National Institute of Technology Warangal

Department of Computer Science and Engineering

B.Tech 2nd Year (CSE)

Military Database Management System

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Contents

DBMS Project Problem Statement

In this project, a database management system is designed to store the information of Soldiers. The database will be accessible to government and military administrators.

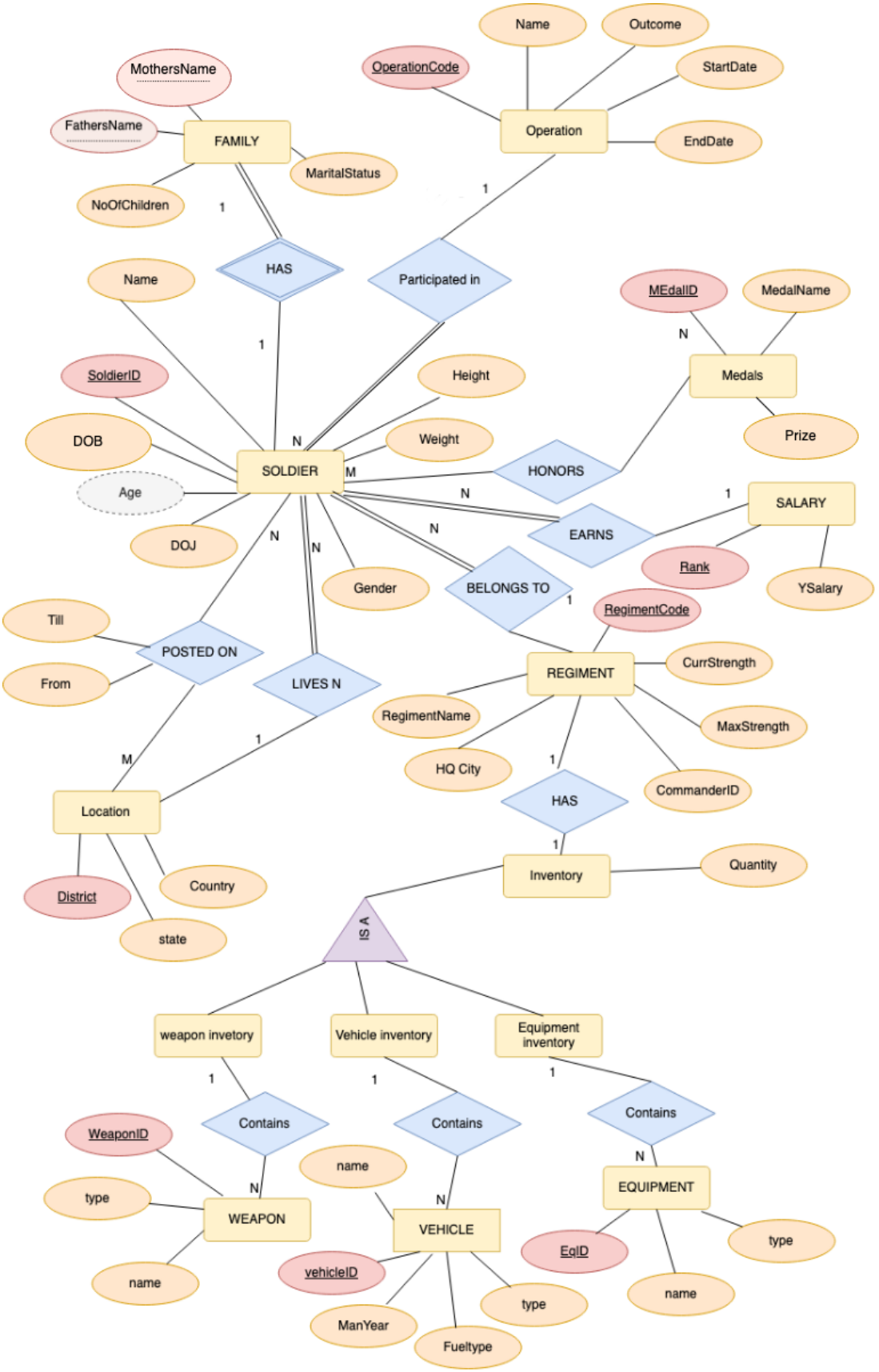
This database contains the personal details of soldiers, their family information, posting of soldiers, information about troops, available military vehicles and weapons, medical supplies and the awards and honors conferred upon the soldiers for their contributions on and off the battlefield.

This will help the officials to access various information quickly and provide resources to the military on time. It will also help in keeping track of all the weapons and supplies being used during wartime and show the requirements of weapons. We can efficiently find soldiers who are currently serving in a particular regiment and also the soldiers who have served in previous operations.

ER Model Assumptions

- A Soldier can participate in at most one operation while an operation can involve multiple numbers of soldiers. Each Operation must involve some soldier hence Total participation.
- A Soldier is given a salary on the basis of his Rank/Position in the Army.
- Multiple Soldiers are grouped to form a regiment. Each Soldier must be a part of one or the other regiment hence there is a total participation of Soldiers in this relationship.
- A Soldier can be honored by multiple medals and a particular medal can be awarded to multiple numbers of Soldiers hence there is a M:N relationship between the two entities.
- Each Soldier has a family whose details are stored in the form of Father's name, Mother's name, Number of children and his/her marital status.
- There are three inventories which belong to a particular regiment namely – Weapons inventory, Vehicle Inventory and Equipment Inventory.
- A Soldier's posting information involves the period of time for which he/she was or will be posted in that particular region. The period of time for which the Soldier is posted will already be predefined by the Army (We already know the deadline date in the future).
- There is a Location table which will serve two purposes – Storing the detailed address of the Soldier and storing the detailed address of all the places where a Soldier has been posted.

ER Model


Name
Outcome
MothersName
OperationCode
StartDate
FathersName
FAMILY
Operation
EndDate
MaritalStatus
NoOfChildren
1
1
HAS
Participated in
Name
MEdalID
MedalName
1
N
SoldierID
Height
Medals
DOB
Weight
Prize
N
SOLDIER
M
HONORS
Age
N
1
SALARY
DOJ
N
N
EARNS
N
Rank
YSalary
Gender
BELONGS TO
1
RegimentCode
Till
N
POSTED ON
REGIMENT
CurrStrength
From
LIVES N
RegimentName
MaxStrength
1
HQ City
1
CommanderID
M
HAS
Location
1
Inventory
Quantity
District
Country
IS A
state
weapon invetory
Vehicle inventory
Equipment inventory
1
1
1
Contains
Contains
Contains
WeaponID
name
N
N
N
type
WEAPON
VEHICLE
EQUIPMENT
EqID
type
name
vehicleID
type
name
ManYear
Fueltype

Functional Dependencies

1) Soldier -

SoldierID -> {Sname, DOB, DOJ, Weight, Height, Gender, District, RegimentCode, Srank}

SoldierID determines the relation. Since all the fields depend on SoldierID, $(SoldierID)^+$ -> R. Thus SoldierID is the Primary Key.

2) **Regiment** -

RegimentCode -> {Rname, HQCity, CurrStrength, MaxStrength, CommanderID}

RegimentCode determines the relation. Since all the fields depend on RegimentCode, $(RegimentCode)^+$ -> R. Thus RegimentCode is the Primary Key.

3) **Location** -

District -> {State, Country}

District determines the relation. Since all the fields depend on District, $(District)^+$ -> R. Thus the District is Primary Key.

4) **Family**-

{FatherName, SoldierID} -> {Children, MaritalStatus}
{MotherName, SoldierID} -> {Children, MaritalStatus}
{SoldierID} -> {MaritalStatus}

{FatherName, SoldierID} and {MotherName, SoldierID} determines the relation. Since all the fields depend on {FatherName, SoldierID}, {MotherName, SoldierID} .$(\{FatherName, SoldierID\})^+$ -> R, {MotherName, SoldierID}+->R. Thus {FatherName, SoldierID},{MotherName, SoldierID} is Candidate Key.

5) Posting relation

This is relationship table between Soldier and Location table. It has two foreign keys SoldierID from Soldier table and District from Location tab

6) Medals

MedalID -> {MedalName, Prize}

MedalID determines the relation. Since all the fields depend on MedalID, $(MedalID)^+$ -> R. Thus MedalID is the Primary Key.

7) Honors relation

This is relationship table between Soldier and Medals table. It has two foreign keys SoldierID from Soldier table and MedalID from Medals table.

8) Salary

Srank->salary

Srank determines the relation. Since all the fields depend on Srank, $(Srank)^+$ -> R. Thus Srank is Primary Key.

9) Weapons_Inventory

{RegimentCode, WeaponID} -> Quantity

{RegimentCode, WeaponID} determines the relation.Since all the fields depend on {RegimentCode, WeaponID}, $(\{RegimentCode, WeaponID\})^+$ -> R. Thus {RegimentCode, WeaponID} is Primary Key.

10) Vehicle_Inventory

{RegimentCode, VehicleID} -> Quantity

{RegimentCode, VehicleID} determines the relation.Since all the fields depend on {RegimentCode, VehicleID}, $(\{RegimentCode, VehicleID\})^+$ -> R. Thus {RegimentCode, VehicleID} is Primary Key.

11) Equipment_Inventory

{RegimentCode, EquipmentID} -> Quantity

{RegimentCode, EquipmentID} determines the relation.Since all the fields depend on {RegimentCode, EquipmentID}, $(\{RegimentCode, EquipmentID\})^+$ -> R. Thus {RegimentCode, EquipmentID} is Primary

12) Weapon

WeaponID->{Wname, Wtype}

WeaponID determines the relation.Since all the fields depend on WeaponID, $(WeaponID)^+$ -> R. Thus WeaponID is the Primary Key.

13) Vehicle

VehicleID->{Vname, Vtype, FuelType, ManYear}

VehicleID determines the relation.Since all the fields depend on VehicleID, $(VehicleID)^+$ -> R. Thus VehicleID is the Primary Key.

14) Equipment

EquipmentID -> {Ename, Etype}

EquipmentID determines the relation.Since all the fields depend on EquipmentID, $(EquipmentID)^+$ -> R. Thus EquipmentID is Primary Key.

15) Operations

OperationCode->{Oname, StartDate, EndDate,Outcome}

OperationCode determines the relation.Since all the fields depend on OperationCode, $(OperationCode)^+$ -> R. Thus OperationCode is Primary Key.

Relational Schema

Soldier		
Attribute	Data type	Constraints
SoldierID	VARCHAR2(20)	Primary Key
Sname	VARCHAR2(20)	NOT NULL
DOB	DATE	NOT NULL
DOJ	DATE	NOT NULL
Height	INT	NOT NULL
Weight	INT	NOT NULL
Gender	CHAR	NOT NULL
District	VARCHAR2(20)	Foreign Key
RegimentCode	VARCHAR2(20)	Foreign Key
OperationCode	VARCHAR2(20)	Foreign Key
Srank	VARCHAR2(20)	Foreign Key

Regiment		
Attribute	Data type	Constraints
RegimentCode	VARCHAR2(20)	Primary Key
Rname	VARCHAR2(20)	NOT NULL
HQCity	VARCHAR2(20)	NOT NULL
CurrStrength	INT	NOT NULL
MaxStrength	INT	NOT NULL
CommanderID	VARCHAR2(20)	NOT NULL

Location		
Attribute	Data type	Constraints
District	VARCHAR2(20)	Primary Key
State	VARCHAR2(20)	NOT NULL
Country	VARCHAR2(20)	NOT NULL

Posting		
Attribute	Data type	Constraints
From Date	DATE	Not null
Till Date	DATE	Not Null
SoldierID	VARCHAR2(20)	Foriegn Key, Not Null
District	VARCHAR2(20)	Foreign Key, Not Null

Family		
Attributes	Datatypes	Constraints
FatherName	VARCHAR(20)	Primary Key(1)
SoldierID	VARCHAR(20)	Primary Key(2), Foreign Key
MotherName	VARCHAR(20)	Primary Key
Children	INT	-
Marital Status	CHAR	NOT NULL

Medals		
Attribute	Data type	Constraints
MedalID	VARCHAR2(20)	Primary Key
Medalname	VARCHAR2(20)	NOT NULL
Prize	INT	NOT NULL

Honors		
Attribute	Data type	Constraints
MedalID	VARCHAR2(20)	Foreign key, not null
SoldierID	VARCHAR2(20)	Foreign key, not null

Salary		
Attribute	Data type	Constraints
SRank	VARCHAR2(20)	Primary Key
Salary	INT	NOT NULL

Weapons_Inventory		
Attribute	Data type	Constraints
RegimentCode	VARCHAR2(20)	Primary Key, Foreign Key
WeaponID	VARCHAR2(20)	Primary Key, Foreign Key
Quantity	INT	Not Null

Vehicle_Inventory		
Attribute	Data type	Constraints
RegimentCode	VARCHAR2(20)	Primary Key(1), Foreign Key
VehicleID	VARCHAR2(20)	Primary Key(2), Foreign Key
Quantity	INT	Not null

Equipment_Inventory		
Attribute	Data type	Constraints
RegimentCode	VARCHAR2(20)	Primary Key(1), Foreign Key
EquipmentID	VARCHAR2(20)	Primary Key(2), Foreign Key
Quantity	INT	Not null

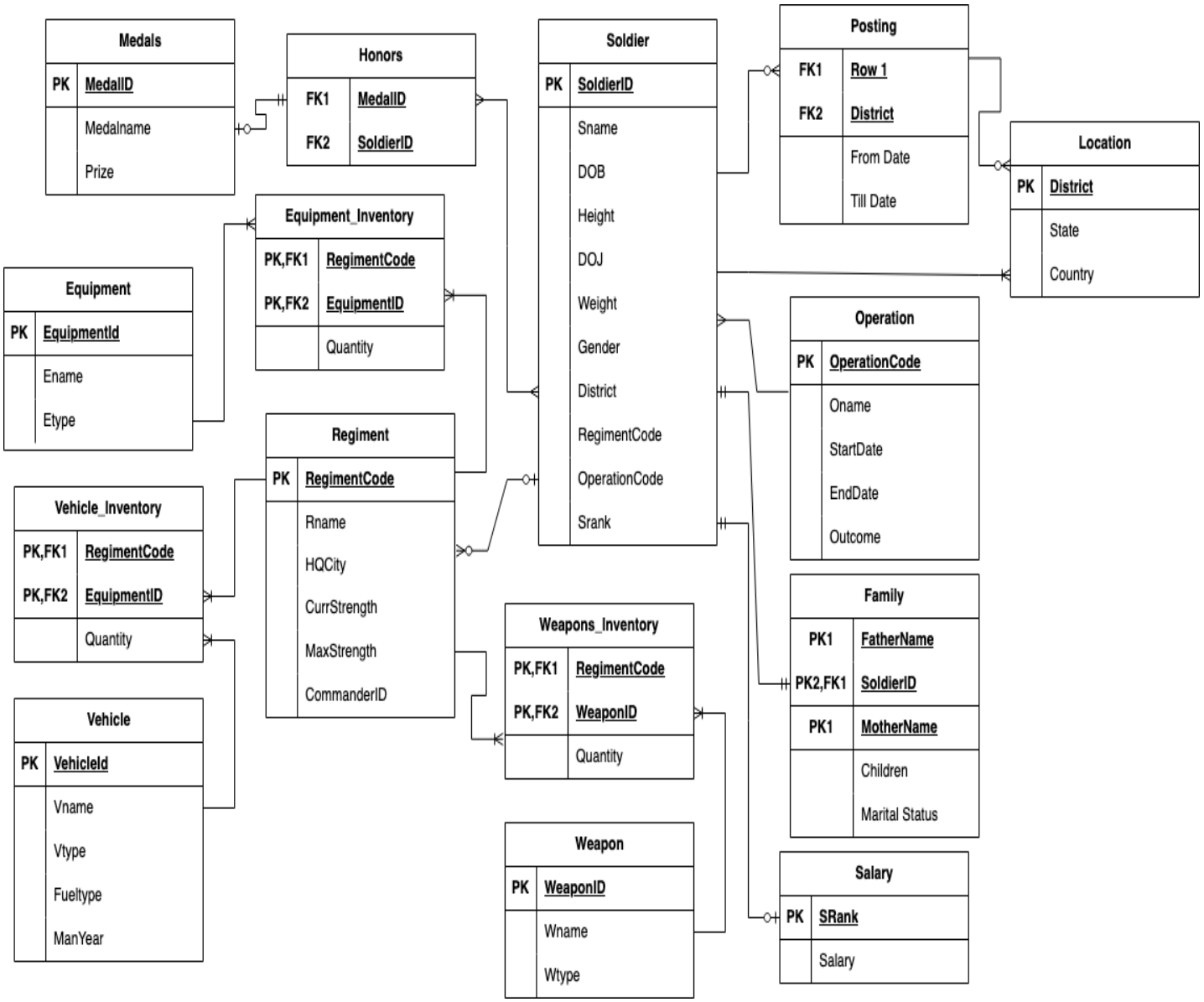
Weapon		
Attribute	Data type	Constraints
WeaponID	VARCHAR2(20)	Primary Key
Wname	VARCHAR2(20)	Not Null
Wtype	VARCHAR2(20)	Not Null

Vehicle		
Attribute	Data type	Constraints
VehicleID	VARCHAR2(20)	Primary Key
Vname	VARCHAR2(20)	Not Null
Vtype	VARCHAR2(20)	Not Null
FuelType	VARCHAR2(20)	Not Null
ManYear	INT	Not Null

Equipment		
Attribute	Data type	Constraints
EquipmentID	VARCHAR2(20)	Primary Key
Ename	VARCHAR2(20)	NOT NULL
Etype	VARCHAR2(20)	NOT NULL

Operation		
Attribute	Data type	Constraints
OperationCode	VARCHAR2(20)	Primary Key
Oname	VARCHAR2(20)	Not Null
StartDate	DATE	Not Null
EndDate	DATE	-
Outcome	VARCHAR2(20)	-

Relational Model



SQL Code

Table Creation :

```
 Create table regiment (
 regimentcode varchar(20) Primary key,
   rname varchar(20) not null,
   hqcity varchar(20) not null,
   currstrength int not null,
   maxstrength int not null,
   commanderid varchar(20) not null
);
create table location (
   district varchar(20) primary key,
   state varchar(20) not null,
   country varchar(20) not null
);
create table salary(
   sRank varchar(20) Primary key,
   salary INT not null
);
create table operation (
   operationcode varchar(20) primary key,
   oname varchar(20) not null,
   startdate date not null,
   enddate date not null,
   outcome varchar(20) not null
);
create table soldier (
   soldierid varchar(20) Primary key,
   sname varchar(20) not null,
   dob date not null,
   doj date not null,
   height int not null,
   weight int not null,
   gender char not null,
   district varchar(20) not null,
   regimentcode varchar(20),
   operationcode varchar(20),
   srank varchar(20) not null,
   foreign key(district) references location(district),
   foreign key (regimentcode) references regiment(regimentcode),
   foreign key (operationcode) references
operation(operationcode),
   foreign key (srank) references salary(srank)
);
create table weapon (
   weaponid varchar(20) Primary key,
   wname varchar(20) not null,
   wtype varchar(20) not null
);
create table vehicle (
   vehicleid varchar(20) Primary key,
   vname varchar(20) not null,
   vtype varchar(20) not null,
   fueltype varchar(20) not null,
   manyear int not null
);
create table equipment (
   equipmentid varchar(20) Primary key,
   ename varchar(20) not null,
   etype varchar(20) not null
);
create table weaponsinventory (
```

```
  quantity int not null,
  regimentcode varchar(20) not null,
  weaponid varchar(20) not null,
  foreign key (regimentcode) references regiment
(regimentcode),
  foreign key (weaponid) references weapon(weaponid)
);
create table vehiclesinventory (
  quantity int not null,
regimentcode varchar(20) not null,
  vehicleid varchar(20) not null,
  foreign key (regimentcode) references regiment
(regimentcode),
  foreign key (vehicleid) references vehicle(vehicleid)
);
create table equipmentsinventory (
  quantity int not null,
  regimentcode varchar(20) not null,
  equipmentid varchar(20) not null,
  foreign key (regimentcode) references regiment
(regimentcode),
  foreign key (equipmentid) references equipment(equipmentid)
);
create table medals (
  medalid varchar(20) primary key,
  medalname varchar(20) not null,
  prize INT not null
);
create table honors (
  medalid varchar(20) not null,
  soldierid varchar(20) not null,
  foreign key (medalid) references medals(medalid),
  foreign key (soldierid) references soldier (soldierid)
);
create table posting (
  pfrom date not null,
  ptill date not null,
  soldierid varchar(20) not null,
  district varchar(20) not null,
  foreign key(soldierid) references soldier(soldierid),
  foreign key(district) references location(district)
);
create table family (
  fathername varchar(20) not null,
  soldierid varchar(20) not null,
  children int not null,
maritalstatus char not null,
  foreign key (soldierid) references soldier (soldierid),
  primary key(soldierid, fathername)
);
```

Insert values:

```
INSERT INTO
regiment
VALUES
  (
     "R01", "Kumaon Regiment", "Ranikhet",57,85, "S12"
  ),
  ( "R02", "Rajput Regiment", "Fatehgarh",61,100, "S05"
  ),
  ( "R03", "Sikh Regiment", "Ramgarh", 75, 120, "S10"
  ),
  ( "R04", "Jat Regiment", "Bareilly", 51, 95, "S18"
  );
INSERT INTO
operation
VALUES
  ( "O01", "Operation Sahyog", '2018-09-24', '2018-11- 17',
"Successful"
```

```
),
  ( "O02", "Operation Calm Down", '2016-05-11', '2016- 08-02',
"Successful"
),
  ( "O03", "Operation All Out", '2015-06-13', '2015-07- 22',
"Unsuccessful"
),
  ( "O04", "Operation Maitri", '2015-02-02', '2015-05- 07',
"Successful"
);
INSERT INTO
salary
VALUES
  ("Soldier", 25000),
  ("Major", 58000),
  ("Captain", 47500),
  ("Colonel", 65000),
  ("Brigadier", 73000),
  ("Lieutenant", 35000);
INSERT INTO
  location
VALUES
  ("Lucknow", "Uttar Pradesh", "India"),
  ("Bhopal", "Madhya Pradesh", "India"),
  ("Meerut", "Uttar Pradesh", "India"),
  ("Patna", "Bihar", "India"),
  ("Jalandhar", "Punjab", "India"),
  ("Almora", "Uttarakhand", "India"),
  ("Chandigarh", "Punjab", "India"),
  ("Tehri", "Uttarakhand", "India"),
  ("Indore", "Madhya Pradesh", "India"),
  ("Allahabad", "Uttar Pradesh", "India");
INSERT INTO
soldier
VALUES
  ( "S01", "Arjun Pratap", '1987-12-12', '2009-03-13',
      176,
      72, 'M', "Bhopal", "R02", "O03", "Colonel"
  ),
  ( "S02", "Saurabh Pandit", '1980-02-15', '2008-12-09',
      179,
      73, 'M', "Meerut", "R02", "O02", "Soldier"
  ),
  ( "S03", "Shubham Verma", '1990-02-24', '2011-04-15',
      182,
      76, 'M', "Bhopal", "R01", "O01", "Soldier"
  ),
  ( "S04", "Mayank Kumvat", '1978-06-14', '2011-09-21',
      163,
      69, 'M', "Almora", "R03", "O01", "Lieutenant"
  ),
  ( "S05", "Satveer Thakur", '1980-04-20', '2004-10-19',
      162,
      65, 'M', "Jalandhar", "R02", "O03", "Major"
),
( "S06", "Hamid Ahmed", '1976-06-10', '2004-02-24',
168,
    70, 'M', "Chandigarh", "R01", "O01", "Brigadier"
),
( "S07", "Ajay Singh", '1984-04-12', '2003-07-09',
    175,
    79, 'M', "Chandigarh", "R04", "O04", "Lieutenant"
),
( "S08", "Avantika Kulkarni", '1990-04-26', '2009-08-18',
    164,
    62, 'F', "Indore", "R04", "O02", "Soldier"
),
( "S09", "Abhishek Saxena", '1975-05-12', '2012-05-16',
    181,
    76, 'M', "Tehri", "R01", "O01", "Brigadier"
```

```
),
( "S10", "Rajveer Singh", '1969-02-15', '2000-03-25',
   173,
   70, 'M', "Allahabad", "R03", "O02", "Captain"
),
( "S11", "Karan Jagtap", '1988-02-05', '2011-09-02',
   167,
   70, 'M', "Allahabad", "R04", "O03", "Captain"
),
( "S12", "Vinay Kumar", '1972-07-07', '2004-04-01',
   169,
   65, 'M', "Meerut", "R01", "O04", "Colonel"
),
( "S13", "Rajat Talesra", '1976-09-19', '2007-10-24',
   172,
   76, 'M', "Patna", "R02", "O03", "Colonel"
),
( "S14", "Ankur Ranjan", '1969-10-11', '2001-07-22',
   169,
   64, 'M', "Almora", "R03", "O01", "Captain"
),
( "S15", "Disha Singh", '1983-09-18', '2008-02-28',
   165,
   65, 'F', "Lucknow", "R04", "O04", "Brigadier"
),
( "S16", "Niranjan Arya", '1971-12-04', '2010-10-21',
171,
      69, 'M', "Lucknow", "R02", "O02", "Lieutenant"
  ),
  ( "S17", "Dheeru Sachdev", '1981-01-19', '2015-12-31',
      168,
      66, 'M', "Tehri", "R03", "O01", "Soldier"
  ),
  ( "S18", "Vipul Yadav", '1975-06-05', '2004-01-24',
      179,
      74, 'M', "Indore", "R04", "O03", "Major"
  ),
  ( "S19", "Brijmohan Singh", '1998-11-25', '2014-02-12',
      173,
      65, 'M', "Lucknow", "R01", "O04", "Soldier"
  ),
  ( "S20", "Harminder Kaur", '1971-12-17', '2015-11-25',
      165,
      62, 'F', "Patna", "R02", "O04", "Colonel"
  );
INSERT INTO
weapon
VALUES
  ("W01", "Glock 17", "Pistol"),
  ("W02", "SPAS 15", "Shotgun"),
  ("W03", "Micro UZI", "SMG"),
  ("W04", "MP5", "SMG"),
  ("W05", "Steyr AUG", "AR"),
  ("W06", "AKM", "AR"),
  ("W07", "Barrett M95", "Sniper Rifle"),
  ("W08", "M4A1 Carbine", "AR"),
  ("W09", "Steyr SSG", "Sniper Rifle"),
  ("W10", "M249", "Machine Gun");
INSERT INTO
vehicle
VALUES
  (  "V01",  "Force Gurkha",  "Ligh Utility",  "Petrol", 2001
  ),
  ("V02", "AL Stallion", "Carrier", "Diesel", 2008),
  (  "V03",  "Sisu Nasu",  "All Terrain",  "Diesel", 1999
),
  ("V04", "Isuzu F", "Carrier", "Diesel", 2007),
  (  "V05",  "Arjun MBT",  "Battle Tank",  "Petrol", 1990
  ),
  ("V06", "Ajeya", "Battle Tank", "Diesel", 1996),
```

```
  (  "V07",  "Sarath",  "Infantry combat",  "Diesel", 2011
  ),
  (  "V08",  "Mazda R1",  "Light Utility",  "Petrol", 2009
  );
INSERT INTO
equipment
VALUES
  ("E01", "MKU Helmet", "Protective gear"),
  ("E02", "Kevlar Vest", "Protective gear"),
  ("E03", "Nigh Vision Goggle", "Utility"),
  ("E04", "HE Grenade", "Utility"),
  ("E05", "Health Pack", "Medicine"),
  ("E06", "First Aid Kit", "Medicine");
INSERT INTO
  weaponsinventory
VALUES
  (12, "R01", "W01"),
  (8, "R01", "W02"),
  (6, "R01", "W03"),
  (8, "R01", "W04"),
  (7, "R01", "W05"),
  (5, "R01", "W06"),
  (4, "R01", "W07"),
  (3, "R01", "W08"),
  (8, "R01", "W09"),
  (4, "R01", "W10"),
  (15, "R02", "W01"),
  (10, "R02", "W02"),
  (5, "R02", "W03"),
  (8, "R02", "W04"),
  (6, "R02", "W05"),
  (4, "R02", "W06"),
  (6, "R02", "W07"),
  (8, "R02", "W08"),
  (4, "R02", "W09"),
  (3, "R02", "W10"),
  (20, "R03", "W01"),
  (10, "R03", "W02"),
  (9, "R03", "W03"),
  (5, "R03", "W04"),
  (6, "R03", "W05"),
  (7, "R03", "W06"),
  (8, "R03", "W07"),
  (10, "R03", "W08"),
  (4, "R03", "W09"),
  (5, "R03", "W10"),
  (16, "R04", "W01"),
  (8, "R04", "W02"),
  (10, "R04", "W03"),
  (8, "R04", "W04"),
  (6, "R04", "W05"),
  (6, "R04", "W06"),
  (8, "R04", "W07"),
  (4, "R04", "W08"),
  (8, "R04", "W09"),
  (5, "R04", "W10");
INSERT INTO
  vehiclesinventory
VALUES
  (5, "R01", "V01"),
  (2, "R01", "V03"),
  (8, "R01", "V04"),
  (3, "R01", "V05"),
  (3, "R02", "V01"),
  (6, "R02", "V08"),
  (4, "R02", "V02"),
  (8, "R02", "V06"),
  (2, "R03", "V02"),
  (6, "R03", "V03"),
  (8, "R03", "V04"),
```

```
  (4, "R03", "V06"),
  (3, "R04", "V08"),
  (7, "R04", "V04"),
  (6, "R04", "V06"),
  (2, "R04", "V03");
INSERT INTO
  equipmentsinventory
VALUES
  (54, "R01", "E01"),
  (37, "R01", "E02"),
  (46, "R01", "E03"),
  (42, "R01", "E04"),
  (40, "R01", "E05"),
  (42, "R01", "E06"),
  (44, "R02", "E01"),
  (57, "R02", "E02"),
  (56, "R02", "E03"),
  (62, "R02", "E04"),
  (40, "R02", "E05"),
  (72, "R02", "E06"),
  (44, "R03", "E01"),
  (32, "R03", "E02"),
  (39, "R03", "E03"),
  (60, "R03", "E04"),
  (45, "R03", "E05"),
  (35, "R03", "E06"),
  (50, "R04", "E01"),
  (30, "R04", "E02"),
  (25, "R04", "E03"),
  (58, "R04", "E04"),
  (27, "R04", "E05"),
  (38, "R04", "E06");
INSERT INTO
medals
VALUES
  ("M01", "Param Vir Chakra", 75000),
  ("M02", "Ashok Chakra", 65000),
  ("M03", "Kirti Chakra", 50000),
  ("M04", "Sarvottam Seva Medal", 42500),
  ("M05", "Uttam Seva Medal", 35550),
  ("M06", "Sena Medal", 15000);
INSERT INTO
honors
VALUES
  ("M03", "S04"),
  ("M06", "S10"),
  ("M01", "S01"),
  ("M02", "S12"),
  ("M03", "S05"),
  ("M01", "S10"),
  ("M03", "S18"),
  ("M02", "S19"),
  ("M05", "S10"),
  ("M04", "S18"),
  ("M01", "S18"),
  ("M06", "S01"),
  ("M02", "S03"),
  ("M05", "S05"),
  ("M01", "S07"),
  ("M04", "S08"),
  ("M02", "S09"),
  ("M04", "S20"),
  ("M06", "S16"),
  ("M05", "S04"),
  ("M06", "S03"),
  ("M02", "S15"),
  ("M03", "S03");
INSERT INTO
posting
VALUES
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  ('2017-10-23', '2020-10-22', "S01", "Lucknow"),
  ('2015-09-13', '2020-10-24', "S02", "Almora"),
  ('2016-07-02', '2020-08-10', "S03", "Tehri"),
  ('2017-11-11', '2020-11-12', "S04", "Meerut"),
  ('2015-10-07', '2020-11-09', "S05", "Patna"),
  ('2018-12-18', '2020-12-26', "S06", "Meerut"),
  ('2016-06-12', '2020-07-15', "S07", "Allahabad"),
  ('2015-10-13', '2020-11-20', "S08", "Patna"),
  ('2017-12-20', '2020-09-29', "S08", "Lucknow"),
  ('2015-11-09', '2020-06-06', "S09", "Lucknow"),
  ('2018-01-01', '2020-09-07', "S10", "Tehri"),
  ('2018-10-02', '2020-09-15', "S10", "Jalandhar"),
  ('2016-02-08', '2020-07-12', "S11", "Chandigarh"),
  ('2017-05-16', '2020-11-09', "S12", "Bhopal"),
  ('2015-12-01', '2020-05-19', "S12", "Allahabad"),
  ('2018-04-28', '2020-10-17', "S13", "Jalandhar"),
  ('2016-12-12', '2020-06-19', "S14", "Lucknow"),
  ('2017-07-19', '2020-05-18', "S15", "Bhopal"),
  ('2018-06-21', '2020-08-08', "S15", "Almora"),
  ('2016-07-16', '2020-02-12', "S16", "Chandigarh"),
  ('2017-03-21', '2020-04-12', "S16", "Tehri"),
  ('2015-05-11', '2020-06-04', "S16", "Lucknow"),
  ('2018-10-24', '2020-06-15', "S17", "Meerut"),
  ('2017-08-16', '2020-11-11', "S18", "Almora"),
  ('2015-04-21', '2020-07-15', "S19", "Allahabad"),
  ('2016-01-16', '2020-11-13', "S20", "Lucknow");
INSERT INTO
family
VALUES
  ("Kuwar Pratap", "S01", 1, 'Y'),
  ("Ashok Pandit", "S02", 0, 'N'),
  ("Rajeev Verma", "S03", 0, 'Y'),
  ("Manas Kumvat", "S04", 0, 'N'),
  ("Nilesh Thakur", "S05", 0, 'Y'),
  ("Ajaz Ahmed", "S06", 0, 'N'),
  ("Shantanu Singh", "S07", 2, 'Y'),
  ("Mahesh Kulkarni", "S08", 2, 'Y'),
  ("Prateek Saxena", "S09", 2, 'Y'),
  ("Aman Singh", "S10", 3, 'Y'),
  ("Arjun Jagtap", "S11", 1, 'Y'),
  ("Vijay Kumar", "S12", 0, 'N'),
  ("Naman Talesra", "S13", 0, 'Y'),
  ("Aditya Ranjan", "S14", 1, 'Y'),
  ("Akbar Singh", "S15", 3, 'Y'),
  ("Dhirendra Arya", "S16", 0, 'N'),
  ("Harshvardhan Sachdev", "S17", 2, 'Y'),
  ("Umesh Yadav", "S18", 1, 'Y'),
  ("Balkishore Singh", "S19", 1, 'Y'),
  ("Jaspreet Kaur", "S20", 2, 'Y');
```

Tables

1. Soldier

SOLDIERID	SNAME	DOB	DOJ	HEIGHT	WEIGHT	GENDER	DISTRICT	REGIMENTCODE	OPERATIONCODE	SRANK
S02	Saurabh Pandit	02-FEB-80	13-DEC-08	179	73	M	Meerut	R02	O02	Soldier
S03	Shubham Verma	24-FEB-90	15-JUN-11	182	76	M	Bhopal	R01	O01	Soldier
S06	Hamid Ahmed	04-AUG-80	21-NOV-04	162	65	M	Chandigarh	R01	O01	Brigadier
S09	Abhishek Saxena	12-JUN-75	23-OCT-12	181	76	M	Tehri	R01	O01	Brigadier
S05	Satveer Thakur	04-AUG-80	21-NOV-04	162	65	M	Jalandhar	R02	O03	Major
S08	Avantika Kulkarni	26-JUN-90	18-SEP-09	164	62	F	Indore	R04	O02	Soldier
S11	Karan Jagtap	05-SEP-88	02-OCT-11	167	70	M	Allahabad	R04	O03	Captain
S12	Vinay Kumar	07-SEP-72	01-OCT-04	169	65	M	Meerut	R01	O04	Colonel
S13	Rajat Talesra	09-OCT-76	24-JUL-07	172	76	M	Patna	R02	O03	Colonel
S19	Brijmohan Singh	11-DEC-98	07-JAN-14	173	65	M	Lucknow	R01	O04	Soldier
S17	Dheeru Sachdev	18-DEC-81	21-SEP-15	168	66	M	Tehri	R03	O01	Soldier
S01	Arjun Pratap	12-DEC-87	13-MAR-09	176	72	M	Bhopal	R02	O03	Colonel
S04	Mayank Kumar	17-JUL-78	21-JUN-11	163	69	M	Almora	R03	O01	Lieutenant
S07	Ajay Singh	12-JUN-84	09-SEP-03	175	79	M	Chandigarh	R04	O04	Lieutenant
S10	Rajveer Singh	23-FEB-69	17-MAR-00	173	70	M	Allahabad	R03	O02	Captain
S14	Ankur Ranjan	11-NOV-69	13-JUL-01	169	76	M	Almora	R03	O01	Captain
S15	Disha Singh	18-NOV-83	13-SEP-08	165	65	F	Lucknow	R04	O04	Brigadier
S16	Niranjan Arya	18-DEC-71	21-SEP-10	171	69	M	Lucknow	R02	O02	Lieutenant
S18	Vipul Yadav	18-DEC-75	21-JAN-04	179	74	M	Indore	R04	O03	Major
S20	Harminder Kaur	11-AUG-71	23-JAN-15	165	62	F	Patna	R02	O04	Colonel

2. Regiment

REGIMENTCODE	RNAME	HQCITY	CURRSTRENGTH	MAXSTRENGTH	COMMANDERID
R01	Kumaon Regiment	Ranikhet	57	85	S12
R03	Sikh Regiment	Ramgarh	75	120	S10
R02	Rajput Regiment	Fatehgarh	61	100	S05
R04	Jat Regiment	Bareilly	51	95	S18

3. Location

DISTRICT	STATE	COUNTRY
Patna	Bihar	India
Bhopal	Madhya Pradesh	India
Indore	Madhya Pradesh	India
Chandigarh	Punjab	India
Jalandhar	Punjab	India
Allahabad	Uttar Pradesh	India
Lucknow	Uttar Pradesh	India
Meerut	Uttar Pradesh	India
Almora	Uttarakhand	India
Tehri	Uttarakhand	India

4. Posting

PFROM	PTILL	SOLDIERID	DISTRICT
23-NOV-17	22-NOV-20	S01	Lucknow
23-NOV-17	23-DEC-20	S08	Lucknow
23-JUL-17	23-DEC-20	S09	Lucknow
23-JUL-17	17-JAN-20	S14	Lucknow
17-AUG-17	17-OCT-20	S16	Lucknow
17-JUN-17	07-JAN-20	S20	Lucknow
17-JUN-17	27-JUN-20	S18	Almora
28-JUN-17	27-MAY-20	S03	Tehri
28-JUN-17	27-JUN-20	S10	Tehri
17-JUN-17	07-JAN-20	S02	Almora
28-JUN-17	27-DEC-20	S05	Patna
08-AUG-17	27-JUN-20	S04	Meerut
28-JUN-17	27-DEC-20	S16	Tehri
28-JUN-17	27-JAN-20	S08	Patna

5.Family

FATHERNAME	SOLDIERID	CHILDREN	MARITALSTATUS	MOTHERNAME
Kuwar Pratap	S01	1	Y	Sita Pratap
Umesh Yadav	S18	0	Y	Sita Yadav
Manas Kumvat	S04	0	N	Rinki Kumvat
Ajaz Ahmed	S06	0	N	Nushrat Ahmed
Dhirendra Arya	S16	0	N	MAnchila Arya
Rajeev Verma	S03	0	Y	Manju Verma
Nilesh Thakur	S05	0	Y	Nimki Thakur
Shantanu Singh	S07	0	Y	Jaspreet Singh
Aman Singh	S10	0	Y	MAndeep Singh
Balkishore Singh	S19	0	Y	Harsha Singh
Jaspreet Kaur	S20	0	Y	Narsha Kaur
Ashok Pandit	S02	0	N	Nisha Kulkarni
Mahesh Kulkarni	S08	0	Y	Nisha Kulkarni
Prateek Saxena	S09	0	Y	Aisha Saxena

6. Medals

MEDALID	MEDALNAME	PRIZE
M04	Sarvottam Seva Medal	42500
M01	Param Vir Chakra	75000
M02	Ashok Chakra	65000
M03	Kirti Chakra	50000
M05	Uttam Seva Medal	35550
M06	Sena Medal	15000

7. Honors

MEDALID	SOLDIERID
M05	S05
M01	S01
M01	S10
M01	S18
M02	S03
M03	S04
M03	S04
M03	S03
M04	S20
M04	S08
M05	S04
M06	S10
M06	S01
M02	S09

8.Salary

SRANK	SALARY
Soldier	25000
Major	58000
Captain	47500
Colonel	65000
Brigadier	73000
Lieutenant	35000

9.WeaponInventory

QUANTITY	REGIMENTCODE	WEAPONID
12	R01	W01
12	R01	W01
8	R01	W02
6	R01	W03
8	R01	W04
7	R01	W05
5	R01	W06
4	R01	W07
3	R01	W08
8	R01	W09
4	R01	W10
15	R02	W01

10. VehicleInventory

QUANTITY	REGIMENTCODE	VEHICLEID
5	R01	V01
2	R01	V02
8	R01	V03
15	R01	V04
5	R01	V05
10	R01	V06
4	R01	V07
3	R01	V08
6	R02	V01
3	R02	V02

11. EquipmentInventory

QUANTITY	REGIMENTCODE	EQUIPMENTID
54	R01	E01
54	R01	E01
54	R01	E01
54	R01	E01
54	R01	E01
38	R04	E01
38	R04	E02
42	R04	E03
44	R04	E04
36	R04	E05

12. Vehicle

VEHICLEID	VNAME	VTYPE	FUELTYPE	MANYEAR
V02	AL Stallion	Carrier	Diesel	2008
V03	Sisu Nasu	All Terrain	Diesel	1999
V04	Isuzu F	Carrier	Diesel	2007
V05	Arjun MBT	Battle Tank	Petrol	1990
V06	Ajeya	Battle Tank	Diesel	1996
V07	Sarath	Infantry Combat	Diesel	2011
V08	Mazda R1	Light Utility	Petrol	2009
V01	Force Gurkha	Light Utility	Petrol	2001

13. Weapon

WEAPONID	WNAME	WTYPE
W01	Glock 17	Pistol
W02	SPAS 15	Shotgun
W03	Micro UZI	SMG
W04	MP5	SMG
W05	Steyr AUG	AR
W06	AKM	AR
W07	Barrett M95	Sniper Riffle
W08	M4A1 Carbine	AR
W09	Steyr SSG	Sniper Riffle
W10	M249	Machine Gun

14. Equipment

Resize Code Edit

EQUIPMENTID	ENAME	ETYPE
E02	Kevlar Vest	Protective Gear
E03	Nigh Vision Goggle	Utility
E04	HE Grenade	Utility
E05	Health Pack	Medicine
E06	First Aid Kit	Medicine
E01	MKU Helmet	Protective Gear

15. Operations

OPERATIONCODE	ONAME	STARTDATE	ENDDATE	OUTCOME
O02	Operation Calm Down	11-MAY-16	02-AUG-16	Successful
O03	Operation All Out	13-JUN-15	22-AUG-15	Unsuccessful
O04	Operation Maitri	02-FEB-15	07-MAY-15	Successful
O01	Operation Sahyog	24-SEP-18	17-NOV-18	Successful

Normalization

1. **Soldier**
   Candidate Key- { SoldierID }
   Prime attributes- {SoldierID}
   Non prime attribute- {Sname, DOB, DOJ, Weight, Height, Gender, District, RegimentCode,OperationCode, Srank}
   All attributes depend on the SoldierID.
   There is no partial dependency, no sub attribute of candidate key exists. Thus it is in 2NF.
   There is no non-prime→ non-prime FD. Thus the table is in 3NF.
   All determinants are strictly candidate keys, Hence the table is in BCNF.

2. **Regiment**
   Candidate Key- { RegimentCode }
   Prime attributes- {RegimentCode}
   Non prime attribute- {Rname, HQCity, CurrStrength, MaxStrength, CommanderID}
   All attributes depend on the RegimentCode.
   There is no partial dependency, no sub attribute of candidate key exists. Thus it is in 2NF.
   There is no non-prime→ non-prime FD. Thus the table is in 3NF.
   All determinants are strictly candidate keys, Hence the table is in BCNF.

3. **Location**
   Candidate Key- { District}
   Prime attributes- {District}
   Non prime attribute- {State, Country}
   All attributes depend on the District.
   There is no partial dependency, no sub attribute of candidate key exists. Thus it is in 2NF.
   There is no non-prime→ non-prime FD. Thus the table is in 3NF.
   All determinants are strictly candidate keys, Hence the table is in BCNF.

4. **Family**
   Candidate Key- { FatherName + SoldierID, MotherName + SoldierID}
   Prime attributes- {FatherName, MotherName, SoldierID}
   Non prime attribute- {Children, Marital Status}
   Here subset SoldierID determines Marital Status of the soldier.
   There is partial dependency. Thus we divide the table for marital status + SoldierID as Family_Marital and Family_Children.
   Table Marital status + SoldierID is in BCNF.
   Table FatherName + SoldierID + MotherName doesn't have non-prime→ non-prime FD. Thus the table is in 3NF.
   All determinants are strictly candidate keys, Hence the table is in BCNF.

5. **Posting**
   Foreign Key- { SoldierID + District }
   Prime attributes- {SoldierID, District}
   Non prime attribute- {From Date, Till Date}
   All attributes depend on the SoldierID + District.
   There is no partial dependency. Thus it is in 2NF.
   There is no non-prime→ non-prime FD. Thus the table is in 3NF.

All determinants are strictly candidate keys, Hence the table is in BCNF.

6. **Medals**
   Candidate Key- { MedalID }
   Prime attributes- {MedalID}
   Non prime attribute- {MedalName, Prize}
   All attributes depend on the MedalID.
   There is no partial dependency, no sub attribute of candidate key exists. Thus it is in 2NF.
   There is no non-prime→ non-prime FD. Thus the table is in 3NF.
   All determinants are strictly candidate keys, Hence the table is in BCNF.

7. **Salary**
   Candidate Key- { Srank }
   Prime attributes- {Srank}
   Non prime attribute- {Salary}
   All attributes depend on the Srank.
   There is no partial dependency, no sub attribute of candidate key exists. Thus it is in 2NF.
   There is no non-prime→ non-prime FD. Thus the table is in 3NF.
   All determinants are strictly candidate keys, Hence the table is in BCNF.

8. **Weapons_Inventory**
   Candidate Key- { RegimentCode + WeaponID}
   Prime attributes- {RegimentCode, WeaponID}
   Non prime attribute- {Quantity}
   All attributes depend on the RegimentCode + WeaponID.
   There is no partial dependency. Thus it is in 2NF.
   There is no non-prime→ non-prime FD. Thus the table is in 3NF.
   All determinants are strictly candidate keys, Hence the table is in BCNF.

9. **Vehicle_Inventory**
   Candidate Key- { RegimentCode + VehicleID }
   Prime attributes- {RegimentCode, VehicleID}
   Non prime attribute- {Quantity}
   All attributes depend on the RegimentCode + VehicleID
   There is no partial dependency. Thus it is in 2NF.
   There is no non-prime→ non-prime FD. Thus the table is in 3NF.
   All determinants are strictly candidate keys, Hence the table is in BCNF.

10. **Equipment_Inventory**
    Candidate Key- {RegimentCode + EquipmentID}
    Prime attributes- {RegimentCode, EquipmentID}
    Non prime attribute- {Quantity}
    All attributes depend on the {RegimentCode, EquipmentID}.
    There is no partial dependency. Thus it is in 2NF.
    There is no non-prime→ non-prime FD. Thus the table is in 3NF.
    All determinants are strictly candidate keys, Hence the table is in BCNF.

11. **Weapon**
    Candidate Key- { WeaponID }
    Prime attributes- {WeaponID}
    Non prime attribute- {Wname, Wtype}
    All attributes depend on the WeaponID.
    There is no partial dependency, no sub attribute of candidate key exists. Thus it is in 2NF.

There is no non-prime→ non-prime FD. Thus the table is in 3NF.
All determinants are strictly candidate keys, Hence the table is in BCNF.

12. **Vehicle**
    Candidate Key- { VehicleID }
    Prime attributes- {VehicleID}
    Non prime attribute- {Vname, Vtype, FuelType, ManYear}
    All attributes depend on the VehicleID.
    There is no partial dependency, no sub attribute of candidate key exists. Thus it is in 2NF.
    There is no non-prime→ non-prime FD. Thus the table is in 3NF.
    All determinants are strictly candidate keys, Hence the table is in BCNF.

13. **Equipment**
    Candidate Key- { EquipmentID }
    Prime attributes- {EquipmentID}
    Non prime attribute- {Ename, Etype}
    All attributes depend on the EquipmentID.
    There is no partial dependency, no sub attribute of candidate key exists. Thus it is in 2NF.
    There is no non-prime→ non-prime FD. Thus the table is in 3NF.
    All determinants are strictly candidate keys, Hence the table is in BCNF.

14. **Operations**
    Candidate Key- { OperationCode }
    Prime attributes- {OperationCode}
    Non prime attribute- {Oname, StartDate, EndDate, Outcome}
    All attributes depend on the OperationCode.
    There is no partial dependency, no sub attribute of candidate key exists. Thus it is in 2NF.
    There is no non-prime→ non-prime FD. Thus the table is in 3NF.
    All determinants are strictly candidate keys, Hence the table is in BCNF.

Normalized Relational Model