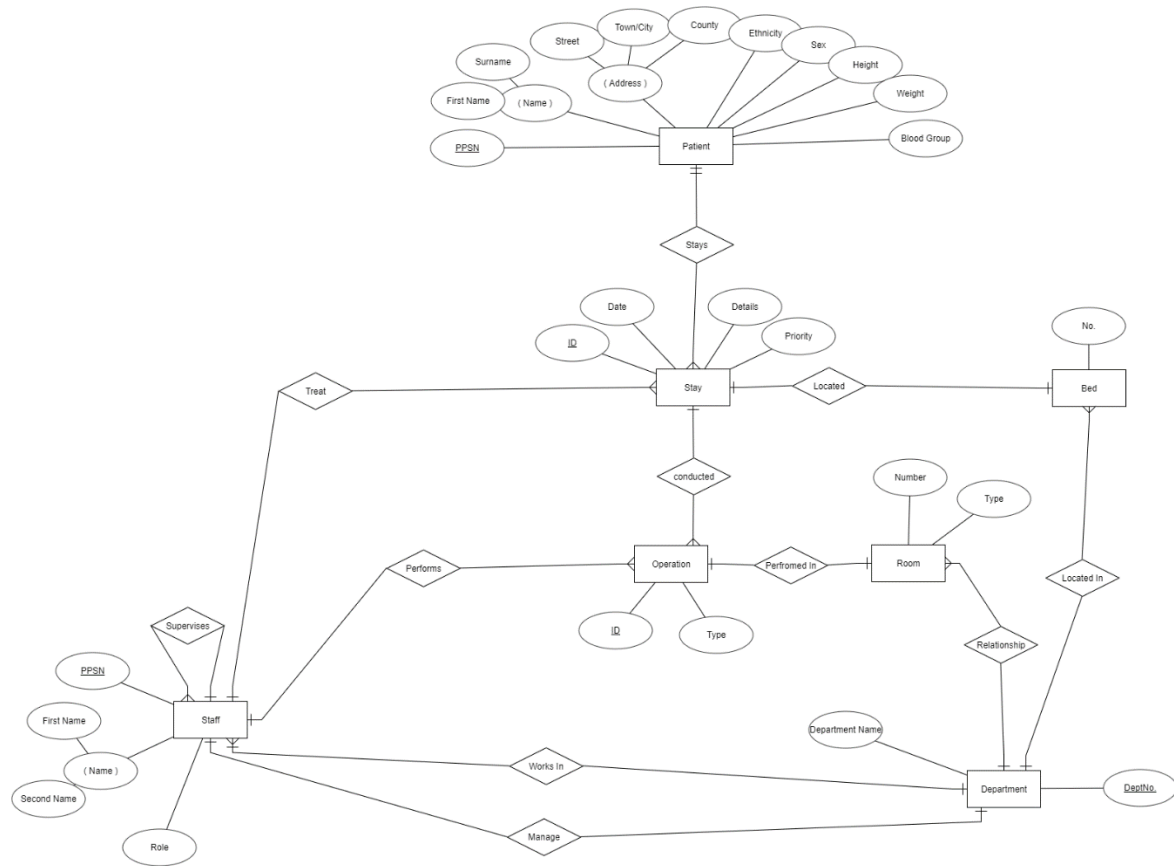

HOSPITAL DATABASE PROJECT

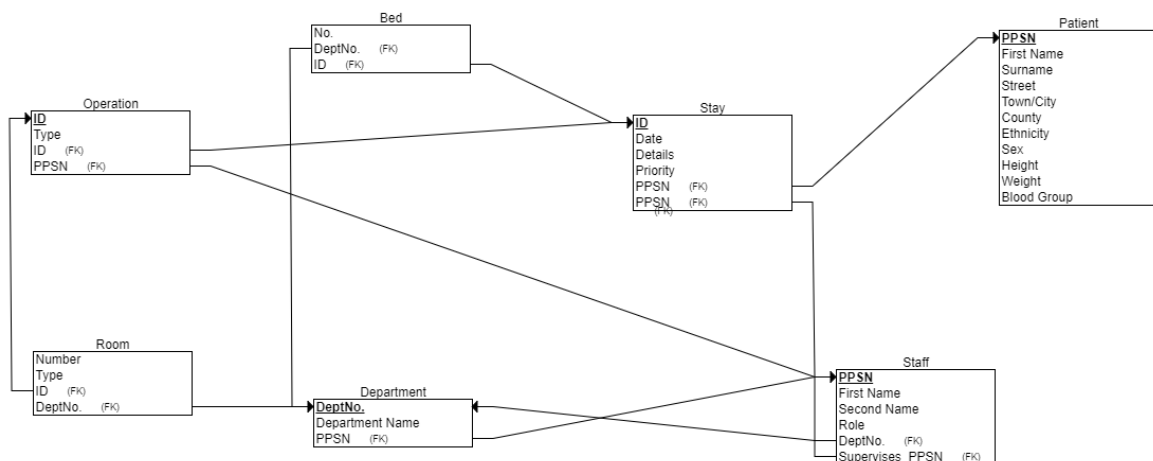
My project takes the form of a patient management system for a hospital. My database allows the recording of patients' stays with the hospital and assigns doctors to their cases as necessary. The Database can keep track of a patients history with the hospital by simply searching all cases which they are associated with. Using my database allows a viewer to keep track of all procedures conducted on a patient by whom, where the procedure was conducted which hospital department is responsible etc.

I have created some views on the patient table which can separate information necessary for clerical work and information needed for medical work. As such by only granting administrative staff access to the administrative view then information regarding the patients health physicality etc would be hidden from those who it doesn't concern. Vice versa doctors could be given access to the medical view for patients and therefore needn't see details regarding the patients address etc.

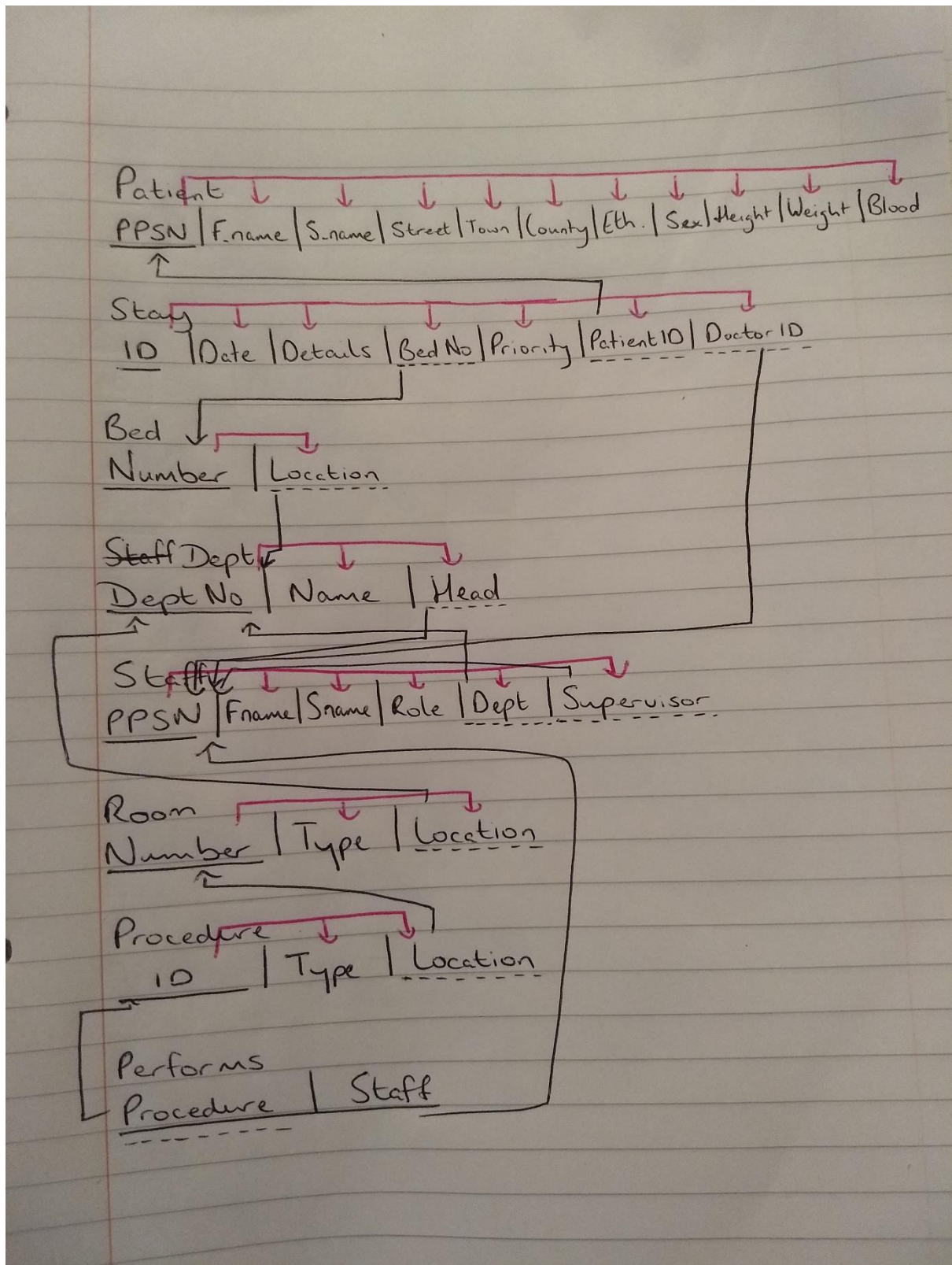
Entity Relationship Diagram



Relational Schema



Functional Dependency Diagram



Assumptions/Constraints

- An individual patient may be associated with multiple cases, i.e. returning patients.
- One Doctor is responsible for the patient's case at any one time however a doctor may deal with multiple cases at the same time.
- A Stay does not necessarily require a bed.
- Staff belong to only one department.
- Rooms belong to only one department.
- Multiple Staff may be involved in a procedure for example a surgery performed by a team of doctors and nurses.

Examples of:

- View Creation
 - CREATE VIEW patient_med_details AS SELECT First_Name, Surname, Ethnicity, Sex, Height, Weight, Blood_Group FROM patient;
- Use of relational select, table joins (across more than one table)
 - CREATE VIEW patient_doctor AS (SELECT patient.First_Name AS patientFirstName, patient.Surname AS patientSurname , staff.First_Name AS doctorFirstName, staff.Second_Name AS doctorSurname FROM patient INNER JOIN stay ON (patient.PPSN = stay.Patient) INNER JOIN staff ON (stay.Doctor = staff.PPSN));
- Update operations.
 - UPDATE department SET Dept_Head = '7764512f' WHERE DeptNo = '1';
 - UPDATE patient SET Blood_Group = 'O-' WHERE PPSN = '1234567r';

Appendix: Commands Used to Create Database

1. CREATE TABLE Patient
2. (
3. PPSN CHAR(8) NOT NULL,
4. First_Name VARCHAR(12) NOT NULL,
5. Surname VARCHAR(20) NOT NULL,
6. Street VARCHAR(16) NOT NULL,
7. Town VARCHAR(16) NOT NULL,
8. County VARCHAR(16) NOT NULL,
9. Ethnicity VARCHAR(16) NOT NULL,
10. Sex CHAR(1) NOT NULL,
11. Height INT NOT NULL,
12. Weight INT NOT NULL,
13. Blood_Group VARCHAR(3) NOT NULL,
14. PRIMARY KEY (PPSN)
- 15.);
- 16.
17. CREATE TABLE Staff
18. (
19. PPSN CHAR(8) NOT NULL,
20. First_Name VARCHAR(16) NOT NULL,
21. Second_Name VARCHAR(20) NOT NULL,
22. Role VARCHAR(20) NOT NULL,
23. Dept INT NOT NULL,
24. Supervisor CHAR(8),
25. PRIMARY KEY (PPSN),
26. FOREIGN KEY (Supervisor) REFERENCES Staff(PPSN)
- 27.);
- 28.
29. CREATE TABLE Department
30. (
31. DeptNo INT NOT NULL,
32. Department_Name VARCHAR(16) NOT NULL,
33. Dept_Head CHAR(8),
34. PRIMARY KEY (DeptNo),
35. FOREIGN KEY (Dept_Head) REFERENCES Staff(PPSN)
- 36.);
- 37.
38. ALTER TABLE Staff ADD FOREIGN KEY (Dept) REFERENCES
Department(DeptNo);

39.
40.CREATE TABLE Bed
41.(
42.Number INT NOT NULL,
43.Location INT NOT NULL,
44.PRIMARY KEY (Number),
45.FOREIGN KEY (Location) REFERENCES Department(DeptNo)
46.);
47.
48.CREATE TABLE Stay
49.(
50.ID INT NOT NULL,
51.Date DATE NOT NULL,
52.Details VARCHAR(512),
53.Bed_No INT,
54.Priority INT NOT NULL,
55.Patient CHAR(8) NOT NULL,
56.Doctor CHAR(8) NOT NULL,
57.PRIMARY KEY (ID),
58.FOREIGN KEY (Patient) REFERENCES Patient(PPSN),
59.FOREIGN KEY (Doctor) REFERENCES Staff(PPSN),
60.FOREIGN KEY (Bed_No) REFERENCES Bed(Bed_No)
61.);
62.
63.
64.CREATE TABLE Room
65.(
66. Number INT NOT NULL,
67. Type VARCHAR(16) NOT NULL,
68. Location INT NOT NULL,
69. PRIMARY KEY (Number),
70. FOREIGN KEY (Location) REFERENCES Department(DeptNo)
71.);
72.
73.CREATE TABLE Operation
74.(
75. ID INT NOT NULL,
76. Type VARCHAR(16) NOT NULL,
77. Room INT NOT NULL,
78. Patient_Case INT NOT NULL,

```

79. PRIMARY KEY (ID),
80. FOREIGN KEY (Room) REFERENCES Room(Number),
81. FOREIGN KEY (Patient_Case) REFERENCES Stay(ID)
82.);
83.
84.CREATE TABLE Performs
85.(
86. Operation INT NOT NULL,
87. Staff CHAR(8) NOT NULL,
88. PRIMARY KEY (Operation, Staff),
89. FOREIGN KEY (Operation) REFERENCES Operation(ID),
90. FOREIGN KEY (Staff) REFERENCES Staff(PPSN)
91.);
92.
93.ALTER TABLE Patient DROP COLUMN Sex;
94.ALTER TABLE Patient ADD COLUMN Sex ENUM('M','F');
95.
96.ALTER TABLE patient DROP COLUMN Blood_Group;
97.ALTER TABLE patient ADD COLUMN Blood_Group ENUM('A+', 'A-',
    'B+', 'B-', 'AB+', 'AB-', 'O+', 'O-');
98.
99.INSERT INTO patient (PPSN, First_Name, Surname, Street, Town,
    County, Ethnicity, Sex, Height, Weight, Blood_Group) VALUES
    ('67849364t', 'John', 'Smith', 'Main Street' , 'Bray', 'Wicklow', 'Irish', 'M',
    '167', '56', 'A+');
100.      INSERT INTO patient (PPSN, First_Name, Surname, Street,
    Town, County, Ethnicity, Sex, Height, Weight, Blood_Group) VALUES
    ('4512354t', 'Mary', 'McKenna', 'Sea Road' , 'Arklow', 'Wicklow', 'Irish',
    'F', '125', '49', 'A-');
101.      INSERT INTO patient (PPSN, First_Name, Surname, Street,
    Town, County, Ethnicity, Sex, Height, Weight, Blood_Group) VALUES
    ('1234567r', 'Mohammed', 'AlAfra', 'Pearse ST' , 'Dublin', 'Dublin',
    'Arabic', 'M', '174', '77', 'OB-')
102.      UPDATE patient SET Blood_Group = 'O-' WHERE PPSN =
    '1234567r';
103.      INSERT INTO patient (PPSN, First_Name, Surname, Street,
    Town, County, Ethnicity, Sex, Height, Weight, Blood_Group) VALUES
    ('8854621r', 'Alex', 'O'Dwyer', 'Grove Road' , 'Dundalk', 'Louth', 'Irish',
    'M', '184', '84', 'AB+')

```

```

104.      INSERT INTO patient (PPSN, First_Name, Surname, Street,
      Town, County, Ethnicity, Sex, Height, Weight, Blood_Group) VALUES
      ('5562137p', 'Jorge', 'Rivas', 'The Meadows' , 'Shankill', 'Dublin',
      'Spanish', 'M', '184', '79', 'O+');
105.
106.      UPDATE patient SET Blood_Group = 'O-' WHERE PPSN =
      '1234567r';
107.
108.      ALTER TABLE department MODIFY Dept_Head CHAR(8);
109.
110.      INSERT INTO department (DeptNo, Department_Name,
      Dept_Head) VALUES ('0', 'Administration', NULL);
111.      INSERT INTO department (DeptNo, Department_Name,
      Dept_Head) VALUES ('1', 'Medicine', NULL);
112.      INSERT INTO department (DeptNo, Department_Name,
      Dept_Head) VALUES ('2', 'Surgery', NULL);
113.      INSERT INTO department (DeptNo, Department_Name,
      Dept_Head) VALUES ('3', 'Emergency', NULL);
114.      INSERT INTO department (DeptNo, Department_Name,
      Dept_Head) VALUES ('5', 'Facilities', NULL);
115.
116.
117.      INSERT INTO staff (PPSN, First_Name, Second_Name, Role,
      Dept, Supervisor) VALUES ('7764512f', 'William', 'Burke', 'Doctor', '1',
      NULL);
118.      INSERT INTO staff (PPSN, First_Name, Second_Name, Role,
      Dept, Supervisor) VALUES ('1234567r', 'Mohammed', 'AlAfra',
      'Surgeon', '2', NULL);
119.      INSERT INTO staff (PPSN, First_Name, Second_Name, Role,
      Dept, Supervisor) VALUES ('4562112r', 'Mary', 'O'Shea', 'Doctor', '3',
      NULL);
120.      INSERT INTO staff (PPSN, First_Name, Second_Name, Role,
      Dept, Supervisor) VALUES ('5671234h', 'Roy', 'Higgins', 'Groundsman',
      '5', NULL)
121.      INSERT INTO staff (PPSN, First_Name, Second_Name, Role,
      Dept, Supervisor) VALUES ('7768304g', 'Lucinda', 'Dwyer', 'CEO', '0',
      NULL);
122.
123.
124.      INSERT INTO Bed (Number, Location) VALUES ('001', '1');

```



```

125.      INSERT INTO Bed (Number, Location) VALUES ('002', '1');
126.      INSERT INTO Bed (Number, Location) VALUES ('003', '1');
127.      INSERT INTO Bed (Number, Location) VALUES ('004', '1');
128.      INSERT INTO Bed (Number, Location) VALUES ('201', '2');
129.
130.      INSERT INTO Stay (ID, Date, Bed_No, Details, Priority, Patient,
      Doctor) VALUES ('2456', '2018/10/21', '001', 'Patient referred by GP
      with Jaundice', '2', '4512354t', '7764512f');
131.      INSERT INTO Stay (ID, Date, Bed_No, Details, Priority, Patient,
      Doctor) VALUES ('4552', '2018/11/26', '003', 'Patient referred by GP',
      '3', '67849364t', '7764512f');
132.      INSERT INTO Stay (ID, Date, Bed_No, Details, Priority, Patient,
      Doctor) VALUES ('4561', '2018/11/28', '201', 'Patient has urgent case
      of Appendicitis', '1', '5562137p', '1234567r');
133.      INSERT INTO Stay (ID, Date, Bed_No, Details, Priority, Patient,
      Doctor) VALUES ('2312', '2018/11/28', NULL, 'Patient Arrived to A&E
      with Broken Arm', '4', '8854621r', '4562112r');
134.      INSERT INTO Stay (ID, Date, Bed_No, Details, Priority, Patient,
      Doctor) VALUES ('7895', '2018/11/28', NULL, 'Patient Arrived to A&E
      after RTI', '1', '1234567r', '4562112r');
135.      INSERT INTO staff (PPSN, First_Name, Second_Name, Role,
      Dept, Supervisor) VALUES ('7756392u', 'John', 'King', 'Technician', '4',
      '7764512f')
136.
137.      INSERT INTO Room (Number, Type, Location) VALUES ('456',
      'Operating Theatre', '2');
138.      INSERT INTO department (DeptNo, Department_Name,
      Dept_Head) VALUES ('4', 'Radiology', NULL);
139.      INSERT INTO Room (Number, Type, Location) VALUES ('123',
      'X-Ray', '4');
140.      INSERT INTO Room (Number, Type, Location) VALUES ('124',
      'MRI', '4');
141.      INSERT INTO Room (Number, Type, Location) VALUES ('457',
      'Operating Theatre', '2');
142.      INSERT INTO Room (Number, Type, Location) VALUES ('012',
      'Examination Clinic', '1');
143.
144.      UPDATE Room SET Type = 'Operating Theatre' WHERE Type
      = 'Operating Theath';
145.

```

146.

```
147.      INSERT INTO operation (ID, Type, Room, Patient_Case)
VALUES ('1', 'Appendectomy', '456', '4561');
```

```
148.      INSERT INTO operation (ID, Type, Room, Patient_Case)
VALUES ('2', 'X-Ray', '123', '2312');
```

```
149.      INSERT INTO operation (ID, Type, Room, Patient_Case)
VALUES ('3', 'Examination', '012', '4552');
```

```
150.      INSERT INTO operation (ID, Type, Room, Patient_Case)
        VALUES ('4', 'X-Ray', '123', '4552');
```

```
151.      INSERT INTO operation (ID, Type, Room, Patient_Case)
VALUES ('5', 'MRI', '124', '4552');
```

152.

153. INSERT INTO performs (Operation, Staff) VALUES ('1', '1234567r');

154. INSERT INTO performs (Operation, Staff) VALUES ('2', '7756392u');

155. INSERT INTO performs (Operation, Staff) VALUES ('4', '7756392u');

156. INSERT INTO performs (Operation, Staff) VALUES ('5', '7756392u');

157. INSERT INTO performs (Operation, Staff) VALUES ('3', '7764512f');

158.

```
159.      UPDATE department SET Dept_Head = '7764512f' WHERE
      DeptNo = '1';
```

```
160.      UPDATE department SET Dept_Head = '1234567r' WHERE
      DeptNo = '2';
```

```
161.      UPDATE department SET Dept_Head = '4562112r' WHERE
      DeptNo = '3';
```

```
162.      UPDATE department SET Dept_Head = '7768304g' WHERE
      DeptNo = '0';
```

```
163.      UPDATE department SET Dept_Head = '7756392u' WHERE
      DeptNo = '4';
```

```
164.      UPDATE department SET Dept_Head = '5671234h' WHERE
      DeptNo = '5';
```

165.

```
166. CREATE VIEW patient_med_details AS SELECT First_Name,
Surname, Ethnicity, Sex, Height, Weight, Blood_Group FROM patient;
```

```
167.      CREATE VIEW patient_Admin_details AS SELECT First_Name,
          Surname, Street, Town, County FROM patient;
```

```
168.      CREATE VIEW patient_doctor AS ( SELECT
        patient.First_Name AS patientFirstName, patient.Surname AS
        patientSurname , staff.First_Name AS doctorFirstName,
        staff.Second_Name AS doctorSurname FROM patient INNER JOIN
        stay ON (patient.PPSN = stay.Patient) INNER JOIN staff ON
        (stay.Doctor = staff.PPSN) )
```

Appendix: Databse Dump

```
--
```

```
-- Database: `hospital`
```

```
--
```

```
--
```

```
-- Dumping data for table `bed`
```

```
--
```

```
INSERT INTO `bed` (`Number`, `Location`) VALUES
```

```
(1, 1),
```

```
(2, 1),
```

```
(3, 1),
```

```
(4, 1),
```

```
(201, 2);
```

```
--
```

```
-- Dumping data for table `department`
```

```
--
```

```
INSERT INTO `department` (`DeptNo`, `Department_Name`, `Dept_Head`) VALUES
```

```
(0, 'Administration', '7768304g'),
```

```
(1, 'Medicine', '7764512f'),
```

```
(2, 'Surgery', '1234567r'),
```

```
(3, 'Emergency', '4562112r'),
```

```
(4, 'Radiology', '7756392u'),
```

```
(5, 'Facilities', '5671234h');
```

```
--
```

```
-- Dumping data for table `operation`
```

```
--
```

```
INSERT INTO `operation` (`ID`, `Type`, `Room`, `Patient_Case`) VALUES
```

```
(1, 'Appendectomy', 456, 4561),
```

```
(2, 'X-Ray', 123, 2312),
```

```
(3, 'Examination', 12, 4552),
```

```
(4, 'X-Ray', 123, 4552),
```

```
(5, 'MRI', 124, 4552);
```

```
--
```

```
-- Dumping data for table `patient`
```

```
--
```

```
INSERT INTO `patient` (`PPSN`, `First_Name`, `Surname`, `Street`, `Town`, `County`, `Ethnicity`, `Height`,  
`Weight`, `Sex`, `Blood_Group`) VALUES
```

```
('1234567r', 'Mohammed', 'AlAfra', 'Pearse ST', 'Dublin', 'Dublin', 'Arabic', 174, 77, 'M', 'O-'),
```

```
('4512354t', 'Mary', 'McKenna', 'Sea Road', 'Arklow', 'Wicklow', 'Irish', 125, 49, 'F', 'A-'),
```

```
('5562137p', 'Jorge', 'Rivas', 'The Meadows', 'Shankill', 'Dublin', 'Spanish', 184, 79, 'M', 'O+'),
```

```
('67849364', 'John', 'Smith', 'Main Street', 'Bray', 'Wicklow', 'Irish', 167, 56, 'M', 'A+'),
```

```
('8854621r', 'Alex', 'O'Dwyer', 'Grove Road', 'Dundalk', 'Louth', 'Irish', 184, 84, 'M', 'AB+');
```

```
--
```

```
-- Dumping data for table `performs`
```

--

INSERT INTO `performs` (`Operation`, `Staff`) VALUES

(1, '1234567r'),

(2, '7756392u'),

(3, '7764512f'),

(4, '7756392u'),

(5, '7756392u');

--

-- Dumping data for table `room`

--

INSERT INTO `room` (`Number`, `Type`, `Location`) VALUES

(12, 'Examination Clin', 1),

(123, 'X-Ray', 4),

(124, 'MRI', 4),

(456, 'Operating Theatr', 2),

(457, 'Operating Theatr', 2);

--

-- Dumping data for table `staff`

--

INSERT INTO `staff` (`PPSN`, `First_Name`, `Second_Name`, `Role`, `Dept`, `Supervisor`) VALUES

('1234567r', 'Mohammed', 'AlAfra', 'Surgeon', 2, NULL),

('4562112r', 'Mary', 'O\'Shea', 'Doctor', 3, NULL),

('5671234h', 'Roy', 'Higgins', 'Groundsman', 5, NULL),

('7756392u', 'John', 'King', 'Technician', 4, '7764512f'),

```
('7764512f', 'William', 'Burke', 'Doctor', 1, NULL),
```

```
('7768304g', 'Lucinda', 'Dwyer', 'CEO', 0, NULL);
```

```
--
```

```
-- Dumping data for table `stay`
```

```
--
```

```
INSERT INTO `stay` (`ID`, `Date`, `Details`, `Bed_No`, `Priority`, `Patient`, `Doctor`) VALUES
```

```
(2312, '2018-11-28', 'Patient Arrived to A&E with Broken Arm', NULL, 4, '8854621r', '4562112r'),
```

```
(2456, '2018-10-21', 'Patient referred by GP with Jaundice', 1, 2, '4512354t', '7764512f'),
```

```
(4552, '2018-11-26', 'Patient referred by GP', 3, 3, '67849364', '7764512f'),
```

```
(4561, '2018-11-28', 'Patient has urgent case of Appendicitis', 201, 1, '5562137p', '1234567r'),
```

```
(7895, '2018-11-28', 'Patient Arrived to A&E after RTI', NULL, 1, '1234567r', '4562112r');
```

```
-----
```