



Course number: CCCS-215

Section: CY2

**I. Amatulrahman Alsubhi**

Name	ID	Email
Deema Alshehri	2211090	2211090@uj.edu.sa
Maryam Alotaibi	2212708	2212708@uj.edu.sa
Layan Kandil	2210192	2210192@uj.edu.sa
Yara Alamri	2210362	2210362@uj.edu.sa

## Phase 1:

### Problem Description

Many people wish to develop their knowledge and gain skills and experience in their field but can't afford to subscribe to any courses and find it difficult to connect with people who have a high level of expertise to consult.

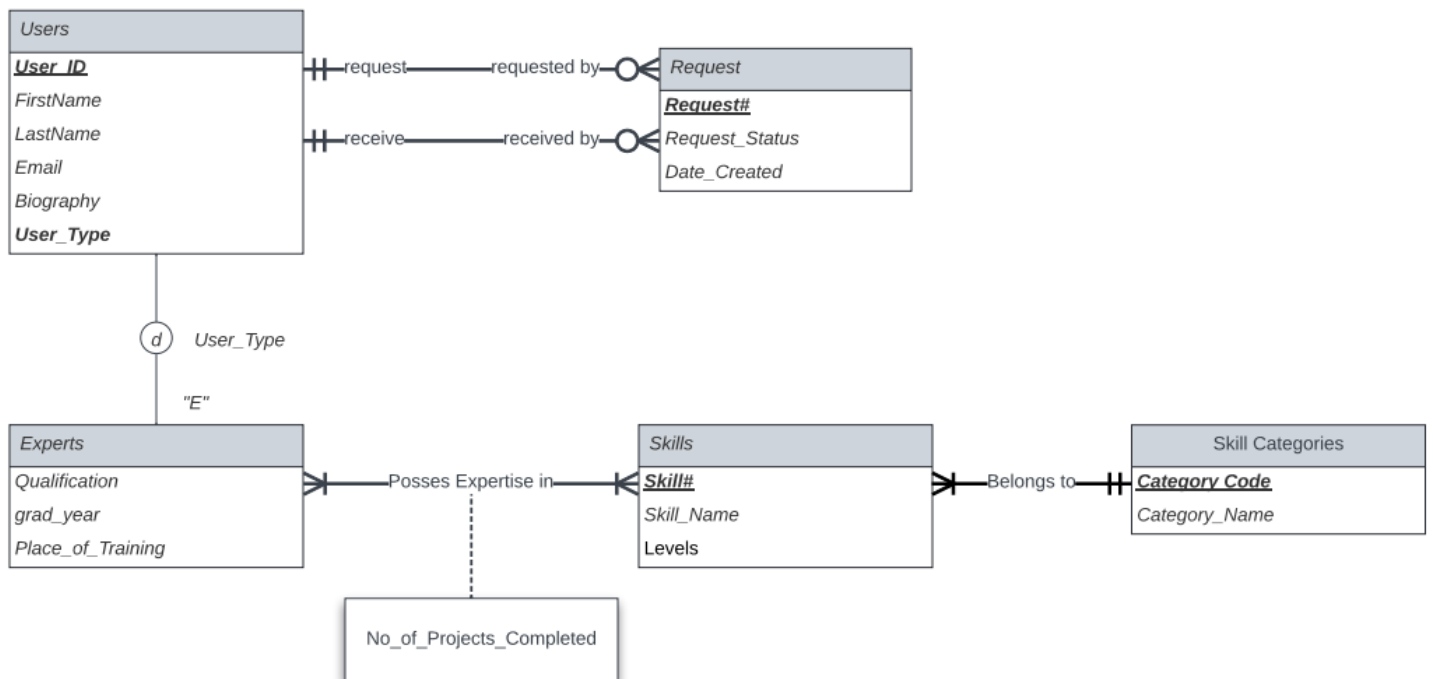
Our idea is to create a free consulting/skills exchange platform that provides an opportunity for individuals to develop skills required in computer fields by connecting with volunteering experts. The platform aims to ease the connection between people with different levels of specific skills and expertise to others who want to learn a specific skill but cannot afford the costs of the course or private lessons. In addition, vision 2030 to achieve the Kingdom's goal of one million volunteers annually and support an emerging non-profit sector, our platform creates an environment that encourages cooperation, knowledge sharing, and enables the experts to market themselves and to be known.

### List of Entities

- Request  
Record the Request details of the user and the expert.
- Users  
Information about ALL the platform users " Beneficiaries and Experts".
- Experts  
providing a comprehensive record of expert details.
- Expertise  
Associative between the expert using the platform and his skills.
- Skills  
List of skills and their level.
- Skill Category  
Specifies the categories of the skills.

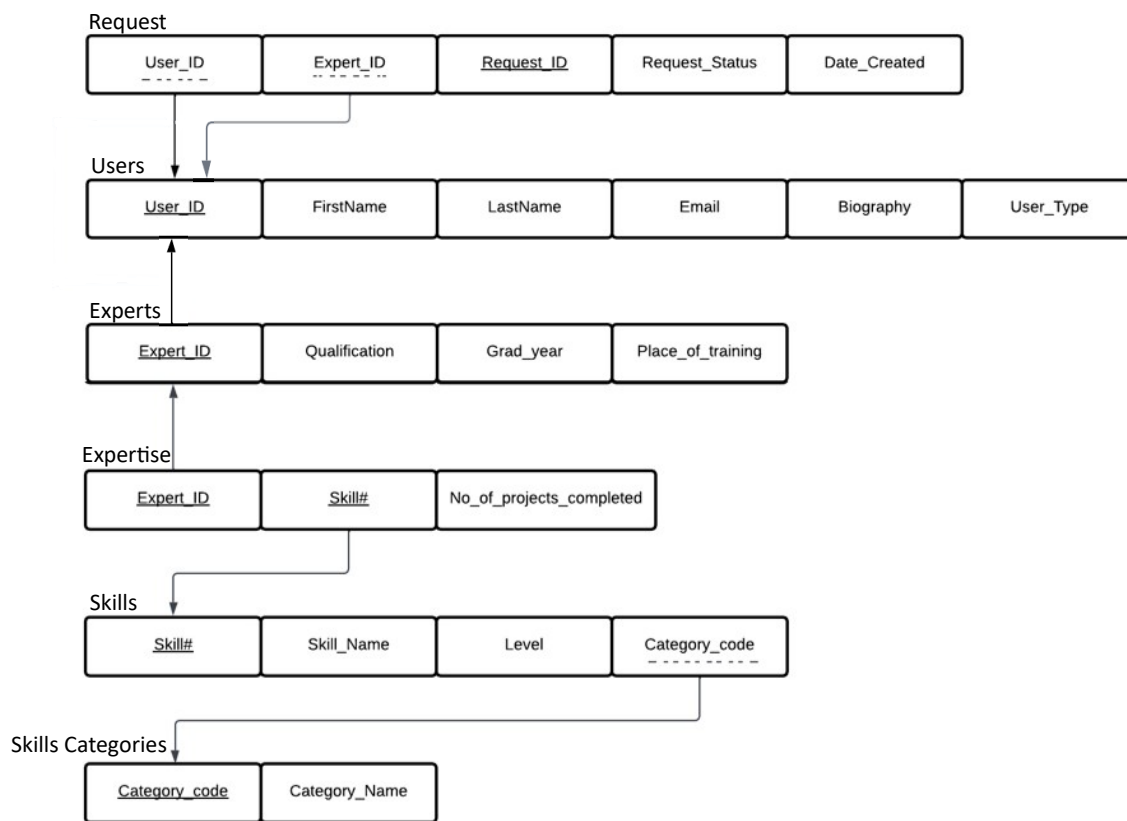
All members of the group have worked together in all aspects of the project.

## Database Diagram EER (Skill Blend)



# Logical Modelling

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## Normalization

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Request(Request#, User\_ID, Expert\_ID, Request\_status, Date\_Created) 3NF

Users(User\_ID, FirstName, LastName, Email, Biography, User\_Type) 3NF

Experts(Expert\_ID, Qualification, Graduation\_year, place\_of\_Training) 3NF

Expertise(Expert\_ID, Skill#, No\_of\_Projects\_Completed) 3NF

Skills(Skill#, Skill\_Name, Level, Category\_Code) 3NF

Skill\_Category(Category\_Code, Category\_Name) 3NF

Functional Dependencies :

Request# → Request\_status, Date\_Created.

User\_ID → FirstName, LastName, Email, Biography, User\_Type.

Expert\_ID → Qualification, Graduation\_year, place\_of\_Training.

Expert\_ID, Skill# → No\_of\_Projects\_Completed.

Skill# → Skill\_Name, Level.

Category\_Code → Category\_Name.

1NF:

- 1- All relations must have a unique primary key.
- 2- Remove repeating groups or remove multi-value attributes.
- 3- All attributes are functionally dependent on all or part of the key.

Our Relations are already in 1NF.

2NF:

- 1- Relations are in 1NF.
- 2- Remove partial dependencies.

Our Relations are already in 2NF.

3NF:

- 1- Relations are in 2NF.
- 2- Remove transitive dependencies.

Our Relations are already in 3NF.

## Phase 3:

The SQL Code: [SkillBlendSQL.zip](#)

### Code Screen Shots :

```
SQL Worksheet

1  CREATE TABLE Users (
2      User_ID number(5,0) ,
3      FirstName VarChar2(13) NOT NULL,
4      LastName VarChar2(20),
5      Email VarChar2(35) NOT NULL CHECK (Email LIKE '%@%.%'),
6      Biography VarChar2(200),
7      User_Type char(1) NOT NULL CHECK (User_Type IN ('E','U')),
8      CONSTRAINT user_pk PRIMARY KEY (User_ID));
9
10 CREATE TABLE Experts (
11     Expert_ID NUMBER(5,0),
12     Qualification VARCHAR2(13) NOT NULL CHECK (Qualification IN ('Masters', 'Doctorate', 'Bachelors', 'Undergraduate', 'Diploma')),
13     Graduation_Year number(4) NOT NULL check (Graduation_Year between 1974 and 2024),
14     place_of_Training VARCHAR2(35),
15     CONSTRAINT exp_pk PRIMARY KEY (Expert_ID),
16     CONSTRAINT exp_fk FOREIGN KEY (Expert_ID) REFERENCES Users(User_ID));
17

Table created.

Table created.
```

```
SQL Worksheet

18 CREATE TABLE Request (
19     Request# INTEGER GENERATED ALWAYS AS IDENTITY (
20         START WITH 1
21         INCREMENT BY 1),
22     User_ID number(5,0) NOT NULL,
23     Expert_ID number(5,0) NOT NULL,
24     Request_Status Varchar2(8) NOT NULL CHECK (Request_Status IN ('Pending','Approved','Done','Declined')),
25     Date_created date default sysdate,
26     CONSTRAINT req_pk PRIMARY KEY (Request#),
27     CONSTRAINT reqUser_fk FOREIGN KEY (User_ID) REFERENCES Users(User_ID),
28     CONSTRAINT reqExp_fk FOREIGN KEY (Expert_ID) REFERENCES Experts(Expert_ID));
29
30 CREATE TABLE Skill_Category(
31     Category_code Varchar2(4),
32     Category_Name varchar2(35) NOT NULL,
33     CONSTRAINT Catg_pk PRIMARY KEY (Category_code));
34

Table created.

Table created.
```

## SQL Worksheet

```
35 v CREATE TABLE Skills(  
36     Skill# INTEGER GENERATED ALWAYS AS IDENTITY (  
37         START WITH 1  
38         INCREMENT BY 1),  
39     Skill_Name varchar2(25) NOT NULL ,  
40     Skill_Level varchar2(6) NOT NULL CHECK (Skill_Level IN ('EASY','MEDIUM','HARD')),  
41     Category_Code Varchar2(4) NOT NULL,  
42     CONSTRAINT skill_pk PRIMARY KEY (Skill#),  
43     CONSTRAINT skill_fk FOREIGN KEY (Category_Code) REFERENCES Skill_Category(Category_code));  
44  
45 v CREATE TABLE Expertise(  
46     Expert_ID number(5,0) NOT NULL REFERENCES Experts(Expert_ID),  
47     Skill# INTEGER NOT NULL REFERENCES Skills(Skill#),  
48     No_of_Projects_Completed INTEGER NOT NULL,  
49     CONSTRAINT Expertise_pk PRIMARY KEY (Expert_ID , Skill#));  
50  
51
```

Table created.

Table created.

## SQL Worksheet

Clear Find

```
51  
52 INSERT INTO USERS values (1024, 'Layan', 'Kandil', '2210192@uj.edu.sa','a Student at UOJ, looking for ways to develop in cyber security.', 'U');  
53 v INSERT INTO USERS values (1080, 'Sara', 'Alharbi', 'saraH21@gmail.com','Sara alharbi, cybersecurity red team with 8 years experience  
54     looking forward to help you develop and reach your cyber dream', 'E');  
55 v INSERT INTO USERS values (1029, 'Dema', 'Alshehri', '2211090@uj.edu.sa','a Student at UOJ, aspire to develop myself and expand my expertise in the field  
56 of CHFI', 'U');  
57 INSERT INTO USERS values (1030, 'Lamar', 'Alsaad', 'LamarSaad@gmail.com','Data Science Student at UOJ, I want to enhance my skills in machine learning"', 'U');  
58 v INSERT INTO USERS values (1000,'hnouf','Alharbi','2212908@uj.edu.sa','AI Robotics Engineer Experienced in utilizing software and  
59     computer-based systems for designing robots','E');  
60 INSERT INTO USERS values(1111,'Leen','Alotaipi','leen22@gmail.com','a Student at UOJ, looking for ways to learn in AI ', 'U');  
61 INSERT INTO USERS (User_ID, FirstName, LastName, Email, User_Type) values (10973, 'Renad', 'Alghamdi', 'ren11@gmail.com', 'E');  
62 INSERT INTO USERS values (1010, 'Yara', 'Alamri', '2210362@uj.edu.sa','a Student at UOJ, I would like to develop my self in software engineering.', 'U');  
63 INSERT INTO USERS values (10365, 'Joud', 'Baqays', 'JoudBaqays@gmail.com','Joud Baqays, Expert in python programming.', 'E');  
64 INSERT INTO USERS (User_ID, FirstName, LastName, Email, User_Type) values (12031, 'mona', 'shahrani', 'monash@hotmail.com', 'E');  
65
```

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

## SQL Worksheet

```
66
67 INSERT INTO EXPERTS (Expert_ID, Qualification , Graduation_Year) values (1080 , 'Masters', 2013);
68 INSERT INTO EXPERTS values (10973 , 'Masters', 2020 , 'SABIC');
69 INSERT INTO EXPERTS values (1000 , 'Doctorate', 2020 , 'SDAIA');
70 INSERT INTO EXPERTS values (10365 , 'Bachelors', 2022 , 'Stc');
71 INSERT INTO EXPERTS values (12031 , 'Diploma', 2017 , 'SNB Bank');
72
73
74 INSERT INTO REQUEST (User_ID, Expert_ID, Request_Status ) values (1024, 1080 , 'Approved');
75 INSERT INTO REQUEST (User_ID, Expert_ID, Request_Status ) values (1030, 10973 , 'Pending');
76 INSERT INTO REQUEST (User_ID, Expert_ID, Request_Status ) values(1111,1000,'Pending');
77 INSERT INTO REQUEST (User_ID, Expert_ID, Request_Status ) values (1010, 10365 , 'Approved');
78 INSERT INTO REQUEST (User_ID, Expert_ID, Request_Status ) values (1029, 10973 , 'Declined');
79 INSERT INTO REQUEST (User_ID, Expert_ID, Request_Status ) values(1111,12031,'Done');
80
```

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

## SQL Worksheet

```
81
82 INSERT INTO Skill_Category values ('CSEC' , 'Cyber Security');
83 INSERT INTO Skill_Category values ('CP10' , 'Computer Programming');
84 INSERT INTO Skill_Category values ('CHFI' , 'CHFI Certification');
85 INSERT INTO Skill_Category values ('DS' , 'Machine Learning ');
86 INSERT INTO Skill_Category values ('AI' , 'Artificial intelligence');
87 INSERT INTO Skill_Category values ('SWE' , 'software engineering');
88 INSERT INTO Skill_Category values ('IT' , 'information technology');
89
90
91 INSERT INTO Skills (Skill_Name, Skill_Level, Category_Code) values ('Java programming', 'MEDIUM', 'CP10');
92 INSERT INTO Skills (Skill_Name, Skill_Level, Category_Code) values ('Red team attacking', 'MEDIUM', 'CSEC');
93 INSERT INTO Skills (Skill_Name, Skill_Level, Category_Code) values ('cyber analysis', 'HARD', 'CSEC');
94 INSERT INTO Skills (Skill_Name, Skill_Level, Category_Code) values ('CHFI Certification ', 'HARD', 'CHFI');
95 INSERT INTO Skills (Skill_Name, Skill_Level, Category_Code) values ('Data analysis', 'MEDIUM', 'DS');
96 INSERT INTO Skills (Skill_Name, Skill_Level, Category_Code) values ('image processing', 'MEDIUM', 'AI');
97 INSERT INTO Skills (Skill_Name, Skill_Level, Category_Code) values (' UI/UX Design ', 'EASY', 'SWE');
98 INSERT INTO Skills (Skill_Name, Skill_Level, Category_Code) values ('Robotics Engineering', 'MEDIUM', 'AI');
99 INSERT INTO Skills (Skill_Name, Skill_Level, Category_Code) values ('python programming', 'MEDIUM', 'SWE');
100 INSERT INTO Skills (Skill_Name, Skill_Level, Category_Code) values ('IT service management', 'HARD', 'IT');
101
```

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.



## SQL Worksheet

```
101
102
103 INSERT INTO Expertise values (1080, 1 , 12);
104 INSERT INTO Expertise values (1080, 2 , 36);
105 INSERT INTO Expertise values (1080, 3 , 24);
106 INSERT INTO Expertise values (10973, 4 , 16);
107 INSERT INTO Expertise values (1000, 5 , 32);
108 INSERT INTO Expertise values (10973, 6, 11);
109 INSERT INTO Expertise values (10973, 7 , 26 );
110 INSERT INTO Expertise values (1000, 8, 10);
111 INSERT INTO Expertise values (10365, 9 , 15);
112 INSERT INTO Expertise values (12031, 10, 42);
113 |
114
```

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

## Queries :

**SQL Worksheet**

```
145
146 v Select Max(sum(NO_OF_PROJECTS_COMPLETED)) AS Experts_maximum_projects,
147       Min(sum(NO_OF_PROJECTS_COMPLETED)) AS Experts_minimum_projects
148   from expertise
149   Group by Expert_ID;
150
151 v SELECT E.Expert_ID, E.Qualification, E.Graduation_Year, S.Skill_name , ES.No_of_Projects_Completed
152   FROM EXPERTS E
153  JOIN Expertise ES ON E.Expert_ID = ES.Expert_ID
154  JOIN Skills S ON S.Skill# = ES.Skill#
155  where ES.Skill# IN (Select Skill# From Skills where Category_Code = 'CSEC')
156  ORDER BY E.Graduation_Year ;
157
```

EXPERTS_MAXIMUM_PROJECTS	EXPERTS_MINIMUM_PROJECTS
72	15

[Download CSV](#)

EXPERT_ID	QUALIFICATION	GRADUATION_YEAR	SKILL_NAME	NO_OF_PROJECTS_COMPLETED
1080	Masters	2013	cyber analysis	24
1080	Masters	2013	Red team attacking	36

[Download CSV](#)

2 rows selected.

**SQL Worksheet**

```
113
114 v Select (FirstName || ' ' || LastName) As User_Name , COUNT(Request#) AS Request_Count
115   From Users join Request ON users.user_ID = Request.User_ID
116   Where user_type = 'U'
117   Group By FirstName , LastName;
118
```

USER_NAME	REQUEST_COUNT
Yara Alamri	1
Dema Alshehri	1
Lamar Alsaad	1
Leen Alotaipi	2
Layan Kandil	1

[Download CSV](#)

5 rows selected.

### SQL Worksheet

```
134 v SELECT Request_Status, COUNT(Request#) AS Request_Count
135 FROM REQUEST
136 GROUP BY Request_Status;
137
138 v Select (FirstName || ' ' || LastName) As Expert_Name
139 From Users Where User_ID IN ( Select Expert_ID from Request );
```

REQUEST_STATUS	REQUEST_COUNT
Done	1
Pending	2
Declined	1
Approved	2

Download CSV

4 rows selected.

EXPERT_NAME
Sara Alharbi
Renad Alghamdi
hnouf Alharbi
Joud Baqays
mona shahrani

### SQL Worksheet

```
114
115 v Select (FirstName || ' ' || LastName) As FullName , sum(No_Of_projects_completed) as total_projects
116 From Users inner join Experts on User_id = Expert_id inner join Expertise on Experts.Expert_id = Expertise.Expert_id
117 Group By FirstName, LastName;
118
```

FULLNAME	TOTAL_PROJECTS
Sara Alharbi	72
hnouf Alharbi	42
Renad Alghamdi	53
mona shahrani	42
Joud Baqays	15

Download CSV

5 rows selected.

## SQL Worksheet

```
114
115 v select FirstName , lastName , Qualification , skill_name as skill , No_of_Projects_Completed
116 from Users inner Join Experts on User_id = Expert_id
117     inner Join Expertise on Experts.Expert_id = Expertise.Expert_id
118     inner join skills on skills.Skill# = Expertise.Skill#
119 order by FirstName;
```

FIRSTNAME	LASTNAME	QUALIFICATION	SKILL	NO_OF_PROJECTS_COMPLETED
Joud	Baqays	Bachelors	python programming	15
Renad	Alghamdi	Masters	CHFI Certification	16
Renad	Alghamdi	Masters	image processing	11
Renad	Alghamdi	Masters	UI/UX Design	26
Sara	Alharbi	Masters	Java programming	12
Sara	Alharbi	Masters	Red team attacking	36
Sara	Alharbi	Masters	cyber analysis	24
hnouf	Alharbi	Doctorate	Robotics Engineering	10
hnouf	Alharbi	Doctorate	Data analysis	32
mona	shahrani	Diploma	IT service management	42

Download CSV

10 rows selected.

## SQL Worksheet

```
113
114 v Select (u.FirstName || ' ' || u.LastName) As User_name,
115     (exp.FirstName || ' ' || exp.LastName) As Expert_name, Request_Status
116 From Request inner join Users u on Request.User_ID = u.User_ID
117     inner join Experts on Request.Expert_ID = Experts.Expert_ID
118     inner join Users exp ON Experts.Expert_ID = exp.User_ID
119 order by Request_Status;
```

USER_NAME	EXPERT_NAME	REQUEST_STATUS
Layan Kandil	Sara Alharbi	Approved
Yara Alamri	Joud Baqays	Approved
Dema Alshehri	Renad Alghamdi	Declined
Leen Alotaipi	mona shahrani	Done
Lamar Alsaad	Renad Alghamdi	Pending
Leen Alotaipi	hnouf Alharbi	Pending

Download CSV

6 rows selected.

# SQL Worksheet

```
113
114  Select Distinct Skill_Name ,Skill_Level from Skills order by Skill_Level ;
115
```

SKILL_NAME	SKILL_LEVEL
UI/UX Design	EASY
CHFI Certification	HARD
IT service management	HARD
cyber analysis	HARD
Data analysis	MEDIUM
Java programming	MEDIUM
Red team attacking	MEDIUM
Robotics Engineering	MEDIUM
image processing	MEDIUM
python programming	MEDIUM

Download CSV

10 rows selected.

## Procedures :

### SQL Worksheet

```
130 √ CREATE OR REPLACE PROCEDURE usertype(ID IN users.User_ID%TYPE) AS
131     fstName users.FIRSTNAME%TYPE;
132     LstName users.LastName%TYPE;
133     UserType users.User_Type%TYPE;
134 √ BEGIN
135     SELECT FIRSTNAME , LASTNAME, User_Type
136     INTO fstName, LstName , UserType
137     FROM users WHERE User_ID = ID;
138
139 √ if (UserType = 'U') Then
140     dbms_output.put_line(fstName || ' ' || LstName || ' is a simple user.');
```

```
141 ELSE
142     dbms_output.put_line(fstName || ' ' || LstName || ' is an Expert user.');
```

```
143 End if;
144 END;
145
146 call usertype(1024);
**
```

### SQL Worksheet

```
150
151
152
153 √ CREATE OR REPLACE PROCEDURE projectsCheck (projectsNum Number) AS
154     CURSOR projects IS
155     Select (FirstName || ' ' || LastName) As FullName , sum(No_Of_projects_completed) as total_projects
156     From Users inner join Experts on User_id = Expert_id inner join Expertise on Experts.Expert_id = Expertise.Expert_id
157     where No_of_Projects_Completed >= projectsNum
158     Group By FirstName, LastName;
159 √ Begin
160     For print IN projects LOOP
161         dbms_output.put_line('The Expert ' || print.FullName || ' Finished ' || print.total_projects || ' Projects ' );
162     End LOOP;
163 End projectsCheck;
164
165 EXECUTE projectsCheck (20);
166
167
```

```
Statement processed.
The Expert Sara Alharbi Finished 60 Projects
The Expert hnouf Alharbi Finished 32 Projects
The Expert Renad Alghamdi Finished 26 Projects
The Expert mona shahrani Finished 42 Projects
```

## SQL Worksheet

```
114
115 ✓ CREATE OR REPLACE PROCEDURE UpdateRqeStat(RequestNum IN REQUEST.Request#%Type, Status IN REQUEST.Request_Status%Type) AS
116 BEGIN
117 UPDATE REQUEST SET Request_Status = Status WHERE RequestNum = Request#;
118 dbms_output.put_line('Request status for request number ' || RequestNum || ' has been updated.');
```

119 END;

```
120
121 ✓ CREATE OR REPLACE PROCEDURE UpdateBiography(ID IN Users.User_ID%Type, newBio IN Users.Biography%Type) AS
122 BEGIN
123 UPDATE Users SET Biography = newBio WHERE ID = User_ID;
124 dbms_output.put_line('Biography for user ' || ID || ' has been updated.');
```

125 END;

```
126
127 call UpdateRqeStat(1, 'Done');
```

128 call UpdateBiography (10973, 'For Further assistant you can contact me via email : ren11@gmail.com');

129

Statement processed.  
Request status for request number 1 has been updated.

Statement processed.  
Biography for user 10973 has been updated.

### SQL Worksheet

Clear

Find

Actions

```
200
201 CREATE OR REPLACE PROCEDURE AddNewUser (U_ID users.User_ID%TYPE ,U_firstName users.FIRSTNAME%TYPE, U_LastName users.LastName%TYPE,
202     U_Type users.User_Type%TYPE, U_Email users.Email%TYPE ) AS
203     Begin
204     INSERT INTO USERS (User_ID , FirstName , LastName , Email , User_Type)
205     VALUES (U_ID, U_firstName , U_LastName , U_Email , U_Type);
206 End AddNewUser;
207
208
```

Procedure created.

### SQL Worksheet

```
207
208 EXEC AddNewUser (11034 , 'Tala' , 'Alamri' , 'U' , 'TalaAlamri@gmail.com' );
209
210
211
```

Statement processed.