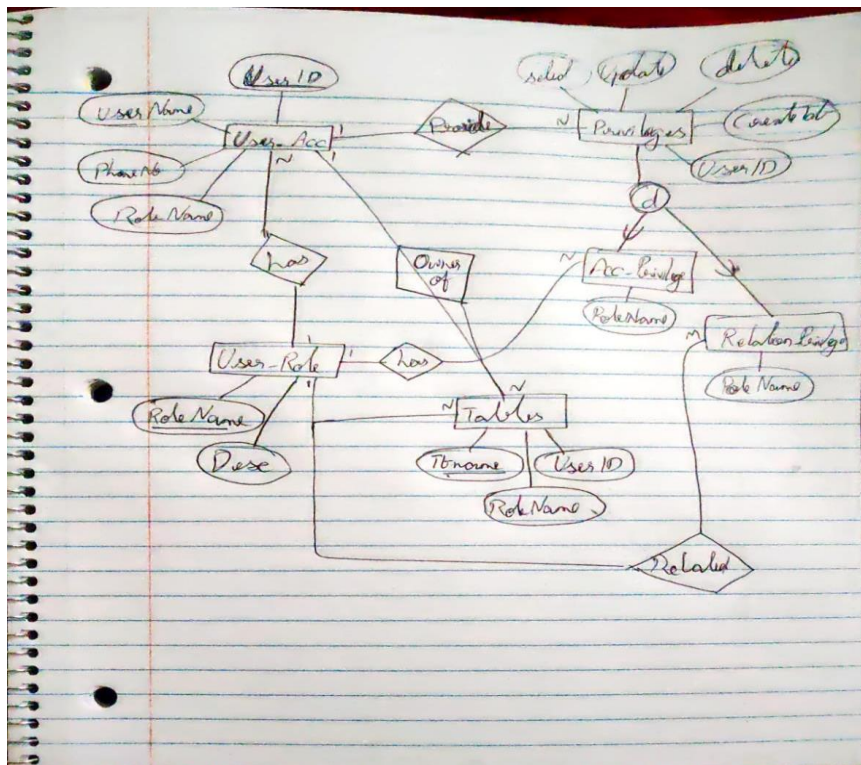


Part1:



(<https://online.visual-paradigm.com/diagrams/features/erd-tool/> - website used to create the eer diagram)



Part2:

EER to relational schema mapping

1. User_Account Table:

UserID	UserName	UserName	RoleName
--------	----------	----------	----------

(UserID (PK) , UserName , PhoneNo , RoleName (FK))

2. User_Roles Table:

<u>RoleName</u>	Description
-----------------	-------------

(RoleName (PK) , Description)

3. Tables Table:

TableName	UserID	RoleName
-----------	--------	----------

(TableName (PK) , UserID (FK) , RoleName (FK))

4. Privileges Table:

SelectPrivileges	UpdatePrivileges	deletePrivileges	CreatePrivileges	UserID	RoleName
------------------	------------------	------------------	------------------	--------	----------

(SelectPrivileges , UpdatePrivileges ,deletePrivileges ,CreatePrivileges , UserID (FK) , RoleName (FK))

No of entities:

1. User_Account entity
2. Privileges entity
3. Account_Privileges entity
4. Relation_Privileges entity
5. User_Roles entity
6. Table entity

Relationships:

1. There is a “Provide” relationship between User_Account entity and Privileges entity
2. There is “Has” relationship between User_Account entity and User_Roles entity.
3. There is “OwnerOf” relationship between User_Account entity and Tables entity

4. There is “Has” relationship between Account_Privileges entity and User_Roles entity.
5. There is “related” relationship between User_Roles entity , Tables entity and Relation_Privileges entity

Multiplicity :

1. There are 1:M multiplicity between User_Account entity and Privileges entity
2. There are M:1 multiplicity between User_Account entity and User_Roles entity.
3. There are 1:M multiplicity between User_Account entity and Tables entity
4. There are M:1 multiplicity between Account_Privileges entity and User_Roles entity.
5. There are 1:M multiplicity between User_Roles entity , Tables entity and Relation_Privileges entity

Create table statements:

```
CREATE TABLE `User_Roles` (
  `Role_Name` VARCHAR(45) NOT NULL,
  `Description` VARCHAR(45) NULL,
  PRIMARY KEY (`Role_Name`))

CREATE TABLE `User_Acc` (
  `UserId` INT NOT NULL AUTO_INCREMENT,
  `username` VARCHAR(45) NULL,
  `phone` VARCHAR(45) NULL,
  `RoleName` VARCHAR(45) NULL,
  PRIMARY KEY (`UserId`),
  INDEX `roles_idx` (`RoleName` ASC) VISIBLE,
  CONSTRAINT `roles`
    FOREIGN KEY (`RoleName`)
    REFERENCES `mydb`.`User_Roles` (`Role_Name`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION)

CREATE TABLE `Privileges` (
  `selectPrivileges` VARCHAR(45) NULL,
```

```

`updatePrivileges` VARCHAR(45) NULL,
`deletePrivileges` VARCHAR(45) NULL,
`createtab` VARCHAR(45) NULL,
`UserID` INT NOT NULL,
`RoleNmae` VARCHAR(45) NOT NULL,
INDEX `userid1_idx` (`UserID` ASC) VISIBLE,
INDEX `role1_idx` (`RoleNmae` ASC) VISIBLE,
CONSTRAINT `userid1`
    FOREIGN KEY (`UserID`)
    REFERENCES `mydb`.`User_Acc` (`UserId`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION,
CONSTRAINT `role1`
    FOREIGN KEY (`RoleNmae`)
    REFERENCES `mydb`.`User_Roles` (`Role_Name`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION)
CREATE TABLE `Account_Privileges` (
    `Rolename` VARCHAR(45) NULL,
    INDEX `xa_idx` (`Rolename` ASC) VISIBLE,
    CONSTRAINT `xa`
        FOREIGN KEY (`Rolename`)
        REFERENCES `mydb`.`User_Roles` (`Role_Name`)
        ON DELETE NO ACTION
        ON UPDATE NO ACTION)
CREATE TABLE `Relation_privilages` (
    `Rolename` VARCHAR(45) NULL,
    INDEX `xb_idx` (`Rolename` ASC) VISIBLE,
    CONSTRAINT `xb`

```

```
FOREIGN KEY (`Rolename`)
REFERENCES `mydb`.`User_Roles` (`Role_Name`)
ON DELETE NO ACTION
ON UPDATE NO ACTION)
CREATE TABLE `Tables` (
`Tablename` VARCHAR(45) NOT NULL,
`UserID` INT NULL,
`Rolename` VARCHAR(45) NULL,
PRIMARY KEY (`Tablename`),
INDEX `userid2_idx` (`UserID` ASC) VISIBLE,
INDEX `rolename_idx` (`Rolename` ASC) VISIBLE,
CONSTRAINT `userid2`
FOREIGN KEY (`UserID`)
REFERENCES `mydb`.`User_Acc` (`UserId`)
ON DELETE NO ACTION
ON UPDATE NO ACTION,
CONSTRAINT `rolename`
FOREIGN KEY (`Rolename`)
REFERENCES `mydb`.`User_Roles` (`Role_Name`)
ON DELETE NO ACTION
ON UPDATE NO ACTION)
```

Part 3:

Output of the program

```
"D:\py projects\db\venv\Scripts\python.exe" "D:/py projects/db/pjt2/pjt2 v1.py"
```

successsfully connected

1: view UserAcc

2: view roles

3: view privilages

4: view tables

5: insert into UserAcc

6: insert into roles

7: insert into privilages

8: insert into tables

9:exit loop

enter option:5

enter username:qwerty

enter phone:1231231231

rolename:admin

database updated

1: view UserAcc

2: view roles

3: view privilages

4: view tables

5: insert into UserAcc

6: insert into roles

7: insert into privilages

8: insert into tables

9:exit loop

enter option:1

-----User Accounts-----

```
{'UserId': 1, 'username': 'can', 'phone': '1235599990', 'RoleName': 'dev'}
{'UserId': 2, 'username': 'dan', 'phone': '1234567890', 'RoleName': 'admin'}
{'UserId': 3, 'username': 'ban', 'phone': '1234567890', 'RoleName': 'admin'}
{'UserId': 4, 'username': 'san', 'phone': '1234437890', 'RoleName': 'admin'}
{'UserId': 5, 'username': 'kan', 'phone': '1222243890', 'RoleName': 'dev'}
{'UserId': 6, 'username': 'lan', 'phone': '1222555890', 'RoleName': 'dev'}
{'UserId': 7, 'username': 'man', 'phone': '1222222890', 'RoleName': 'client'}
{'UserId': 8, 'username': 'jan', 'phone': '1222222000', 'RoleName': 'client'}
{'UserId': 9, 'username': 'pan', 'phone': '1225552000', 'RoleName': 'client'}
{'UserId': 10, 'username': 'qan', 'phone': '1225444000', 'RoleName': 'client'}
{'UserId': 11, 'username': 'fan', 'phone': '1225449900', 'RoleName': 'client'}
{'UserId': 12, 'username': 'argvs', 'phone': '1225555500', 'RoleName': 'client'}
{'UserId': 21, 'username': 'anrg', 'phone': '1231231231', 'RoleName': 'client'}
{'UserId': 22, 'username': 'argvsq', 'phone': '4444444445', 'RoleName': 'dev'}
{'UserId': 23, 'username': 'qwerty', 'phone': '1231231231', 'RoleName': 'admin'}
```

1: view UserAcc

2: view roles

3: view privileges

4: view tables

5: insert into UserAcc

6: insert into roles

7: insert into privileges

8: insert into tables

9:exit loop

enter option:6

enter rolename:person

enter role description:is a person

database updated

1: view UserAcc

2: view roles

3: view privileges

4: view tables

5: insert into UserAcc

6: insert into roles

7: insert into privileges

8: insert into tables

9:exit loop

enter option:2

-----Roles-----

{'Role_Name': 'admin', 'Description': 'the one responsible'}

{'Role_Name': 'client', 'Description': 'the one who comes with a problem'}

{'Role_Name': 'dev', 'Description': 'the one who does work'}

{'Role_Name': 'exe', 'Description': 'executes'}

{'Role_Name': 'person', 'Description': 'is a person'}

1: view UserAcc

2: view roles

3: view privileges

4: view tables

5: insert into UserAcc

6: insert into roles

7: insert into privileges

8: insert into tables

9:exit loop

enter option:7

enter select privilege (yes/or)yes

enter update privilege (yes/or)yes

enter delete privilege (yes/or)yes

enter create tab privilege (yes/or)yes

enter for which userID these privileges apply21

if all privileges are granted the privilege is taken as account privilege else relation privilege

database updated

1: view UserAcc

2: view roles

3: view privileges

4: view tables

5: insert into UserAcc

6: insert into roles

7: insert into privileges

8: insert into tables

9:exit loop

enter option:3

-----Privileges-----

{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 1, 'RoleNmae': 'dev'}

{'selectPrivileges': 'yes', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'yes', 'UserID': 2, 'RoleNmae': 'admin'}

{'selectPrivileges': 'yes', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'yes', 'UserID': 3, 'RoleNmae': 'admin'}

{'selectPrivileges': 'yes', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'yes', 'UserID': 4, 'RoleNmae': 'admin'}

{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 5, 'RoleNmae': 'dev'}

{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 6, 'RoleNmae': 'dev'}

{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 7, 'RoleNmae': 'client'}

{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 8, 'RoleNmae': 'client'}

{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 9, 'RoleNmae': 'client'}

```
{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 10, 'RoleNmae': 'client'}
```

```
{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 11, 'RoleNmae': 'client'}
```

```
{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 12, 'RoleNmae': 'client'}
```

```
{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 21, 'RoleNmae': 'dev'}
```

1: view UserAcc

2: view roles

3: view privilages

4: view tables

5: insert into UserAcc

6: insert into roles

7: insert into privilages

8: insert into tables

9:exit loop

enter option:8

enter new table name:tab243

enter role userID(this will be the owener of the table):21

enter role name(which already exist)person

database updated

1: view UserAcc

2: view roles

3: view privilages

4: view tables

5: insert into UserAcc

6: insert into roles

7: insert into privilages

8: insert into tables

9:exit loop

enter option:4

-----Tables-----

1 is owener of table {'Tablename': 'tab1', 'UserID': 1, 'Rolename': 'dev'}

6 is owener of table {'Tablename': 'tab10', 'UserID': 6, 'Rolename': 'dev'}

6 is owener of table {'Tablename': 'tab11', 'UserID': 6, 'Rolename': 'dev'}

5 is owener of table {'Tablename': 'tab12', 'UserID': 5, 'Rolename': 'admin'}

1 is owener of table {'Tablename': 'tab2', 'UserID': 1, 'Rolename': 'dev'}

21 is owener of table {'Tablename': 'tab243', 'UserID': 21, 'Rolename': 'person'}

2 is owener of table {'Tablename': 'tab3', 'UserID': 2, 'Rolename': 'admin'}

2 is owener of table {'Tablename': 'tab4', 'UserID': 2, 'Rolename': 'admin'}

3 is owener of table {'Tablename': 'tab5', 'UserID': 3, 'Rolename': 'admin'}

4 is owener of table {'Tablename': 'tab6', 'UserID': 4, 'Rolename': 'admin'}

5 is owener of table {'Tablename': 'tab7', 'UserID': 5, 'Rolename': 'dev'}

5 is owener of table {'Tablename': 'tab8', 'UserID': 5, 'Rolename': 'dev'}

6 is owener of table {'Tablename': 'tab9', 'UserID': 6, 'Rolename': 'dev'}

1: view UserAcc

2: view roles

3: view privilages

4: view tables

5: insert into UserAcc

6: insert into roles

7: insert into privilages

8: insert into tables

9:exit loop

enter option:9

3.5

{'UserId': 1, 'username': 'can', 'phone': '1235599990', 'RoleName': 'dev', 'Role_Name': 'dev',
'Description': 'the one who does work'}

```
{'UserId': 2, 'username': 'dan', 'phone': '1234567890', 'RoleName': 'admin', 'Role_Name': 'admin',  
'Description': 'the one responsible'}  
  
{'UserId': 3, 'username': 'ban', 'phone': '1234567890', 'RoleName': 'admin', 'Role_Name': 'admin',  
'Description': 'the one responsible'}  
  
{'UserId': 4, 'username': 'san', 'phone': '1234437890', 'RoleName': 'admin', 'Role_Name': 'admin',  
'Description': 'the one responsible'}  
  
{'UserId': 5, 'username': 'kan', 'phone': '1222243890', 'RoleName': 'dev', 'Role_Name': 'dev',  
'Description': 'the one who does work'}  
  
{'UserId': 6, 'username': 'lan', 'phone': '1222555890', 'RoleName': 'dev', 'Role_Name': 'dev', 'Description':  
'the one who does work'}  
  
{'UserId': 7, 'username': 'man', 'phone': '1222222890', 'RoleName': 'client', 'Role_Name': 'client',  
'Description': 'the one who comes with a problem'}  
  
{'UserId': 8, 'username': 'jan', 'phone': '1222222000', 'RoleName': 'client', 'Role_Name': 'client',  
'Description': 'the one who comes with a problem'}  
  
{'UserId': 9, 'username': 'pan', 'phone': '1225552000', 'RoleName': 'client', 'Role_Name': 'client',  
'Description': 'the one who comes with a problem'}  
  
{'UserId': 10, 'username': 'qan', 'phone': '1225444000', 'RoleName': 'client', 'Role_Name': 'client',  
'Description': 'the one who comes with a problem'}  
  
{'UserId': 11, 'username': 'fan', 'phone': '1225449900', 'RoleName': 'client', 'Role_Name': 'client',  
'Description': 'the one who comes with a problem'}  
  
{'UserId': 12, 'username': 'argvs', 'phone': '1225555500', 'RoleName': 'client', 'Role_Name': 'client',  
'Description': 'the one who comes with a problem'}  
  
{'UserId': 21, 'username': 'anrg', 'phone': '1231231231', 'RoleName': 'client', 'Role_Name': 'client',  
'Description': 'the one who comes with a problem'}  
  
{'UserId': 22, 'username': 'argvsq', 'phone': '4444444445', 'RoleName': 'dev', 'Role_Name': 'dev',  
'Description': 'the one who does work'}  
  
{'UserId': 23, 'username': 'qwerty', 'phone': '1231231231', 'RoleName': 'admin', 'Role_Name': 'admin',  
'Description': 'the one responsible'}
```

3.6

```
{'RoleName': 'dev', 'Role_Name': 'dev', 'Description': 'the one who does work'}
```

3.7

{'Rolename': 'admin', 'Role_Name': 'admin', 'Description': 'the one responsible', 'Tablename': 'tab12', 'UserID': 5}

{'Rolename': 'admin', 'Role_Name': 'admin', 'Description': 'the one responsible', 'Tablename': 'tab3', 'UserID': 2}

{'Rolename': 'admin', 'Role_Name': 'admin', 'Description': 'the one responsible', 'Tablename': 'tab4', 'UserID': 2}

{'Rolename': 'admin', 'Role_Name': 'admin', 'Description': 'the one responsible', 'Tablename': 'tab5', 'UserID': 3}

{'Rolename': 'admin', 'Role_Name': 'admin', 'Description': 'the one responsible', 'Tablename': 'tab6', 'UserID': 4}

3.8a

{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 1, 'RoleNmae': 'dev'}

{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 5, 'RoleNmae': 'dev'}

{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 6, 'RoleNmae': 'dev'}

{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 21, 'RoleNmae': 'dev'}

3.8b

{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 5, 'RoleNmae': 'dev'}

3.8c

```
{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 1, 'RoleNmae': 'dev'}
```

```
{'selectPrivileges': 'yes', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'yes', 'UserID': 2, 'RoleNmae': 'admin'}
```

```
{'selectPrivileges': 'yes', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'yes', 'UserID': 3, 'RoleNmae': 'admin'}
```

```
{'selectPrivileges': 'yes', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'yes', 'UserID': 4, 'RoleNmae': 'admin'}
```

```
{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 5, 'RoleNmae': 'dev'}
```

```
{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 6, 'RoleNmae': 'dev'}
```

```
{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 7, 'RoleNmae': 'client'}
```

```
{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 8, 'RoleNmae': 'client'}
```

```
{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 9, 'RoleNmae': 'client'}
```

```
{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 10, 'RoleNmae': 'client'}
```

```
{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 11, 'RoleNmae': 'client'}
```

```
{'selectPrivileges': 'no', 'updatePrivileges': 'no', 'deletePrivileges': 'no', 'createtab': 'no', 'UserID': 12, 'RoleNmae': 'client'}
```

```
{'selectPrivileges': 'yes', 'updatePrivileges': 'yes', 'deletePrivileges': 'yes', 'createtab': 'yes', 'UserID': 21, 'RoleNmae': 'dev'}
```

Process finished with exit code 0