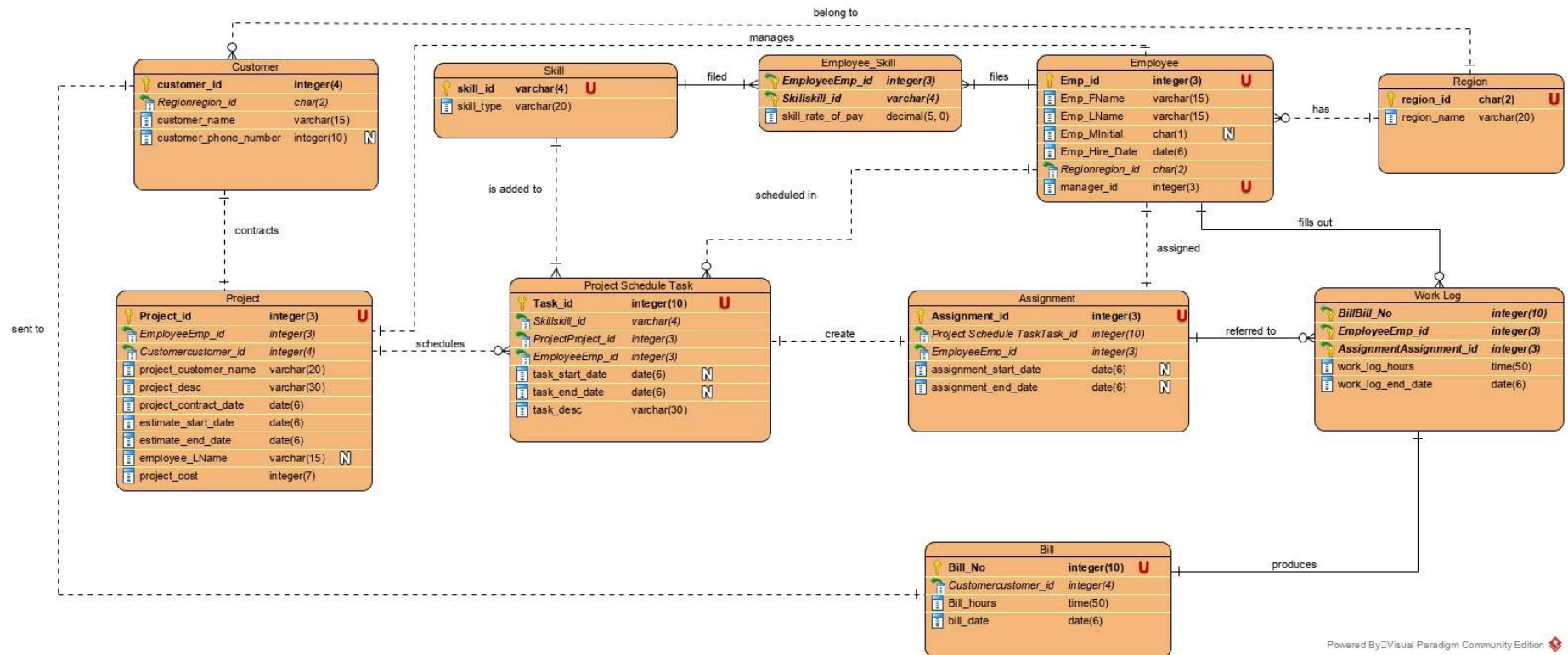


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INFS601

Database Project – Tasks 1, 2, 3

EACH	ENTITY1	May/Must	Relationship	One or Many	ENTITY2
	Employee	must	Come from	one	Region
	Customer	must	Belong to	one	Region
	Employee	must	have	one	Skill
	Employee	may	have	many	Skill
	Employee	may	Be in scheduled	one	Project Schedule Task
	Employee	may	Manage	one	Project
	Employee	must	Be assigned	one	Assignment
	Employee	must	Fill out	one	Work Log
	Skill	may	have	many	Employee
	Skill	must	Be added to	many	Project Schedule Task
	Project	must	Have a contract	one	Customer
	Project	must	Schedule	many	Project Schedule Task
	Project	must	have	one	Employee Manager
	Project Schedule Task	may	create	one	Assignment
	Project Schedule Task	must	Have added	One	Skill
	Assignment	must	Be created from	one	Project Schedule Task
	Assignment	must	Referred to	one	Work log
	Work log	must	Be filled out by	one	Employee
	Work log	must	Refer to	one	Assignment
	Work log	must	Produce	one	Bill
	Bill	must	Refer to	one	Work log
	Bill	must	Be sent to	one	Customer
	Customer	may	receive	one	Bill



- Employee and Skills have a many-to-many relationship. Hence created bridge table with composite primary key.
- Employee Skill Inventory and Work Log are weak Entities.
- Employee Skill Inventory and Work Log have strong relationships with other connecting relationships.
- The rest of the entities are strong with weak relationships.

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INFS601

Normalisation

- Projects

Project ID:	1	Description:	Sales Management System			
Company:	See Rocks	Contract Date:	2/12/2010	As of:	03/29/10	
SCHEDULED				ACTUAL ASSIGNMENTS		
Project Task	Start Date	End Date	Skill	Employee	Start Date	End Date
Initial Interview	3/1/16	3/6/16	Project Mgr.	101—Connor S.	3/1/16	3/6/16
			Sys. Analyst II	102—Burklow S.	3/1/16	3/6/16
			DB Designer I	103—Smith M.	3/1/16	3/6/16
Database Design	3/11/16	3/15/16	DB Designer I	104—Smith M.	3/11/16	3/14/16
System Design	3/11/16	4/12/16	Sys. Analyst II	105—Burklow S.	3/11/16	
			Sys. Analyst I	106—Bush E.	3/11/16	
			Sys. Analyst I	107—Zebras S.	3/11/16	
Database Implementation	3/18/16	3/22/16	Oracle DBA	108—Smith J.	3/15/16	3/19/16
System Coding & Testing	3/25/16	5/20/16	Oracle Developer I	109—Summers A.	3/21/16	
			Oracle Developer II	110—Ellis M.	3/21/16	
			Oracle DBA	111—Ephanor V.	3/21/16	
				112—Smith J.	3/21/16	
System Documentation	3/25/16	6/7/16	Tech. Writer	113—Kilby S.	3/25/16	
Final Evaluation	6/10/16	6/14/16	Project Mgr. Sys. Analyst II DB Designer I Oracle DBA			
On-Site System Online and Data Loading	6/17/16	6/21/16	Project Mgr. Sys. Analyst II DB Designer I Oracle DBA			
Sign-Off	7/1/16	7/1/16	Project Mgr.			

Table 3 Project Assignment Form

- This table is not in 1NF because of multivalued attributes.
- Must remove the repeating groups by filling relevant data values into the vacant cells of the table.

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P_ID	Customer	DESC	Contract date	Project Task	Start Date	End Date	Skill	Assignment id	Employee	Start Date	End Date
1	See Rocks	Sales Management System	2/12/2010	Initial Interview	3/1/16	3/6/16	Project Mgr.	101	Connor S.	3/1/16	3/6/16
1	See Rocks	Sales Management System	2/12/2010	Initial Interview	3/1/16	3/6/16	Sys. Analyst II	102	Burklow S.	3/1/16	3/6/16
1	See Rocks	Sales Management System	2/12/2010	Initial Interview	3/1/16	3/6/16	DB Designer I	103	Smith M.	3/1/16	3/6/16
1	See Rocks	Sales Management System	2/12/2010	Database Design	3/11/16	3/15/16	DB Designer I	104	Smith M.	3/11/16	3/14/16
1	See Rocks	Sales Management System	2/12/2010	System Design	3/11/16	4/12/16	Sys. Analyst II	105	Burklow S.	3/11/16	
1	See Rocks	Sales Management System	2/12/2010	System Design	3/11/16	4/12/16	Sys. Analyst I Sys.	106	Bush E.	3/11/16	
1	See Rocks	Sales Management System	2/12/2010	System Design	3/11/16	4/12/16	Analyst I	107	Zebras S.	3/11/16	
1	See Rocks	Sales Management System	2/12/2010	Database Implementation	3/18/16	3/22/16	Oracle DBA	108	Smith J.	3/15/16	3/19/16
1	See Rocks	Sales Management System	2/12/2010	System Coding & Testing	3/25/16	5/20/16	Oracle Developer	109	Summers A.	3/21/16	
1	See Rocks	Sales Management System	2/12/2010	System Coding & Testing	3/25/16	5/20/16	I Oracle	110	Ellis M.	3/21/16	
1	See Rocks	Sales Management System	2/12/2010	System Coding & Testing	3/25/16	5/20/16	Developer II	111	Ephanor V.	3/21/16	
1	See Rocks	Sales Management System	2/12/2010	System Coding & Testing	3/25/16	5/20/16	Oracle DBA	112	Smith J.	3/21/16	
1	See Rocks	Sales Management System	2/12/2010	System Documentation	3/25/16	6/7/16	Tech. Writer	113	Kilby S.	3/25/16	
1	See Rocks	Sales Management System	2/12/2010	Final Evaluation	6/10/16	6/14/16	Project Mgr.				
1	See Rocks	Sales Management System	2/12/2010	Final Evaluation	6/10/16	6/14/16	Sys. Analyst II				
1	See Rocks	Sales Management System	2/12/2010	Final Evaluation	6/10/16	6/14/16	DB Designer I				
1	See Rocks	Sales Management System	2/12/2010	Final Evaluation	6/10/16	6/14/16	Oracle DBA				
1	See Rocks	Sales Management System	2/12/2010	On-Site System	6/17/16	6/21/16	Project Mgr.				

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				Online and Data Loading							
1	See Rocks	Sales Management System	2/12/2010	On-Site System Online and Data Loading	6/17/16	6/21/16	Sys. Analyst II				
1	See Rocks	Sales Management System	2/12/2010	On-Site System Online and Data Loading	6/17/16	6/21/16	DB Designer I				
1	See Rocks	Sales Management System	2/12/2010	On-Site System Online and Data Loading	6/17/16	6/21/16	Oracle DBA				
1	See Rocks	Sales Management System	2/12/2010	Sign-Off	7/1/16	7/1/16	Project Mgr.				

- The table is in 1NF
- The table is not in 2NF due to it's partial dependencies.
- Primary key = Project_id, Assignment_id
- Partial dependency – Project_id → customer_id, description, contract_date, est_start_date, est_end_date, employee_id
- Partial dependency – Assignment_id → employee_id, date assignment starts, and date assignment ends

P_ID	Customer	DESC	Contract date	Project Task	Start Date	End Date	Skill	Assignment id	Employee	Start Date	End Date
------	----------	------	---------------	--------------	------------	----------	-------	---------------	----------	------------	----------

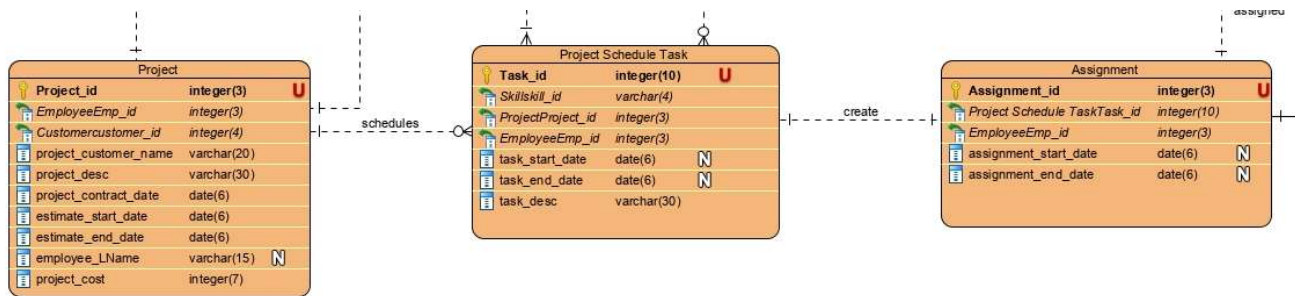
Project

Project_id	customer_id	description	contract_date	est_start_date	est_end_date	employee_id
------------	-------------	-------------	---------------	----------------	--------------	-------------

Assignment_id	task_id	employee_id	date assignment starts	date assignment ends
---------------	---------	-------------	------------------------	----------------------

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INFS601

- No partial dependencies
- No transitive dependencies
- Tables are in 3NF.



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INFS601

Work Log

Employee Name	Week Ending	Assignment Number	Hours Worked	Bill Number
Burklow S.	3/1/16	1-102	4	xxx
Connor S.	3/1/16	1-101	4	xxx
Smith M.	3/1/16	1-103	4	xxx
Burklow S.	3/8/16	1-102	24	xxx
Connor S.	3/8/16	1-101	24	xxx
Smith M.	3/8/16	1-103	24	xxx
Burklow S.	3/15/16	1-105	40	xxx
Bush E.	3/15/16	1-106	40	xxx
Smith J.	3/15/16	1-108	6	xxx
Smith M.	3/15/16	1-104	32	xxx
Zebras S.	3/15/16	1-107	35	xxx
Burklow S.	3/22/16	1-105	40	
Bush E.	3/22/16	1-106	40	
Ellis M.	3/22/16	1-110	12	
Ephanor V.	3/22/16	1-111	12	
Smith J.	3/22/16	1-108	12	
Smith J.	3/22/16	1-112	12	
Summers A.	3/22/16	1-109	12	
Zebras S.	3/22/16	1-107	35	
Burklow S.	3/29/16	1-105	40	
Bush E.	3/29/16	1-106	40	
Ellis M.	3/29/16	1-110	35	
Ephanor V.	3/29/16	1-111	35	
Kilby S.	3/29/16	1-113	40	
Smith J.	3/29/16	1-112	35	
Summers A.	3/29/16	1-109	35	
Zebras S.	3/29/16	1-107	35	
Note: xxx represents the bill ID. Use the one that matches the bill number in your database.				

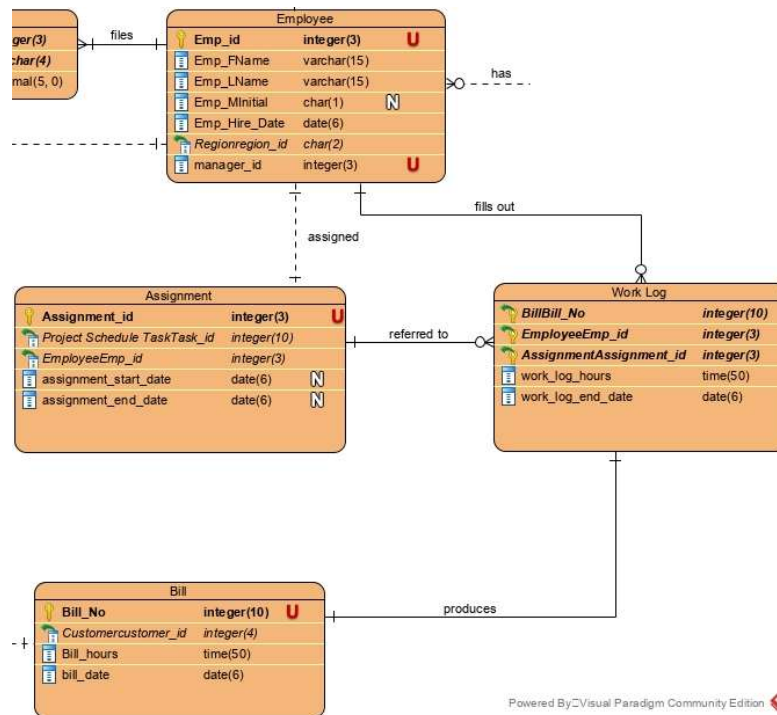
Table 4 Project Work-Log Form as of 3/29/16

- No multivalued attributes and no repeated values
- Table is in 1NF

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INFS601

- Full dependency = bill no. + assignment_id = hours worked and end week dates
- Composite PK: bill no. + assignment_id
- Table is in 2NF since there are no partial dependencies.
- Not in 3NF due to transitive dependencies.
- Employee, Assignment and Bill are separate entities.
- Employee_id is a FK



drop table REGION cascade constraints;
drop table EMPLOYEE cascade constraints;
drop table EMP_SKILL_INVENTORY cascade constraints;
drop table SKILL cascade constraints;
drop table CUSTOMER cascade constraints;
drop table PROJECTS cascade constraints;
drop table PROJECT_SCHEDULE_TASK cascade constraints;
drop table ASSIGNMENT cascade constraints;
drop table BILL cascade constraints;
drop table WORK_LOG cascade constraints;

```
CREATE TABLE REGION
( region_id    VARCHAR2(2) CONSTRAINT region_id_nn NOT NULL,
  region_name  VARCHAR2(20)
);
```

```
ALTER TABLE REGION
ADD ( CONSTRAINT region_id_pk
      PRIMARY KEY (region_id)
);
```

```
CREATE TABLE SKILL
( skill_id    CHAR(4) CONSTRAINT skill_id_nn NOT NULL,
  skill_type  VARCHAR2(20)
);
```

```
ALTER TABLE SKILL
ADD ( CONSTRAINT skill_skill_id_pk PRIMARY KEY (skill_id)
);
```

```
CREATE TABLE EMPLOYEE
( employee_id  NUMBER(3) CONSTRAINT employee_id_nn NOT NULL,
  employee_FName VARCHAR2(20),
  employee_LName VARCHAR2(20),
  employee_MInitial VARCHAR(1),
  hire_date    DATE,
  manager_id   NUMBER(3),
  region_id    VARCHAR2(2)
);
```

```
ALTER TABLE EMPLOYEE
ADD ( CONSTRAINT employee_employee_id_pk PRIMARY KEY (employee_id),
      CONSTRAINT employee_region_id_fk FOREIGN KEY (region_id) REFERENCES REGION,
      CONSTRAINT employee_manager_id_fk FOREIGN KEY (manager_id) REFERENCES EMPLOYEE
);
```

```
CREATE TABLE EMP_SKILL_INVENTORY
( employee_id  NUMBER(3),
  skill_id     CHAR(4),
  rate_of_pay  DECIMAL(5,0),
```

```
CONSTRAINT EMP_SKILL_INVENTORY_fk1 FOREIGN KEY (employee_id) REFERENCES EMPLOYEE(
```

```
employee_id),  
    CONSTRAINT EMP_SKILL_INVENTORY_fk2 FOREIGN KEY (skill_id) REFERENCES SKILL(skill_id)  
);
```

```
ALTER TABLE EMP_SKILL_INVENTORY  
ADD(CONSTRAINT EMP_SKILL_INVENTORY_pk PRIMARY KEY (employee_id, skill_id)  
);
```

```
CREATE TABLE CUSTOMER  
( customer_id  NUMBER(4) CONSTRAINT customer_id_nn NOT NULL,  
  customer_name VARCHAR2(20),  
  customer_phone_no NUMBER(10),  
  region_id    VARCHAR2(2)  
);
```

```
ALTER TABLE CUSTOMER  
ADD ( CONSTRAINT  customer_customer_id_pk PRIMARY KEY (customer_id),  
    CONSTRAINT  customer_region_id_fk FOREIGN KEY (region_id) REFERENCES REGION  
);
```

```
CREATE TABLE PROJECTS  
( project_id  NUMBER(3) CONSTRAINT project_id_nn NOT NULL,  
  customer_id  NUMBER(4),  
  employee_id  NUMBER(3),  
  project_description VARCHAR2(30),  
  contract_date DATE,  
  project_cost NUMBER(7),  
  estimate_start_date DATE,  
  estimate_end_date DATE  
);
```

```
ALTER TABLE PROJECTS  
ADD ( CONSTRAINT  projects_project_id_pk PRIMARY KEY (project_id),  
    CONSTRAINT  projects_customer_id_fk FOREIGN KEY (customer_id) REFERENCES CUSTOMER,  
    CONSTRAINT  projects_employee_id_fk FOREIGN KEY (employee_id) REFERENCES EMPLOYEE  
);
```

```
CREATE TABLE PROJECT_SCHEDULE_TASK  
( task_id  NUMBER(6) CONSTRAINT task_id_nn NOT NULL,  
  project_id  NUMBER(3),  
  employee_id  NUMBER(3),  
  skill_id  CHAR(4),  
  task_description VARCHAR2(30),  
  start_date DATE,  
  end_date DATE  
);
```

```
ALTER TABLE PROJECT_SCHEDULE_TASK  
ADD ( CONSTRAINT  task_task_id_pk PRIMARY KEY (task_id),  
    CONSTRAINT  task_project_id_fk FOREIGN KEY (project_id) REFERENCES PROJECTS,  
    CONSTRAINT  task_employee_id_fk FOREIGN KEY (employee_id) REFERENCES EMPLOYEE,  
    CONSTRAINT  task_skill_id_fk FOREIGN KEY (skill_id) REFERENCES SKILL
```

);

CREATE TABLE ASSIGNMENT

(assignment_id NUMBER(3) CONSTRAINT assignment_id_nn NOT NULL,
task_id NUMBER(6),
employee_id NUMBER(3),
start_date DATE,
end_date DATE
);

ALTER TABLE ASSIGNMENT

ADD (CONSTRAINT assignment_assignment_id_pk PRIMARY KEY (assignment_id),
CONSTRAINT assignment_task_id_fk FOREIGN KEY (task_id) REFERENCES PROJECT_SCHEDULE_
TASK,
CONSTRAINT assignment_employee_id_fk FOREIGN KEY (employee_id) REFERENCES EMPLOYEE
);

CREATE TABLE BILL

(bill_no NUMBER(10) CONSTRAINT bill_no_nn NOT NULL,
customer_id NUMBER(4),
hours_worked NUMBER(2),
bill_date DATE
);

ALTER TABLE BILL

ADD (CONSTRAINT bill_bill_no_pk PRIMARY KEY (bill_no),
CONSTRAINT bill_customer_id_fk FOREIGN KEY (customer_id) REFERENCES CUSTOMER
);

CREATE TABLE WORK_LOG

(employee_id NUMBER(3),
assignment_id NUMBER(3),
bill_no NUMBER(10),
log_hours NUMBER(2),
log_date DATE,

CONSTRAINT WORK_LOG_fk1 FOREIGN KEY (employee_id) REFERENCES EMPLOYEE(employee_id),
CONSTRAINT WORK_LOG_fk2 FOREIGN KEY (assignment_id) REFERENCES ASSIGNMENT(assignment_id)
);

ALTER TABLE WORK_LOG

ADD(CONSTRAINT work_log_pk PRIMARY KEY (employee_id, assignment_id),
CONSTRAINT work_log_billno_fk FOREIGN KEY (bill_no) REFERENCES BILL
);

COMMIT;

DESC REGION;

INSERT INTO REGION VALUES

('NW', 'Northwest'
);

INSERT INTO REGION VALUES

```
( 'SW', 'Southwest'
);
INSERT INTO REGION VALUES
( 'MN', 'Midwest North'
);
INSERT INTO REGION VALUES
( 'MS', 'Midwest South'
);
INSERT INTO REGION VALUES
( 'NE', 'Northeast'
);
INSERT INTO REGION VALUES
( 'SE', 'Southeast'
);
```

```
SELECT * FROM REGION;
```

```
DESC SKILL;
INSERT INTO SKILL VALUES
( 'DAT1', 'Data Entry I'
);
INSERT INTO SKILL VALUES
( 'DAT2', 'Data Entry II'
);
INSERT INTO SKILL VALUES
( 'SYS1', 'Systems Analyst I'
);
INSERT INTO SKILL VALUES
( 'SYS2', 'Systems Analyst II'
);
INSERT INTO SKILL VALUES
( 'DBD1', 'DB Designer I'
);
INSERT INTO SKILL VALUES
( 'DBD2', 'DB Designer II'
);
INSERT INTO SKILL VALUES
( 'ODV1', 'Oracle Developer I'
);
INSERT INTO SKILL VALUES
( 'ODV2', 'Oracle Developer II'
);
INSERT INTO SKILL VALUES
( 'C++1', 'Programmer I'
);
INSERT INTO SKILL VALUES
( 'C++2', 'Programmer II'
);
INSERT INTO SKILL VALUES
( 'ASP1', 'ASP I'
);
INSERT INTO SKILL VALUES
```

```

        ('ASP2', 'ASP II'
    );
INSERT INTO SKILL VALUES
    ('WEBA', 'Web Admin'
    );
INSERT INTO SKILL VALUES
    ('PRMR', 'Project Manager'
    );
INSERT INTO SKILL VALUES
    ('ODBA', 'Oracle DBA'
    );
INSERT INTO SKILL VALUES
    ('TECH', 'Technical Writer'
    );

select * from skill;
DESC EMPLOYEE;
INSERT INTO EMPLOYEE VALUES
    ( 101, 'Sean', 'Connor', 'S', TO_DATE('01-MAR-2015', 'dd-MON-yyyy'), 101, 'NW'
    );
INSERT INTO EMPLOYEE VALUES
    ( 102, 'Shane', 'Burklow', 'S', TO_DATE('01-MAR-2015', 'dd-MON-yyyy'), NULL, 'SE'
    );
INSERT INTO EMPLOYEE VALUES
    ( 103, 'Mary', 'Smith', 'M', TO_DATE('29-APR-2015', 'dd-MON-yyyy'), NULL, 'NE'
    );
INSERT INTO EMPLOYEE VALUES
    ( 104, 'Emily', 'Bush', 'E', TO_DATE('30-APR-2015', 'dd-MON-yyyy'), NULL, 'MS'
    );
INSERT INTO EMPLOYEE VALUES
    ( 105, 'Steve', 'Zebras', 'S', TO_DATE('01-MAY-2015', 'dd-MON-yyyy'), NULL, 'MN'
    );
INSERT INTO EMPLOYEE VALUES
    ( 106, 'Anna', 'Summers', 'A', TO_DATE('01-MAY-2015', 'dd-MON-yyyy'), NULL, 'SW'
    );
INSERT INTO EMPLOYEE VALUES
    ( 107, 'Maria', 'Ellis', 'M', TO_DATE('01-MAY-2015', 'dd-MON-yyyy'), NULL, 'NW'
    );
INSERT INTO EMPLOYEE VALUES
    ( 108, 'Jose', 'Smith', 'J', TO_DATE('02-JUN-2015', 'dd-MON-yyyy'), NULL, 'MN'
    );
INSERT INTO EMPLOYEE VALUES
    ( 109, 'Victor', 'Epahnor', 'V', TO_DATE('30-JUN-2015', 'dd-MON-yyyy'), NULL, 'NE'
    );
INSERT INTO EMPLOYEE VALUES
    ( 110, 'Surgena', 'Kilby', 'S', TO_DATE('30-JUN-2015', 'dd-MON-yyyy'), NULL, 'NE'
    );
SELECT * FROM EMPLOYEE;
COMMIT;
DESC EMP_SKILL_INVENTORY;

INSERT INTO EMP_SKILL_INVENTORY VALUES

```

```

        ( 101,'PRMR', 100
    );
INSERT INTO EMP_SKILL_INVENTORY VALUES
    ( 102,'SYS2', 90
    );
INSERT INTO EMP_SKILL_INVENTORY VALUES
    ( 103,'DBD1', 70
    );
INSERT INTO EMP_SKILL_INVENTORY VALUES
    ( 104,'SYS1', 85
    );
INSERT INTO EMP_SKILL_INVENTORY VALUES
    ( 105,'SYS1', 85
    );
INSERT INTO EMP_SKILL_INVENTORY VALUES
    ( 106,'ODV1', 85
    );
INSERT INTO EMP_SKILL_INVENTORY VALUES
    ( 107,'ODV2', 90
    );
INSERT INTO EMP_SKILL_INVENTORY VALUES
    ( 108,'ODBA', 95
    );
INSERT INTO EMP_SKILL_INVENTORY VALUES
    ( 110,'TECH', 99
    );

```

```

SELECT * FROM EMP_SKILL_INVENTORY;

```

```

DESC CUSTOMER;

```

```

INSERT INTO CUSTOMER VALUES
    ( 001, 'See Rocks', 0800838383, 'NE'
    );

```

```

DESC PROJECTS;
SELECT * FROM CUSTOMER;

```

```

INSERT INTO PROJECTS VALUES
    ( 01, 001, 101, 'Sales Management Sys', TO_DATE('02-DEC-2018', 'dd-MON-yyyy'), 15500,
      TO_DATE('01-MAR-2019', 'dd-MON-yyyy'), TO_DATE('25-MAR-2019', 'dd-MON-yyyy')
    );

```

```

SELECT * FROM PROJECTS;

```

```

DESC PROJECT_SCHEDULE_TASK;

```

```

INSERT INTO PROJECT_SCHEDULE_TASK VALUES
    ( 0001, 01, 101, 'PRMR','Initial Interview', TO_DATE('01-MAR-2019', 'dd-MON-yyyy'), TO_DATE('06-MAR-2019', 'dd-MON-yyyy')
    );
INSERT INTO PROJECT_SCHEDULE_TASK VALUES

```

```

( 0002, 01, 103, 'DBD1','Database Design', TO_DATE('11-MAR-2019', 'dd-MON-yyyy'), TO_DATE('15-MAR-2019', 'dd-MON-yyyy')
);
INSERT INTO PROJECT_SCHEDULE_TASK VALUES
( 0003, 01, 102, 'SYS1','System Design', TO_DATE('11-MAR-2019', 'dd-MON-yyyy'), TO_DATE('12-APR-2019', 'dd-MON-yyyy')
);
INSERT INTO PROJECT_SCHEDULE_TASK VALUES
( 0004, 01, 108, 'ODV2','Database Implementation', TO_DATE('18-MAR-2019', 'dd-MON-yyyy'), TO_DATE('22-MAR-2019', 'dd-MON-yyyy')
);
INSERT INTO PROJECT_SCHEDULE_TASK VALUES
( 0005, 01, 107, 'ODBA','System Coding and Testing', TO_DATE('25-MAR-2019', 'dd-MON-yyyy'), TO_DATE('20-MAY-2019', 'dd-MON-yyyy')
);
INSERT INTO PROJECT_SCHEDULE_TASK VALUES
( 0006, 01, 110, 'TECH','System Documentation', TO_DATE('25-MAR-2019', 'dd-MON-yyyy'), TO_DATE('07-JUN-2019', 'dd-MON-yyyy')
);

select * from project_schedule_task;

DESC Assignment;

INSERT INTO ASSIGNMENT VALUES
( 200, 0001, 101, TO_DATE('01-MAR-2019', 'dd-MON-yyyy'), TO_DATE('06-MAR-2019', 'dd-MON-yyyy')
);

INSERT INTO ASSIGNMENT VALUES
( 201, 0001, 102, TO_DATE('01-MAR-2019', 'dd-MON-yyyy'), TO_DATE('06-MAR-2019', 'dd-MON-yyyy')
);
INSERT INTO ASSIGNMENT VALUES
( 202, 0001, 103, TO_DATE('01-MAR-2019', 'dd-MON-yyyy'), TO_DATE('06-MAR-2019', 'dd-MON-yyyy')
);
INSERT INTO ASSIGNMENT VALUES
( 203, 0002, 103, TO_DATE('11-MAR-2019', 'dd-MON-yyyy'), TO_DATE('15-MAR-2019', 'dd-MON-yyyy')
);
INSERT INTO ASSIGNMENT VALUES
( 204, 0003, 102, TO_DATE('11-MAR-2019', 'dd-MON-yyyy'), TO_DATE('12-APR-2019', 'dd-MON-yyyy')
);
INSERT INTO ASSIGNMENT VALUES
( 205, 0003, 104, TO_DATE('11-MAR-2019', 'dd-MON-yyyy'), TO_DATE('12-APR-2019', 'dd-MON-yyyy')
);
INSERT INTO ASSIGNMENT VALUES
( 206, 0003, 105, TO_DATE('11-MAR-2019', 'dd-MON-yyyy'), TO_DATE('12-APR-2019', 'dd-MON-yyyy')
);
SELECT * FROM ASSIGNMENT;

DESC BILL;

INSERT INTO BILL VALUES
( 00000001, 001, 4, TO_DATE('03-MAR-2019', 'dd-MON-yyyy')

```

```
);
INSERT INTO BILL VALUES
  ( 00000002, 001, 24, TO_DATE('08-MAR-2019', 'dd-MON-yyyy')
  );
INSERT INTO BILL VALUES
  ( 00000003, 001, 40, TO_DATE('15-MAR-2019', 'dd-MON-yyyy')
  );
INSERT INTO BILL VALUES
  ( 00000004, 001, 6, TO_DATE('15-MAR-2019', 'dd-MON-yyyy')
  );
INSERT INTO BILL VALUES
  ( 00000005, 001, 12, TO_DATE('22-MAR-2019', 'dd-MON-yyyy')
  );
INSERT INTO BILL VALUES
  ( 00000006, 001, 35, TO_DATE('29-MAR-2019', 'dd-MON-yyyy')
  );

SELECT * FROM BILL;

DESC WORK_LOG;

INSERT INTO WORK_LOG VALUES
  ( 102, 200, 00000001, 4, TO_DATE('03-MAR-2019', 'dd-MON-yyyy')
  );

INSERT INTO WORK_LOG VALUES
  ( 101, 200, 00000001, 4, TO_DATE('03-MAR-2019', 'dd-MON-yyyy')
  );
INSERT INTO WORK_LOG VALUES
  ( 103, 200, 00000001, 4, TO_DATE('03-MAR-2019', 'dd-MON-yyyy')
  );
SELECT * FROM WORK_LOG;

COMMIT;
```


Table REGION created.

Table REGION altered.

Table SKILL created.

Table SKILL altered.

Table EMPLOYEE created.

Table EMPLOYEE altered.

Table EMP_SKILL_INVENTORY created.

Table EMP_SKILL_INVENTORY altered.

Table CUSTOMER created.

Table CUSTOMER altered.

Table PROJECTS created.

Table PROJECTS altered.

Table PROJECT_SCHEDULE_TASK created.

Table PROJECT_SCHEDULE_TASK altered.

Table ASSIGNMENT created.

Table ASSIGNMENT altered.

Table BILL created.

Table BILL altered.

Table WORK_LOG created.

Table WORK_LOG altered.

Commit complete.

Name	Null?	Type
------	-------	------

```

-----
REGION_ID    NOT NULL VARCHAR2(2)
REGION_NAME          VARCHAR2(20)

```

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

```

RE REGION_NAME
-- -----
NW Northwest
SW Southwest
MN Midwest North
MS Midwest South
NE Northeast
SE Southeast

```

6 rows selected.

```

Name          Null?    Type
-----
SKILL_ID      NOT NULL CHAR(4)
SKILL_TYPE          VARCHAR2(20)

```

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

SKIL SKILL_TYPE

DAT1 Data Entry I
DAT2 Data Entry II
SYS1 Systems Analyst I
SYS2 Systems Analyst II
DBD1 DB Designer I
DBD2 DB Designer II
ODV1 Oracle Developer I
ODV2 Oracle Developer II
C++1 Programmer I
C++2 Programmer II
ASP1 ASP I

SKIL SKILL_TYPE

ASP2 ASP II
WEBA Web Admin
PRMR Project Manager
ODBA Oracle DBA
TECH Technical Writer

16 rows selected.

Name	Null?	Type
-----	-----	-----
EMPLOYEE_ID	NOT NULL	NUMBER(3)
EMPLOYEE_FNAME		VARCHAR2(20)
EMPLOYEE_LNAME		VARCHAR2(20)
EMPLOYEE_MINIATIAL		VARCHAR2(1)
HIRE_DATE		DATE
MANAGER_ID		NUMBER(3)
REGION_ID		VARCHAR2(2)

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

EMPLOYEE_ID	EMPLOYEE_FNAME	EMPLOYEE_LNAME	E	HIRE_DAT	MANAGER_ID	RE
101	Sean	Connor	S	01/03/15	101	NW
102	Shane	Burklow	S	01/03/15		SE
103	Mary	Smith	M	29/04/15		NE
104	Emily	Bush	E	30/04/15		MS
105	Steve	Zebras	S	01/05/15		MN
106	Anna	Summers	A	01/05/15		SW
107	Maria	Ellis	M	01/05/15		NW
108	Jose	Smith	J	02/06/15		MN
109	Victor	Epahnor	V	30/06/15		NE
110	Surgena	Kilby	S	30/06/15		NE

10 rows selected.

Commit complete.

Name	Null?	Type
EMPLOYEE_ID	NOT NULL	NUMBER(3)
SKILL_ID	NOT NULL	CHAR(4)
RATE_OF_PAY		NUMBER(5)

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

EMPLOYEE_ID	SKIL	RATE_OF_PAY
101	PRMR	100
102	SYS2	90
103	DBD1	70
104	SYS1	85
105	SYS1	85
106	ODV1	85
107	ODV2	90
108	ODBA	95
110	TECH	99

9 rows selected.

Name	Null?	Type
CUSTOMER_ID	NOT NULL	NUMBER(4)
CUSTOMER_NAME		VARCHAR2(20)
CUSTOMER_PHONE_NO		NUMBER(10)
REGION_ID		VARCHAR2(2)

1 row inserted.

Name	Null?	Type
PROJECT_ID	NOT NULL	NUMBER(3)
CUSTOMER_ID		NUMBER(4)
EMPLOYEE_ID		NUMBER(3)
PROJECT_DESCRIPTION		VARCHAR2(30)
CONTRACT_DATE		DATE
PROJECT_COST		NUMBER(7)
ESTIMATE_START_DATE		DATE
ESTIMATE_END_DATE		DATE

CUSTOMER_ID	CUSTOMER_NAME	CUSTOMER_PHONE_NO	RE
1	See Rocks	800838383	NE

1 row inserted.

PROJECT_ID	CUSTOMER_ID	EMPLOYEE_ID	PROJECT_DESCRIPTION	CONTRACT
PROJECT_COST	ESTIMATE	ESTIMATE		
15500	01/03/19	25/03/19	101 Sales Management Sys	02/12/18

Name	Null?	Type
TASK_ID	NOT NULL	NUMBER(6)
PROJECT_ID		NUMBER(3)
EMPLOYEE_ID		NUMBER(3)
SKILL_ID		CHAR(4)

TASK_DESCRIPTION	VARCHAR2(30)
START_DATE	DATE
END_DATE	DATE

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

TASK_ID	PROJECT_ID	EMPLOYEE_ID	SKIL	TASK_DESCRIPTION	START_DA
06/03/19	1	1	101	PRMR Initial Interview	01/03/19
15/03/19	2	1	103	DBD1 Database Design	11/03/19
12/04/19	3	1	102	SYS1 System Design	11/03/19
22/03/19	4	1	108	ODV2 Database Implementation	18/03/19
20/05/19	5	1	107	ODBA System Coding and Testing	25/03/19
07/06/19	6	1	110	TECH System Documentation	25/03/19

6 rows selected.

Name	Null?	Type
ASSIGNMENT_ID	NOT NULL	NUMBER(3)
TASK_ID		NUMBER(6)
EMPLOYEE_ID		NUMBER(3)
START_DATE		DATE
END_DATE		DATE

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

ASSIGNMENT_ID	TASK_ID	EMPLOYEE_ID	START_DA	END_DATE
200	1	101	01/03/19	06/03/19
201	1	102	01/03/19	06/03/19
202	1	103	01/03/19	06/03/19
203	2	103	11/03/19	15/03/19
204	3	102	11/03/19	12/04/19
205	3	104	11/03/19	12/04/19
206	3	105	11/03/19	12/04/19

7 rows selected.

Name	Null?	Type
BILL_NO	NOT NULL	NUMBER(10)
CUSTOMER_ID		NUMBER(4)
HOURS_WORKED		NUMBER(2)
BILL_DATE		DATE

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

BILL_NO	CUSTOMER_ID	HOURS_WORKED	BILL_DAT
1	1	4	03/03/19
2	1	24	08/03/19
3	1	40	15/03/19
4	1	6	15/03/19
5	1	12	22/03/19
6	1	35	29/03/19





6 rows selected.

REGION_ID	REGION_NAME
NW	Northwest
SW	Southwest
MN	Midwest North
MS	Midwest South
NE	Northeast
SE	Southeast

SKILL_ID	SKILL_TYPE
DAT1	Data Entry I
DAT2	Data Entry II
SYS1	Systems Analyst I
SYS2	Systems Analyst II
DBD1	DB Designer I
DBD2	DB Designer II
ODV1	Oracle Developer I
ODV2	Oracle Developer II
C++1	Programmer I
C++2	Programmer II
ASP1	ASP I
ASP2	ASP II
WEBA	Web Admin
PRMR	Project Manager
ODBA	Oracle DBA
TECH	Technical Writer

EMPLOYEE_ID	EMPLOYEE_FNAME	EMPLOYEE_LNAME	EMPLOYEE_INITIAL	HIRE_DATE	MANAGER_ID	REGION_ID
101	Sean	Connor	S	01/03/15	101	NW
102	Shane	Burklow	S	01/03/15	(null)	SE
103	Mary	Smith	M	29/04/15	(null)	NE
104	Emily	Bush	E	30/04/15	(null)	MS
105	Steve	Zebras	S	01/05/15	(null)	MN
106	Anna	Summers	A	01/05/15	(null)	SW
107	Maria	Ellis	M	01/05/15	(null)	NW
108	Jose	Smith	J	02/06/15	(null)	MN
109	Victor	Epahnor	V	30/06/15	(null)	NE
110	Surgena	Kilby	S	30/06/15	(null)	NE

EMPLOYEE_ID	SKILL_ID	RATE_OF_PAY
101	PRMR	100
102	SYS2	90
103	DBD1	70
104	SYS1	85
105	SYS1	85
106	ODV1	85
107	ODV2	90
108	ODBA	95
110	TECH	99

 CUSTOMER_ID	 CUSTOMER_NAME	 CUSTOMER_PHONE_NO	 REGION_ID
1	See Rocks	800838383	NE

TASK_ID	PROJECT_ID	EMPLOYEE_ID	SKILL_ID	TASK_DESCRIPTION	START_DATE	END_DATE
1	1	101	PRMR	Initial Interview	01/03/19	06/03/19
2	1	103	DBD1	Database Design	11/03/19	15/03/19
3	1	102	SYS1	System Design	11/03/19	12/04/19
4	1	108	ODV2	Database Implementation	18/03/19	22/03/19
5	1	107	ODBA	System Coding and Testing	25/03/19	20/05/19
6	1	110	TECH	System Documentation	25/03/19	07/06/19

TASK_ID	PROJECT_ID	EMPLOYEE_ID	SKILL_ID	TASK_DESCRIPTION	START_DATE	END_DATE
1	1	101	PRMR	Initial Interview	01/03/19	06/03/19
2	1	103	DBD1	Database Design	11/03/19	15/03/19
3	1	102	SYS1	System Design	11/03/19	12/04/19
4	1	108	ODV2	Database Implementation	18/03/19	22/03/19
5	1	107	ODBA	System Coding and Testing	25/03/19	20/05/19
6	1	110	TECH	System Documentation	25/03/19	07/06/19

❖ ASSIGNMENT_ID	❖ TASK_ID	❖ EMPLOYEE_ID	❖ START_DATE	❖ END_DATE
200	1	101	01/03/19	06/03/19
201	1	102	01/03/19	06/03/19
202	1	103	01/03/19	06/03/19
203	2	103	11/03/19	15/03/19
204	3	102	11/03/19	12/04/19
205	3	104	11/03/19	12/04/19
206	3	105	11/03/19	12/04/19

BILL_NO	CUSTOMER_ID	HOURS_WORKED	BILL_DATE
1	1	4	03/03/19
2	1	24	08/03/19
3	1	40	15/03/19
4	1	6	15/03/19
5	1	12	22/03/19
6	1	35	29/03/19

EMPLOYEE_ID	ASSIGNMENT_ID	BILL_NO	LOG_HOURS	LOG_DATE
102	200	1	4	03/03/19
101	200	1	4	03/03/19
103	200	1	4	03/03/19

-- Task 6

--1 - Basic: Searching employee full name from employee

```
SELECT employee_id, employee_FNAME || ' ' || employee_LNAME AS "Full Name"
FROM EMPLOYEE;
```

--2 - searching customer name from customer and region - outer joins

```
SELECT c.customer_name, c.region_id, r.region_name
FROM CUSTOMER c, REGION r
WHERE r.region_id = c.region_id;
```

--3 - inner joins

```
SELECT worker.employee_FName || ' ' || worker.employee_LName "Employee Name", worker.employee_id "Employee #",
manager.employee_FName || ' ' || manager.employee_LName "Manager Name", manager.employee_id "Manager #"
FROM EMPLOYEE worker, EMPLOYEE manager
WHERE worker.manager_id = manager.employee_id; -- only one manager 101
```

--4 - substitution

```
SELECT skill_type
FROM SKILL
WHERE SKILL_ID = '&SKILL_ID'; -- search skill id and the type comes up
```

--5 - substitution with outer joins

```
SELECT c.customer_name, p.CONTRACT_DATE, t.TASK_DESCRIPTION, a.END_DATE
FROM CUSTOMER c, PROJECTS p, PROJECT_SCHEDULE_TASK t, ASSIGNMENT a
WHERE c.customer_id = p.customer_id
AND p.project_id = t.PROJECT_ID
AND t.task_id = a.TASK_ID
AND t.task_id = '&task_id';
--try 0001 - only output
```

--6 - greater than less than sign

```
SELECT log_hours || ' ' || log_date AS "Time"
FROM WORK_LOG
WHERE log_hours > 10; --Nothing should show up since tables are only 4 hours
```

--7 - greater than less than sign for dates

```
SELECT e.employee_id, t.task_description, t.START_DATE || ' ' || t.END_DATE AS "Task Dates", a.START_DATE || ' ' || a.END_DATE AS "Assignment Dates"
FROM PROJECT_SCHEDULE_TASK t, ASSIGNMENT a, EMPLOYEE e
WHERE t.task_id = a.TASK_ID
AND t.EMPLOYEE_ID = e.EMPLOYEE_ID
AND a.EMPLOYEE_ID = e.EMPLOYEE_ID
AND a.END_DATE > '06/03/19'; --output for assignments ending after 6 March 2019
```

--8 -Calculating average

```
SELECT a.END_DATE, b.bill_date, ROUND(AVG(w.log_hours), 2) "Average Hours"
FROM WORK_LOG w, ASSIGNMENT a, Bill b
WHERE a.ASSIGNMENT_ID = w.ASSIGNMENT_ID
AND b.BILL_NO = w.BILL_NO
GROUP by b.bill_date, a.END_DATE; --should be 4 since it's the only value
```

--9 - Calculating avg, max, min of hourly pay

```
SELECT ROUND(AVG(rate_of_pay), 2) "Average Hourly Pay", MAX(rate_of_pay) "Maximum Hourly Pay", MIN(rate_of_pay) "Minimum Hourly Pay", ROUND(STDDEV(rate_of_pay), 2) "Standard Deviation"
FROM EMP_SKILL_INVENTORY
WHERE rate_of_pay < 90;
```

--10 -- Counting number of employees with skill

```
SELECT skill_id as "Skills", COUNT(*) AS "Number of Employees"
FROM SKILL
Group by skill_id
ORDER by COUNT(*) desc;
```

EMPLOYEE_ID Full Name

101 Sean Connor
102 Shane Burklow
103 Mary Smith
104 Emily Bush
105 Steve Zebras
106 Anna Summers
107 Maria Ellis
108 Jose Smith
109 Victor Epahnor
110 Surgena Kilby

10 rows selected.

CUSTOMER_NAME RE REGION_NAME

See Rocks NE Northeast

Employee Name Employee # Manager Name Manager #

Sean Connor 101 Sean Sean 101

old:SELECT skill_type
FROM SKILL
WHERE SKILL_ID = '&SKILL_ID'

new:SELECT skill_type
FROM SKILL
WHERE SKILL_ID = 'ODBA'

SKILL_TYPE

Oracle DBA

old:SELECT c.customer_name, p.CONTRACT_DATE, t.TASK_DESCRIPTION, a.END_DATE
FROM CUSTOMER c, PROJECTS p, PROJECT_SCHEDULE_TASK t, ASSIGNMENT a
WHERE c.customer_id = p.customer_id

AND p.project_id = t.PROJECT_ID
AND t.task_id = a.TASK_ID
AND t.task_id = '&task_id'

new:SELECT c.customer_name, p.CONTRACT_DATE, t.TASK_DESCRIPTION, a.END_DATE
FROM CUSTOMER c, PROJECTS p, PROJECT_SCHEDULE_TASK t, ASSIGNMENT a
WHERE c.customer_id = p.customer_id

AND p.project_id = t.PROJECT_ID
AND t.task_id = a.TASK_ID
AND t.task_id = '0001'

CUSTOMER_NAME CONTRACT TASK_DESCRIPTION END_DATE

See Rocks	02/12/18 Initial Interview	06/03/19
See Rocks	02/12/18 Initial Interview	06/03/19
See Rocks	02/12/18 Initial Interview	06/03/19

no rows selected

EMPLOYEE_ID	TASK_DESCRIPTION	Task Dates	Assignment Dates
103	Database Design	11/03/19 15/03/19	11/03/19 15/03/19
102	System Design	11/03/19 12/04/19	11/03/19 12/04/19

END_DATE BILL_DAT Average Hours

06/03/19	03/03/19	4
----------	----------	---

Average Hourly Pay Maximum Hourly Pay Minimum Hourly Pay Standard Deviation

81.25	85	70	7.5
-------	----	----	-----

Skil Number of Employees




ASP1	1
WEBA	1
C++1	1
C++2	1
DAT1	1
DAT2	1
DBD1	1
DBD2	1
ODBA	1
ODV1	1
ODV2	1

Skil Number of Employees

PRMR	1
SYS1	1
SYS2	1
TECH	1
ASP2	1

16 rows selected.

EMPLOYEE_ID	Full Name
101	Sean Connor
102	Shane Burklow
103	Mary Smith
104	Emily Bush
105	Steve Zebras
106	Anna Summers
107	Maria Ellis
108	Jose Smith
109	Victor Epahnor
110	Surgena Kilby




 CUSTOMER_NAME	 REGION_ID	 REGION_NAME
See Rocks	NE	Northeast

Employee Name	Employee #	Manager Name	Manager #
Sean Connor	101	Sean Sean	101

 SKILL_TYPE
Oracle DBA

⚙ CUSTOMER_NAME	⚙ CONTRACT_DATE	⚙ TASK_DESCRIPTION	⚙ END_DATE
See Rocks	02/12/18	Initial Interview	06/03/19
See Rocks	02/12/18	Initial Interview	06/03/19
See Rocks	02/12/18	Initial Interview	06/03/19

EMPLOYEE_ID	TASK_DESCRIPTION	Task Dates	Assignment Dates
103	Database Design	11/03/19 15/03/19	11/03/19 15/03/19
102	System Design	11/03/19 12/04/19	11/03/19 12/04/19

 END_DATE	 BILL_DATE	 Average Hours
06/03/19	03/03/19	4

Average Hourly Pay	Maximum Hourly Pay	Minimum Hourly Pay	Standard Deviation
81.25	85	70	7.5

Skills	Number of Employees
ASP1	1
WEBA	1
C++1	1
C++2	1
DAT1	1
DAT2	1
DBD1	1
DBD2	1
ODBA	1
ODV1	1
ODV2	1
PRMR	1
SYS1	1
SYS2	1
TECH	1
ASP2	1