CS/SE 6360.002
FINAL PROJECT

ABASE DESIGN FOR FIRE DEPARTMENT

Requirements

Services offered by Fire Department

Numerous services are offered by the department which can broadly be classified into two categories – Emergency and Primary Non-Emergency.

- Emergency Services include –
  - Fire Suppression
  - Advanced Life Support Medical Treatment
  - and Patient Transportation
  - Specialized Rescue Operations
  - Hazardous Material Incident Mitigation
  - Response to Weather-Related Emergencies
- Non-Emergency services include –
  - Fire Prevention Inspections
  - Public Fire Safety Education Programs
  - Support of Numerous Community Events
  - Recreational Activities
  - HR and Recruitment
  - Research & Development

Department Structure

Each department has a unique department number and are located on various locations across the city. Fire offices can be called 24x7 on helpline numbers to report an emergency or to request services. Some departments like Development Services, Finance, Water Customer Service etc. have working hours while most others like Fire Department works 24x7. A various number of services are offered by city fire department which spans a couple of counsels/districts of the metropolitan area. A department can utilize multiple equipment for various purposes.

Employee Structure and Minimum Wage Act

Each department will employ several people which can be on various designations like Fire Fighter, Manager, Fire Technician, Health Professionals- doctors, nursing staff etc., Fire Truck Driver, Combustibles Professional etc. Department of Data and Statistics, USAGov shows that the lower 25 percentile employees in fire departments earned up to $15.24 per hour or $31,690 per year. “An employee working in fire services is entitled to get a compensation corresponding to more than the minimum 25th percentile salary per annum” (Fair Minimum Wage Act, 2013 amending Fair Labor Standards Act, 1938)

Incidences

Several Incidences are dealt with by the department during the course of the year and the department keeps track of information –

- Incidence Type: Wildfire, Urban Fire, Explosion, Industrial, Training and Research etc.
- Cause: Lightening, Chemical explosives, Under Investigation, Unknown, Electricity, Intentional, Education etc.
- The date of origin, the action taken, the current status of the incidence, equipment used to deal with it, the impact zone and estimated containment date.

Equipment and Classification

Multiple types of Equipment are available at the fire department's disposal which can be broadly classified into water, gas, aerosol and other types depending on the type of suppressing agent it contains. All the equipment come with detailed handling and hazard information.

Apparatus

Multiple types of apparatus are employed by the fire department during incidences which classify as one of the categories of equipment procured among which there is a primary. The department keeps track of its manufacturer, procurement date, expiry date and the quantity procured. The apparatus may also come with additional hazard and handling instructions which must be documented. Once an incidence is resolved, all apparatus it utilized must be marked available.

Line of Duty Death

Following the traditions of honoring the fighters died during active line of duty, the department keeps track of all those brave souls who have sacrificed their lives during active duty and pay homage to those men on regular basis. A monthly Dependency & Indemnity Compensation (DIC) is calculated in accordance with the employee type & is paid as a compensation to the family member of the deceased.

Employee Compensation

The compensation the employees get can be computed as per the following rule supplied by the HR department and in accordance with FLSA –

- If the employee is a department manager, the compensation amounts to 4.0x of minimum wage.
- If the employee is a supervisor, the compensation amounts to 3.5x of minimum wage.

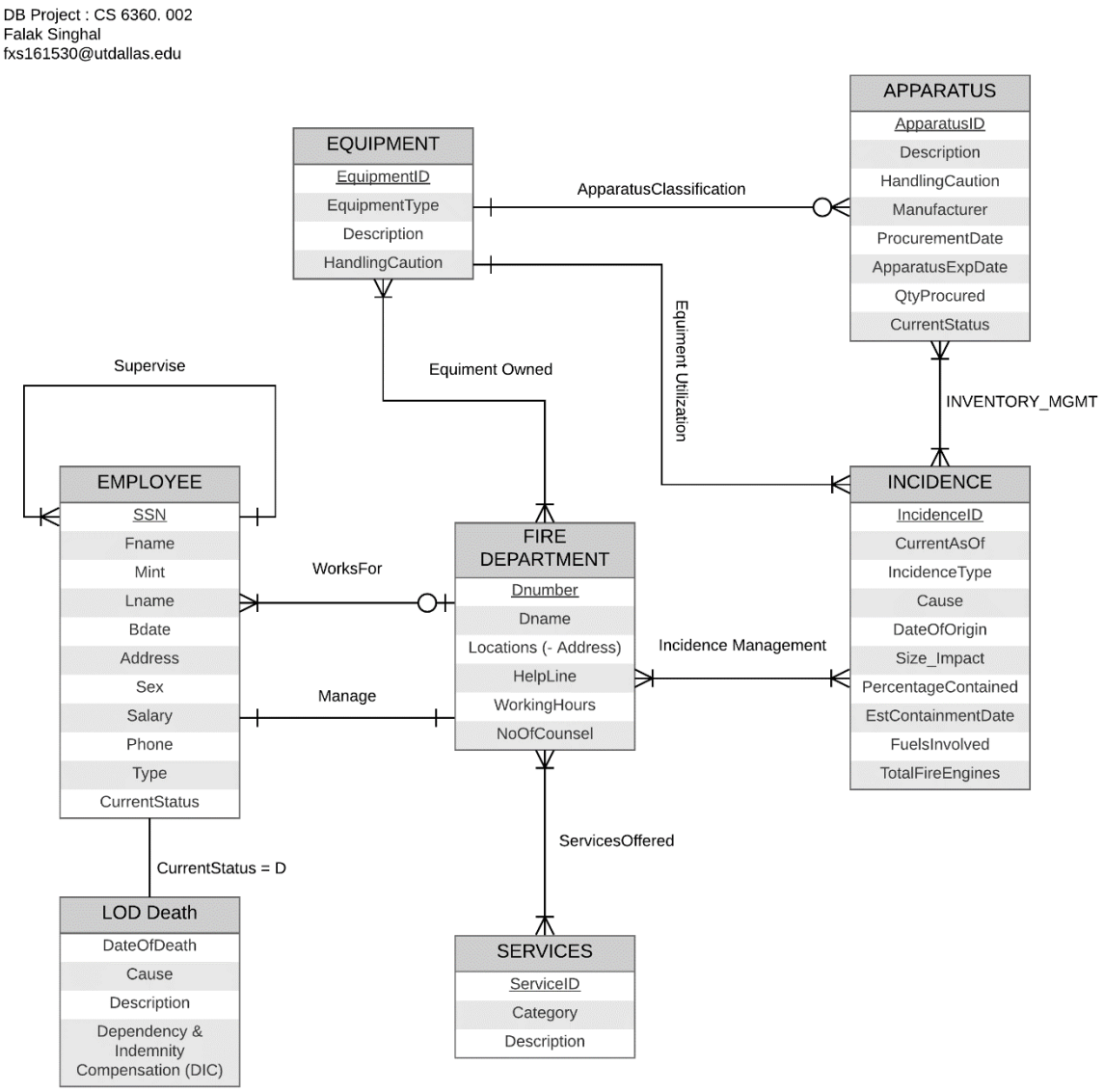
- If the employee is a fire fighter, the compensation amounts to 3.3x of minimum wage.
- If the employee is an accountant, the compensation amounts 3.3x to of minimum wage.
- If the employee is some health personnel, the compensation amounts to 3.3x of minimum wage.
- If the employee is a driver, the compensation amounts to 3.0x of minimum wage.
- If the employee is a temporary employee, the compensation amounts to 2.5x of minimum wage.
- If the employee is the chief executive officer (CEO), the compensation amounts to 4.5x of minimum wage.

Compensation for LOD

computed as per the following rule supplied by the HR department –

- If the deceased was a department manager, the compensation amounts to 40% of his salary.
- If the deceased was a supervisor, the compensation amounts to 35% of his salary.
- If the deceased was a fire fighter, the compensation amounts to 33% of his salary.
- If the deceased was an accountant, the compensation amounts 33% to of his salary.
- If the deceased was some health personnel, the compensation amounts to 33% of his salary.
- If the deceased was a driver, the compensation amounts to 30% of his salary.
- If the deceased was a temporary employee, the compensation amounts to 25% of his salary.
- If the deceased was the chief executive officer (CEO), the compensation amounts to 45% of his salary.

Modeling of Requirements as ER-Diagram:



The requirements can be summarized/ derived from ERD as –

1. An Employee can work for 0 (deceased employee) or 1 department, a department may employ many employees (M:1)
2. A fire department deals with many incidences at the same time and incidences may involve several departments at the same time. (M:N)
3. A fire department offers 1 or more services and a service may be offered by 1 or more departments simultaneously. (M:N)
4. A fire department owns one or more equipment types and one type of equipment can be owned by multiple departments at the same time. (M:N)
5. An Incidence may use one or more apparatus; apparatus can be utilized in 1 or more incidence (M:N)
6. Some of the employees are classified under Line of Duty Deaths whose Current Status is D.
7. An employee can be supervised by 1 employee (supervisor/manager) and 1 supervisor can manage one or more employees. (M:1)
8. An employee manages a fire department as chief department manager and one department must be managed by an employee. (1:1)
9. An incidence utilizes one of the equipment kind as primary and each equipment type can be utilized by multiple incidences. (1:M)

Mapping of ERD in Relational Schema

1. EMPLOYEE

SSN	Fname	Minit	Lname	Bdate	Address	Sex	Salary	Phone

EType	CurrentStatus	Supervisor_ssn	Dno

- Primary Key : SSN
- Foreign Keys : FOREIGN KEY (SUPERVISORSSN) REFERENCES EMPLOYEEP(SSN), FOREIGN KEY (DNO) REFERENCES FIREDEPARTMENT(DNUMBER)

2. FIREDEPARTMENT

Dnumber	Dname	HelpLine	WorkingHours	NoOfCounsel	Manager_Ssn

- Primary Key : DNUMBER
- Foreign Keys : FOREIGN KEY (MANAGERSSN) REFERENCES EMPLOYEEP(SSN)

3. EQUIPMENT

EquipmentID	EquipmentType	Description	HandlingCaution

- Primary Key : EQUIPMENTID
- Foreign Keys : None

4. APPARATUS

ApparatusID	Description	HandlingCaution	Manufacturer	ProcurementDate	ApparatusExpDate	QtyProcured	CurrentStatus	EquipID

- Primary Key : APPARATUSID
- Foreign Keys : FOREIGN KEY (EQUIPID) REFERENCES EQUIPMENT(EQUIPMENTID)

5. INCIDENCE

IncidenceID	CurrentAsOf	IncidenceType	Cause	DateOfOrigin	Size_Impact

PercentageContained	EstContainmentDate	FuelsInvolved	TotalFireEngines	EquipID

- Primary Key : INCIDENCEID
- Foreign Keys : FOREIGN KEY (EQUIPID) REFERENCES EQUIPMENT(EQUIPMENTID)

6. SERVICES

- | ServiceID | Category | Description |
  Primary Key : SERVICEID
- Foreign Keys : None

7. DEPARTMENT LOCATIONS

Dno	Location	Address

- Primary Key : DNO, DLOCATION
- Foreign Keys : FOREIGN KEY (DNO) REFERENCES FIREDEPARTMENT(DNUMBER)

8. EQUIPMENT OWNED

EquipID	Dno

- Primary Key : EQUIPID, DNO
- Foreign Keys : FOREIGN KEY (EQUIPID) REFERENCES EQUIPMENT(EQUIPMENTID), FOREIGN KEY (DNO) REFERENCES FIREDEPARTMENT (DNUMBER)

9. INCIDENCE MANAGEMENT

Dno	IncID

- Primary Key : DNO, INCID
- Foreign Keys : FOREIGN KEY (DNO)REFERENCES FIREDEPARTMENT(DNUMBER), FOREIGN KEY (INCID)REFERENCES INCIDENCE(INCIDENCEID)

10. SERVICES OFFERED

Dno	ServID

- Primary Key : DNO, SERVID
- Foreign Keys : FOREIGN KEY (DNO)REFERENCES FIREDEPARTMENT(DNUMBER), FOREIGN KEY (SERVID)REFERENCES SERVICES(SERVICEID)

11. LODDEATH

LSSN	DateOfDeath	Cause	Description	DIC

- Primary Key : LSSN
- Foreign Keys : FOREIGN KEY (LSSN)REFERENCES EMPLOYEEP(SSN)

12. INVENTORY_MGMT

SERIAL	INCID	APPARTID	TOTALQTY

- Primary Key : SERIAL
- Foreign Keys : FOREIGN KEY (INCID) REFERENCES INCIDENCE(INCIDENCEID), FOREIGN KEY (APPRATID) REFERENCES APPARATUS(APPARATUSID)

SQL Statements to create Relations in DB and Add Constraints

```
CREATE TABLE FIREDEPARTMENT(
DNUMBER VARCHAR(50),
DNAME VARCHAR(50),
HELPLINE NUMBER(12) NOT NULL,
WORKINGHOURS VARCHAR(50) DEFAULT '24x7',
NOOFCOUNSEL NUMBER(12),
MANAGERSSN INTEGER,
CONSTRAINT FIREDEPARTMENT_PK PRIMARY KEY (DNUMBER));

CREATE TABLE INEVNTORY_MGMT (
SERIAL NUMBER(10),
INCID  VARCHAR(50),
APPRATID   VARCHAR(50),
TOTALQTY  NUMBER(12),
CONSTRAINT INEVNTORY_MGMT_PK PRIMARY KEY(SERIAL),
CONSTRAINT INEVNTORY_MGMT_FK_INCID FOREIGN KEY (INCID) REFERENCES INCIDENCE(INCIDENCEID),
CONSTRAINT INEVNTORY_MGMT_FK_APPARTID FOREIGN KEY (APPRATID) REFERENCES APPARATUS(APPARATUSID)
);
CREATE TABLE EMPLOYEEP(
  SSN INTEGER,
  FNAME VARCHAR(50) NOT NULL,
  MINT VARCHAR(10) DEFAULT '',
  LNAME VARCHAR(50),
  BDATE DATE,
  ADDRESS VARCHAR(300),
  SEX VARCHAR(10),
  SALARY NUMBER(12,2),
```

```
  PHONE NUMBER(12),
  CURRENTSTATUS VARCHAR(50),
  SUPERVISORSSN INTEGER,
  DNO VARCHAR(50),
  CONSTRAINT EMPLOYEE_PK PRIMARY KEY (SSN),
  CONSTRAINT EMPLOYEE_FK2 FOREIGN KEY (DNO)
     REFERENCES FIREDEPARTMENT(DNUMBER) ON DELETE SET NULL,
  CONSTRAINT SALARYCHK CHECK (SALARY >31690)
);
-- RUN AFTER ADDING TUPLES
ALTER TABLE EMPLOYEEP ADD CONSTRAINT EMPLOYEE_FK1 FOREIGN KEY (SUPERVISORSSN) REFERENCES
EMPLOYEEP(SSN) ON DELETE SET NULL;
ALTER TABLE EMPLOYEEP ADD CONSTRAINT EMPLOYEE_FK2 FOREIGN KEY (DNO) REFERENCES
FIREDEPARTMENT(DNUMBER) ON DELETE SET NULL;
ALTER TABLE EMPLOYEEP ADD ETYPE VARCHAR(50) DEFAULT 'TEMPORARY';
ALTER TABLE FIREDEPARTMENT ADD CONSTRAINT FIREDEPARTMENT_FK1 FOREIGN KEY (MANAGERSSN)
REFERENCES EMPLOYEEP(SSN) ON DELETE SET NULL;


CREATE TABLE EQUIPMENT(
EQUIPMENTID VARCHAR(50),
EQUIPMENTTYPE VARCHAR(50),
DESCRIPTION VARCHAR(300),
HANDLINGCAUTION VARCHAR(300),
CONSTRAINT EQUIPMENT_PK PRIMARY KEY (EQUIPMENTID)
)
CREATE TABLE INCIDENCE(
INCIDENCEID VARCHAR(50),
CURRENTASOF DATE DEFAULT TRUNC(SYSDATE),
INCIDENCETYPE VARCHAR(50),
CAUSE VARCHAR(100) DEFAULT 'Under Investigation',
DATEOFORIGIN DATE,
SIZE_IMPACT VARCHAR(100),
PERCENTAGECONTAINED NUMBER(5,2) DEFAULT 0.00
  CHECK (PERCENTAGECONTAINED>=0.0 AND PERCENTAGECONTAINED <=100),
ESTCONTAINMENTDATE DATE,
FUELINVOLVED VARCHAR(50) DEFAULT 'Unknown',
TOTALFIREENGINE NUMBER(5),
EQUIPID VARCHAR(50),
CONSTRAINT INCIDENCE_PK PRIMARY KEY (INCIDENCEID)
```

```
);

ALTER TABLE INCIDENCE ADD CONSTRAINT INCIDENCE_FK1 FOREIGN KEY (EQUIPID) REFERENCES
EQUIPMENT(EQUIPMENTID) ON DELETE SET NULL;

CREATE TABLE APPARATUS(

APPARATUSID VARCHAR(50),

DESCRIPTION VARCHAR(300),

HANDLINGCAUTION VARCHAR(300),

MANUFACTURER VARCHAR(100),

PROCUREMENDATE DATE,

EXPIREDATE DATE,

QTYPROCURED NUMBER(12),

CURRENTSTATUS VARCHAR(50) DEFAULT 'IN USE',

EQUIPID VARCHAR(50),

CONSTRAINT APPARATUS_PK PRIMARY KEY (APPARATUSID)

);

ALTER TABLE APPARATUS ADD CONSTRAINT APPARATUS_FK1 FOREIGN KEY (EQUIPID) REFERENCES
EQUIPMENT(EQUIPMENTID) ON DELETE SET NULL;


CREATE TABLE SERVICES(

SERVICEID VARCHAR(50),

SCATEGORY VARCHAR(50),

DESCRIPTION VARCHAR(300),

CONSTRAINT SERVICES_PK PRIMARY KEY (SERVICEID)

)


CREATE TABLE DEPARTMENTLOCATIONS(

DNO VARCHAR(50),

DLOCATION VARCHAR(1000),

ADDRESS VARCHAR(300) NOT NULL,

CONSTRAINT DEPARTMENTLOCATIONS_PK PRIMARY KEY (DNO,DLOCATION),

CONSTRAINT DEPARTMENTLOCATIONS_FK1 FOREIGN KEY (DNO) REFERENCES FIREDEPARTMENT(DNUMBER) ON
DELETE SET NULL

)

CREATE TABLE EQUIPMENTOWNED(

EQUIPID VARCHAR(50),

EQUIPTYPE VARCHAR(50),

DNO VARCHAR(50),

CONSTRAINT EQUIPMENTOWNED_PK PRIMARY KEY (EQUIPID,DNO)

)
```

```
ALTER TABLE EQUIPMENTOWNED ADD CONSTRAINT EQUIPMENTOWNED_FK2 FOREIGN KEY (EQUIPID) REFERENCES EQUIPMENT(EQUIPMENTID) ON DELETE CASCADE;

ALTER TABLE EQUIPMENTOWNED ADD CONSTRAINT EQUIPMENTOWNED_FK1 FOREIGN KEY (DNO) REFERENCES FIREDEPARTMENT(DNUMBER) ON DELETE CASCADE,


CREATE TABLE INCIDENCEMANAGEMENT(

DNO VARCHAR(50),

INCID VARCHAR(50),

CONSTRAINT INCIDENCEMANAGEMENT_PK PRIMARY KEY (DNO,INCID),

CONSTRAINT INCIDENCEMANAGEMENT_FK1 FOREIGN KEY (DNO)REFERENCES FIREDEPARTMENT(DNUMBER) ON DELETE CASCADE,

CONSTRAINT INCIDENCEMANAGEMENT_FK2 FOREIGN KEY (INCID)REFERENCES INCIDENCE(INCIDENCEID) ON DELETE CASCADE

)


CREATE TABLE SERVICESOFFERED(

DNO VARCHAR(50),

SERVID VARCHAR(50),

CONSTRAINT SERVICESOFFERED_PK PRIMARY KEY (DNO,SERVID),

CONSTRAINT SERVICESOFFERED_FK1 FOREIGN KEY (DNO)REFERENCES FIREDEPARTMENT(DNUMBER) ON DELETE CASCADE,

CONSTRAINT SERVICESOFFERED_FK2 FOREIGN KEY (SERVID)REFERENCES SERVICES(SERVICEID) ON DELETE CASCADE

)


CREATE TABLE LODDEATH(

LSSN INTEGER,

DATEOFDEATH DATE DEFAULT TRUNC(SYSDATE),

CAUSE VARCHAR(50) DEFAULT 'Under Investigation',

DESCRIPTION VARCHAR(300) DEFAULT 'Line of duty death',

DIC NUMBER(12,2) DEFAULT 10000.00,

CONSTRAINT LODDEATH_PK PRIMARY KEY (LSSN),

CONSTRAINT LODDEATH_FK1 FOREIGN KEY (LSSN)REFERENCES EMPLOYEEP(SSN)
```

)Normalization of Relational Schema

The following Functional Dependencies exists in the relational schema –

1. EMPLOYEE {SSN -> Fname, Mint, Lname, Bdate, Address, Sex, Salary, Phone, EType, Current-Status, Supervisor_ssn, Dno}
2. FIREDEPARTMENT {Dnumber -> Dname, HelpLine, WorkingHours, NoOfCounsel}
3. EQUIPMENT {EquipmentID -> EquipmentType, Description, HandlingCaution}
4. APPARATUS {ApparatusID -> Description, HandlingCaution, Manufacturer, ProcurementDate, ApparatusExpDate, QtyProcured, CurrentStatus}
5. INCIDENCE {IncidenceID -> CurrentAsOf, IncidenceType, Cause, DateOfOrigin, Size_Impact, PercentageContained, EstContainmentDate, FuelsInvolved, TotalFireEngines}
6. SERVICES {ServiceID -> Category, Description}
7. LODDEATH {DateOfDeath, Cause, Description, DIC}
8. DEPARTMENT LOCATIONS {Dno, Location -> Address}
9. INVENTORY_MGMT {Serial -> IncID, AppartID, TotalQty}

The above functional dependencies cause the schema to be in third normal form.

PL/SQL – Triggers

The following triggers are used to implement various requirements –

Trigger-I INVENTORY

Whenever there is an incidence an entry is made in the inventory_mgmt table requesting particular qty of an apparatus
--Check if the qty is available before allocating

- Procedure Called : CHK_QTY()
- Parameters passed : Apparatus ID, Quantity

```
4  CREATE OR REPLACE TRIGGER INVENTORY
5      BEFORE
6      INSERT OR UPDATE OF TOTALQTY  ON INVENTORY_MGMT
7      FOR EACH ROW
8  DECLARE
9    THISQTY APPARATUS.QTYPROCURED%TYPE;
10 BEGIN
11       CHK_QTY(:NEW.APPRATID,THISQTY);
12       IF(:NEW.TOTALQTY > THISQTY) THEN
13         RAISE_APPLICATION_ERROR(-20001,'THE MAX AVAILABLE QTY FOR '||
14         :NEW.APPRATID||' IS '||THISQTY||'. CAN NOT ALLOCATE MORE THIS VALUE.');
15       END IF;
16 END;
17
```

- Negative Test Case SQL:
  INSERT INTO INVENTORY_MGMT VALUES (1,'INC00002','APR0005',9999);
- Negative Test Case Output:

```
7
8  --Triggers T-1
9  INSERT INTO INVENTORY_MGMT VALUES (1,'INC00002','APR0005',9999);
```

Script Output | Task completed in 0.094 seconds

```
Error starting at line : 9 in command -
INSERT INTO INVENTORY_MGMT VALUES (1,'INC00002','APR0005',9999)
Error report -
SQL Error: ORA-20001: THE MAX AVAILABLE QTY FOR APR0005 IS 800
CANNOT ALLOCATE MORE THIS VALUE
ORA-06512: at "FXS161530.INVENTORY", line 7
ORA-04088: error during execution of trigger 'FXS161530.INVENTORY'
```

Trigger-II LODENTRY

Whenever status of an employee is updated as ‘LODD' meaning line of duty death, a record in his name is inserted automatically in Loddeath table with default values.

- Procedure Called: None

```
33  CREATE OR REPLACE TRIGGER LODENTRY
34    AFTER UPDATE OF CURRENTSTATUS ON EMPLOYEEP
35    FOR EACH ROW
36    BEGIN
37      IF :NEW.CURRENTSTATUS LIKE 'LODD' THEN
38        DBMS_OUTPUT.put_line('DEATH INCIDENCE RECORDED FOR '||:NEW.FNAME
39        ||' SSN: '||:NEW.SSN);
40        INSERT INTO LODDEATH(LSSN) VALUES (:NEW.SSN);
41        -- REST OF THE VALUES COMES FROM DEFAULT PARAMETERS VALUES
42      END IF;
43  END;
```

- Triggering SQL:

UPDATE EMPLOYEEP SET CURRENTSTATUS='LODD' WHERE EMPLOYEEP.SSN=123456107;

Trigger-III: Minimum Wage & Salary Constraints

The above constraint is implemented using a trigger to check the salary if it is in accordance with FLSA with additional min salary requirement provided by Fire Department HR Dept.

If the salaries are found to be not complying with FLSA, the trigger prevents the inserting of record by raising an application level error. (PTO)

```
120 CREATE OR REPLACE TRIGGER CHECK_SALARY
121   BEFORE INSERT OR UPDATE OF SALARY ON EMPLOYEEP
122     FOR EACH ROW
123   BEGIN
124     IF(:NEW.ETYPE LIKE 'DEPARTMENT_MANAGER') THEN
147     END IF;
148     IF(:NEW.ETYPE LIKE 'HEALTH_PERSONNEL') THEN
149       IF (:NEW.SALARY< 31690*5) THEN
150         RAISE_APPLICATION_ERROR(-20001,'MINIMUM WAGE FOR '||:NEW.ETYPE||
151               ' CAN NOT BE LESS THAN $'||31690*3.8);
152       END IF;
153     END IF;
154     IF(:NEW.ETYPE LIKE 'DRIVER') THEN
155       IF (:NEW.SALARY< 31690*5) THEN
156         RAISE_APPLICATION_ERROR(-20001,'MINIMUM WAGE FOR '||:NEW.ETYPE||
157               ' CAN NOT BE LESS THAN $'||31690*3.0);
158       END IF;
159     END IF;
160     IF(:NEW.ETYPE LIKE 'TEMPORARY') THEN
161       IF (:NEW.SALARY< 31690*5) THEN
162         RAISE_APPLICATION_ERROR(-20001,'MINIMUM WAGE FOR '||:NEW.ETYPE||
163               ' CAN NOT BE LESS THAN $'||31690*2.5);
164       END IF;
165     END IF;
166      IF(:NEW.ETYPE LIKE 'CEO') THEN
167       IF (:NEW.SALARY< 31690*5) THEN
168         RAISE_APPLICATION_ERROR(-20001,'MINIMUM WAGE FOR '||:NEW.ETYPE||
169               ' CAN NOT BE LESS THAN $'||31690*4.5);
170       END IF;
171     END IF;
172 END;
```

- Negative Test Case SQL:
  INSERT INTO EMPLOYEEP VALUES (987123010,'Falak','','Singhal','17-JAN-92','demo,
  Dallas','Male',1000,'456789515','ACTIVE',123456999,'HR002','DEPARTMENT_MANAGER');
- Negative Test Case Output:

```
22 -- Trigger T-3
23 INSERT INTO EMPLOYEEP VALUES (987123010,'Falak','','Singhal','17-JAN-92','demo,
24 Dallas','Male',1000,'456789515','ACTIVE',123456999,'HR002','DEPARTMENT_MANAGER');
```

Script Output ×

Task completed in 0.093 seconds

```
Error starting at line : 23 in command -
INSERT INTO EMPLOYEEP VALUES (987123010,'Falak','','Singhal','17-JAN-92','demo,
Dallas','Male',1000,'456789515','ACTIVE',123456999,'HR002','DEPARTMENT_MANAGER')
Error report -
SQL Error: ORA-20001: MINIMUM WAGE FOR DEPARTMENT_MANAGER CAN NOT BE LESS THAN : $126760
ORA-06512: at "FXS161530.CHECK_SALARY", line 4
ORA-04088: error during execution of trigger 'FXS161530.CHECK_SALARY'
```

PL/SQL- Procedures

Procedure-I Calculating DIC

This procedure calculates the DIC compensation upon the death of the employee based on employee type.

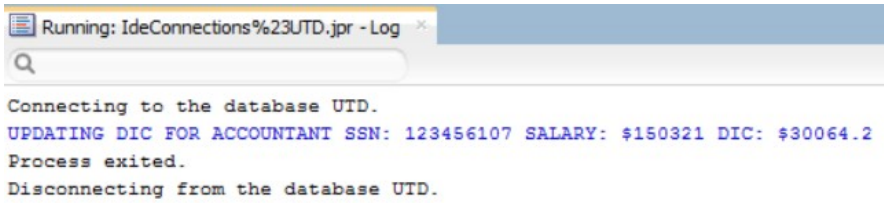
- Arg: (Employee SSN IN)

```
43 create or replace PROCEDURE CALCULATE_DIC(THIS_SSN IN EMPLOYEEP.SSN%TYPE) AS
44   EMPTYPE EMPLOYEEP.ETYPE%TYPE;
45   THIS_SALARY EMPLOYEEP.SALARY%TYPE;
46   THISDIC LODDEATH.DIC%TYPE;
47 BEGIN
48   SELECT ETYPE,SALARY INTO EMPTYPE,THIS_SALARY FROM EMPLOYEEP WHERE SSN=THIS_SSN
49   IF EMPTYPE LIKE 'DEPARTMENT_MANAGER' THEN  THISDIC := THIS_SALARY * 0.40;
50   END IF;
51   IF EMPTYPE LIKE 'SUPERVISOR' THEN THISDIC := THIS_SALARY * 0.35;
52   END IF;
53   IF EMPTYPE LIKE 'FIRE FIGHTER' THEN   THISDIC := THIS_SALARY * 0.33;
54   END IF;
55   IF EMPTYPE LIKE 'ACCOUNTANT' THEN THISDIC := THIS_SALARY * 0.33;
56   END IF;
57   IF EMPTYPE LIKE 'HEALTH_PERSONNEL' THEN THISDIC := THIS_SALARY * 0.38;
58   END IF;
59   IF EMPTYPE LIKE 'DRIVER' THEN THISDIC := THIS_SALARY * 0.30;
60   END IF;
61   IF EMPTYPE LIKE 'TEMPORARY' THEN THISDIC := THIS_SALARY * 0.25;
62   END IF;
63   IF EMPTYPE LIKE 'CEO' THEN THISDIC := THIS_SALARY * 0.45;
64   ELSE THISDIC := THIS_SALARY * 0.20;
65   END IF;
66   DBMS_OUTPUT.put_line('UPDATING DIC FOR '||EMPTYPE||' SSN: '||THIS_SSN||
67   ' SALARY: '||THIS_SALARY||' DIC: '||THISDIC);
68   UPDATE LODDEATH SET DIC=THISDIC WHERE LSSN=THIS_SSN;
69 END;
```

- Test Case SQL:

```
DECLARE
  THIS_SSN NUMBER;
BEGIN
  THIS_SSN := 123456107;
  CALCULATE_DIC(
    THIS_SSN => THIS_SSN
  );
END;
```

- Output:



Procedure-II Auxiliary (helper Procedure for Trigger -1)

When an entry for apparatus request in the inventory_mgmt table is made, check if qtyalloted is less than or equal to Apparatus.qtyprocured

- Args : (Apparatus ID IN, Quantity OUT)

```
CREATE OR REPLACE PROCEDURE CHK_QTY(APRTID IN APPARATUS.APPARATUSID%TYPE,
                                    QTYREAD OUT APPARATUS.QTYPROCURED%TYPE) AS
BEGIN
  SELECT QTYPROCURED INTO QTYREAD
  FROM APPARATUS
  WHERE APPARATUS.APPARATUSID=APRTID;
END;
```

Procedure-III Reporting and Analysis

Print the details of those incidences which are yet to be contained such that the estimated containment time takes 10 days or more. Also display the name and the department number of the department handling those incidences along with the impact region and type of primary equipment it is utilizing.

- Arg: None
- Test Case SQL:

```
create or replace PROCEDURE REPORTING_ANALYSIS AS
  CURSOR DETAILS IS
    SELECT INCIDENCEID,DNAME,FIREDEPARTMENT.DNUMBER,INCIDENCETYPE,DATEOFORIGIN,
              ESTCONTAINMENTDATE,SIZE_IMPACT,PERCENTAGECONTAINED,EQUIPMENTTYPE
    FROM INCIDENCE,FIREDEPARTMENT,INCIDENCEMANAGEMENT,EQUIPMENT
    WHERE INCIDENCE.INCIDENCEID=INCIDENCEMANAGEMENT.INCID
      AND FIREDEPARTMENT.DNUMBER=INCIDENCEMANAGEMENT.DNO
      AND INCIDENCE.EQUIPID=EQUIPMENT.EQUIPMENTID
      AND PERCENTAGECONTAINED<100
      AND INCIDENCE.ESTCONTAINMENTDATE>TRUNC(SYSDATE)
      AND INCIDENCE.ESTCONTAINMENTDATE-INCIDENCE.DATEOFORIGIN>=10;
  MYDATA DETAILS%ROWTYPE;
BEGIN
  OPEN DETAILS;
  LOOP
    FETCH DETAILS INTO MYDATA;
    EXIT WHEN(DETAILS%NOTFOUND);
    DBMS_OUTPUT.put_line('INCIDENCE : '||MYDATA.INCIDENCEID||' OF TYPE '||
    MYDATA.INCIDENCETYPE||', MANAGED BY DEPT: ('||MYDATA.DNUMBER||') '||
    MYDATA.DNAME||'; ORIGINATED ON: '||MYDATA.DATEOFORIGIN
    ||'& EST CONTAINMENT BY: '||MYDATA.ESTCONTAINMENTDATE||'. IMPACT: '||
    MYDATA.SIZE_IMPACT||', %-CONTAINED: '||MYDATA.PERCENTAGECONTAINED||
    '% USING PRIMARY EQIP OF TYPE :'||MYDATA.EQUIPMENTTYPE);
  END LOOP;
  CLOSE DETAILS;
END;
```

```
BEGIN
  REPORTING_ANALYSIS();
--rollback;
END;
```

- SQL Output:

```
Connecting to the database UTD.
INCIDENCE : INC00001 OF TYPE Wildfire, MANAGED BY DEPT: (FR001) FIRE; ORIGINATED ON: 23-
NOV-16& EST CONTAINMENT BY: 03-DEC-16. IMPACT: 4347 Acres, %-CONTAINED: 95% USING
PRIMARY EQIP OF TYPE :Water and Foam
```

INCIDENCE : INC00005 OF TYPE Industrial Fire, MANAGED BY DEPT: (FR001) FIRE; ORIGINATED ON: 27-NOV-16& EST CONTAINMENT BY: 07-DEC-16. IMPACT: 1523 Acres, %-CONTAINED: 95% USING PRIMARY EQIP OF TYPE :Dry Powder
INCIDENCE : INC00010 OF TYPE Wildfire, MANAGED BY DEPT: (FR001) FIRE; ORIGINATED ON: 16-NOV-16& EST CONTAINMENT BY: 10-DEC-16. IMPACT: 158 Acres, %-CONTAINED: 20% USING PRIMARY EQIP OF TYPE :Water and Foam
INCIDENCE : INC00011 OF TYPE Wildfire, MANAGED BY DEPT: (FR001) FIRE; ORIGINATED ON: 14-NOV-16& EST CONTAINMENT BY: 10-DEC-16. IMPACT: 529 Acres, %-CONTAINED: 36% USING PRIMARY EQIP OF TYPE :Water and Foam
INCIDENCE : INC00012 OF TYPE Homefire, MANAGED BY DEPT: (FR001) FIRE; ORIGINATED ON: 23-NOV-16& EST CONTAINMENT BY: 10-DEC-16. IMPACT: 30 Acres, %-CONTAINED: 97% USING PRIMARY EQIP OF TYPE :Dry Powder
INCIDENCE : INC00013 OF TYPE Wildfire, MANAGED BY DEPT: (FR001) FIRE; ORIGINATED ON: 10-NOV-16& EST CONTAINMENT BY: 10-DEC-16. IMPACT: 851 Acres, %-CONTAINED: 99% USING PRIMARY EQIP OF TYPE :Water and Foam
INCIDENCE : INC00014 OF TYPE Wildfire, MANAGED BY DEPT: (FR001) FIRE; ORIGINATED ON: 21-NOV-16& EST CONTAINMENT BY: 10-DEC-16. IMPACT: 654 Acres, %-CONTAINED: 95% USING PRIMARY EQIP OF TYPE :Water and Foam
Process exited.
Disconnecting from the database UTD.