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## **CS 486/586 Introduction to DBMS**

### **The Graduate Student Project**

### **Healthcare Management and Patient Analytics**

#### **Deliverable 4**

#### **Abstract**

The database project focuses on healthcare and hospital services of a city. In the rapidly evolving landscape of healthcare, effective management and analysis of patient data are critical for improving patient outcomes, optimizing resource allocation, and enhancing operational efficiency within healthcare facilities. Healthcare management systems leverage such comprehensive datasets to streamline various aspects of hospital operations, such as patient admissions, discharge planning, resource utilization, and revenue cycle management. By analyzing trends and patterns in patient data, healthcare administrators and clinicians can make informed decisions to enhance the quality of care provided, and ensure regulatory compliance. This database plays a crucial role in supporting decision-making processes within healthcare organizations. Additionally, researchers can utilize this data to investigate trends in healthcare delivery, assess the effectiveness of specific treatments, and identify areas for improvement in patient care. The hospital inpatient discharges database serves as a foundational element for understanding the dynamics of healthcare systems, contributing to advancements in medical research, policy formulation, and enhancing overall healthcare quality and accessibility.

#### **ER Diagram Design**

The ER diagram delineates the structure of the hospital inpatient discharges by identifying key entities like 'Health Service Area', 'Patient ID' etc. The design strategy emphasized the creation of specified tables to find the data and enhance the efficiency and accuracy of the database layout. This approach seeks to optimize data analysis processes for improved precision.

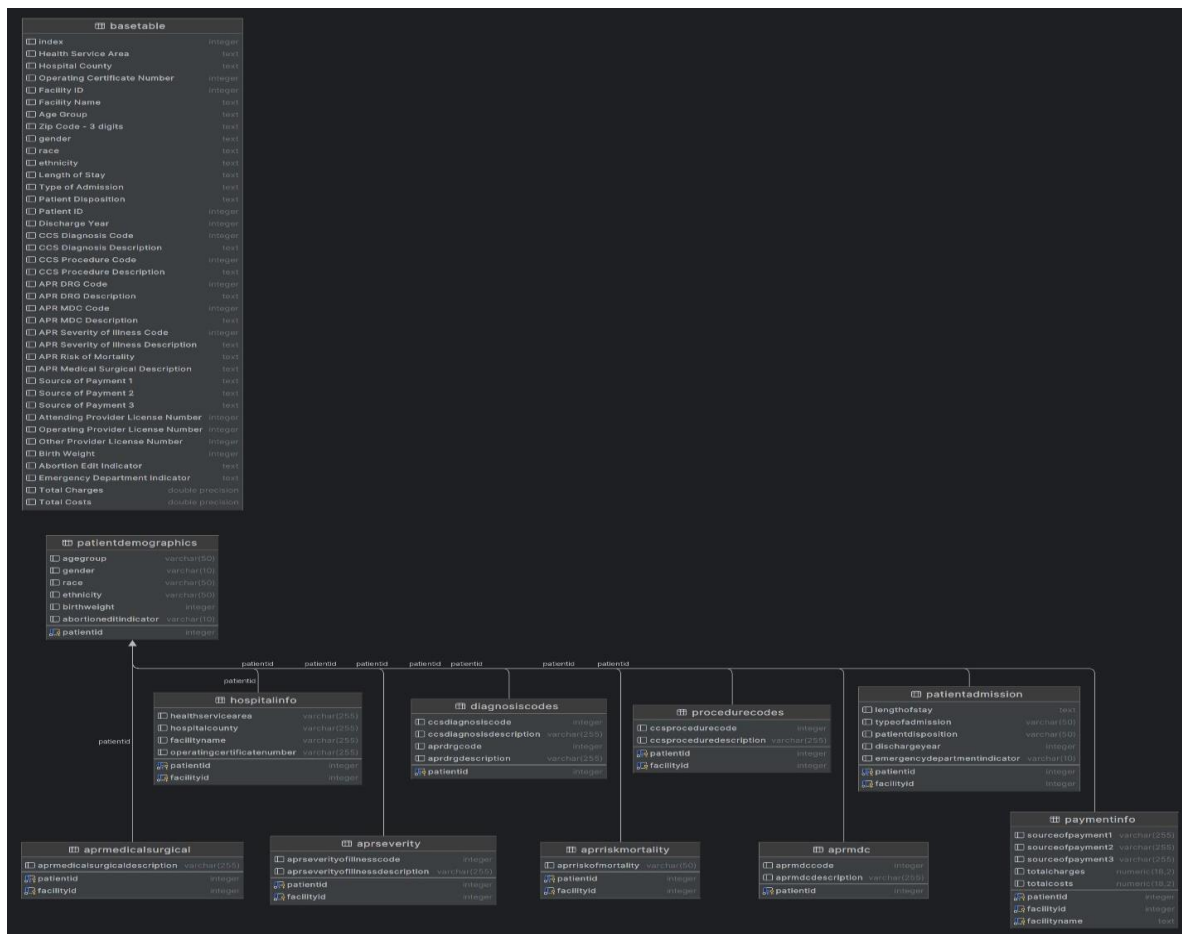


Fig. ER Diagram

## Database Population

In our Healthcare Management and Patient Analytics project, we populated the database by sourcing data from Kaggle in the form of CSV files. The data collected included patient records, healthcare facility information, medical procedures, and other relevant healthcare-related data which is considered as a base table.

The CSV file was then copied from our local to the Linux machine (using ssh) and then we connected to our database management system and utilized the '**copy**' command to efficiently import the CSV data into the corresponding tables in the database.

\copy hospital.basetable from program 'zcat hospital\_inpatient\_discharge.csv.gz' with (format csv, header)

This bulk loading method allowed for seamless transfer of large volumes of data while maintaining data integrity. Once the data was imported, we performed verification checks to ensure its accuracy and completeness.

## CREATING TABLES

Based on the ER diagram, our schema focuses on finding the data by creating tables and enhancing query performance. Through the incorporation of primary and foreign keys, it ensures data integrity and establishes logical relationships across the entire database. Here we have used Abbreviations for few fields:

CCS diagnosis stands for "Clinical Classifications Software diagnosis."

APR Medical Surgical stands for "All Patient Refined Medical Surgical."

APR MDC stands for "All Patient Refined Diagnosis Related Groups Major Diagnostic Category."

APR DRG stands for "All Patient Refined Diagnosis Related Group."

### Creating table hospital

```
create table hospital.baseTable (  
index    integer,  
Health Service Area  text,  
Hospital County    text,  
Operating Certificate Number    integer,  
Facility ID        integer,  
Facility Name      text,  
Age Group          text,  
Zip Code - 3 digits    text,  
gender             text,  
race               text,  
ethnicity          text,  
Length of Stay      text,  
Type of Admission    text,  
Patient Disposition  text,  
Patient ID          integer,
```

Discharge Year     integer,  
 CCS Diagnosis Code     integer,  
 CCS Diagnosis Description     text,  
 CCS Procedure Code     integer,  
 CCS Procedure Description     text,  
 APR DRG Code     integer,  
 APR DRG Description     text,  
 APR MDC Code     integer,  
 APR MDC Description     text,  
 APR Severity of Illness Code     integer,  
 APR Severity of Illness Description     text,  
 APR Risk of Mortality     text,  
 APR Medical Surgical Description     text,  
 Source of Payment 1     text,  
 Source of Payment 2     text,  
 Source of Payment 3     text,  
 Attending Provider License Number     integer,  
 Operating Provider License Number     integer,  
 Other Provider License Number     integer,  
 Birth Weight     integer,  
 Abortion Edit Indicator     text,  
 Emergency Department Indicator     text,  
 Total Charges     double precision,  
 Total Costs     double precision  
 );

**Creating table PatientDemographics**

```
CREATE TABLE hospital.PatientDemographics (  
    PatientID INTEGER primary key,  
    AgeGroup VARCHAR(50),  
    Gender VARCHAR(10),  
    Race VARCHAR(50),  
    Ethnicity VARCHAR(50),  
    BirthWeight INT,  
    AbortionEditIndicator VARCHAR(10) );
```

### **Creating table HospitalInfo**

```
CREATE TABLE hospital.HospitalInfo (  
    PatientID INTEGER,  
    FacilityID integer,  
    HealthServiceArea VARCHAR(255),  
    HospitalCounty VARCHAR(255),  
    FacilityName VARCHAR(255),  
    OperatingCertificateNumber varchar(255),  
    primary key(PatientID, FacilityID), foreign key(PatientID) references  
    hospital.PatientDemographics(PatientID));
```

### **Creating table PatientAdmission**

```
CREATE TABLE hospital.PatientAdmission (  
    PatientID INT,  
    FacilityID integer,  
    LengthOfStay text,  
    TypeOfAdmission VARCHAR(50),  
    PatientDisposition VARCHAR(50),
```

```

        DischargeYear INT,
        EmergencyDepartmentIndicator          VARCHAR(10),
primary key(PatientID, FacilityID), FOREIGN KEY (PatientID) REFERENCES
hospital.PatientDemographics(PatientID) );

```

### Creating table DiagnosisCodes

```

CREATE TABLE hospital.DiagnosisCodes (
        PatientID INT PRIMARY KEY,
        CCSDiagnosisCode INT,
        CCSDiagnosisDescription VARCHAR(255),
        APRDRGCode INT,
        APRDRGDescription VARCHAR(255),
        FOREIGN KEY (PatientID) REFERENCES
hospital.PatientDemographics(PatientID) );

```

### Creating table ProcedureCodes

```

CREATE TABLE hospital.ProcedureCodes (
        PatientID INT,
        FacilityID integer,
        CCSProcedureCode INT,
        CCSProcedureDescription          VARCHAR(255),
primary key(PatientID, FacilityID), FOREIGN KEY (PatientID) REFERENCES
hospital.PatientDemographics(PatientID) );

```

### Creating table APRSeverity

```

CREATE TABLE hospital.APRSeverity (
        PatientID INT,

```

```

        FacilityID integer,
        APRSeverityOfIllnessCode INT,
        APRSeverityOfIllnessDescription VARCHAR(255),
primary key(PatientID, FacilityID), FOREIGN KEY (PatientID) REFERENCES
hospital.PatientDemographics(PatientID) );

```

### **Creating table APRRiskMortality**

```

CREATE TABLE hospital.APRRiskMortality (
        PatientID INT,
        FacilityID integer,
        APRRiskOfMortality VARCHAR(50),
        primary key(PatientID, FacilityID), FOREIGN KEY (PatientID) REFERENCES
hospital.PatientDemographics(PatientID) );

```

### **Creating table APRMDC**

```

CREATE TABLE hospital.APRMDC (
        PatientID INT PRIMARY KEY,
        APRMDCCode INT,
        APRMDCDescription VARCHAR(255),
        FOREIGN KEY (PatientID) REFERENCES
hospital.PatientDemographics(PatientID) );

```

### **Creating table APRMedicalSurgical**

```

CREATE TABLE hospital.APRMedicalSurgical (
        PatientID INT,
        FacilityID integer,

```

```

        APRMedicalSurgicalDescription          VARCHAR(255),
primary key(PatientID, FacilityID), FOREIGN KEY (PatientID) REFERENCES
hospital.PatientDemographics(PatientID) );

```

### Creating table PaymentInfo

```

CREATE TABLE hospital.PaymentInfo (
        PatientID INT,
        FacilityID integer,
        FacilityName text,
        SourceOfPayment1 VARCHAR(255),
        SourceOfPayment2 VARCHAR(255),
        SourceOfPayment3 VARCHAR(255),
        TotalCharges DECIMAL(18, 2),
        TotalCosts DECIMAL(18, 2),
        primary key(PatientID, FacilityID, FacilityName), FOREIGN KEY (PatientID)
REFERENCES hospital.PatientDemographics(PatientID) );

```

### Creating table DistinctHospitals

```

create table hospital.DistinctHospitals(
        FacilityID integer primary key,
        HealthServiceArea VARCHAR(255),
        HospitalCounty VARCHAR(255),
        FacilityName VARCHAR(255) );

```

### Creating View

```

CREATE VIEW hospital.HospitalPatientViews AS
SELECT
    PD.PatientID,
    PD.AgeGroup,

```



```

    PD.Gender,
    HI.FacilityName,
    HI.HealthServiceArea,
    PA.LengthOfStay,
    PA.TypeOfAdmission,
    PC.ccsprocedurecode,
    PC.CCSProcedureDescription,
    ARM.APRRRiskOfMortality,
    PI.SourceOfPayment1,
    PI.TotalCosts
FROM
    hospital.PatientDemographics PD
    INNER JOIN hospital.HospitalInfo HI ON PD.PatientID = HI.PatientID
    INNER JOIN hospital.PatientAdmission PA ON PD.PatientID = PA.PatientID
    LEFT JOIN hospital.ProcedureCodes PC ON PD.PatientID = PC.PatientID
    LEFT JOIN hospital.APRRRiskMortality ARM ON PD.PatientID = ARM.PatientID
    LEFT JOIN hospital.PaymentInfo PI ON PD.PatientID = PI.PatientID;

```

## SQL Queries

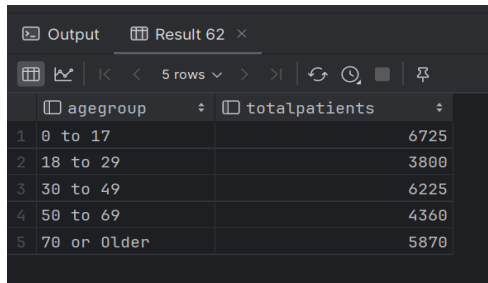
1.How many patients are there in each age group?

```

SELECT
    AgeGroup,
    COUNT(PD.PatientID) AS TotalPatients
FROM
    hospital.PatientDemographics PD
GROUP BY
    AgeGroup
ORDER BY
    AgeGroup;

```

## Output



The screenshot shows a database interface with a table titled 'Result 62'. The table has two columns: 'agegroup' and 'totalpatients'. There are five rows of data representing different age ranges and their corresponding patient counts.

	agegroup	totalpatients
1	0 to 17	6725
2	18 to 29	3800
3	30 to 49	6225
4	50 to 69	4360
5	70 or older	5870

2. List all hospital facilities with the highest average length of stay for patients? Include the following information for each hospital: facility name, average length of stay, total number of patients admitted, counts of patients with low, medium, and high severity of illness, and total charges covered by Medicare and Medicaid?

```
SELECT
    h.FacilityName,
    ROUND(AVG(pa.LengthOfStay)) AS AverageLengthOfStay,
    COUNT(*) AS TotalPatients,
    SUM(CASE WHEN apr.APRSeverityOfIllnessCode = 1 THEN 1 ELSE 0 END) AS
    LowSeverityPatients,
    SUM(CASE WHEN apr.APRSeverityOfIllnessCode = 2 THEN 1 ELSE 0 END) AS
    MediumSeverityPatients,
    SUM(CASE WHEN apr.APRSeverityOfIllnessCode = 3 THEN 1 ELSE 0 END) AS
    HighSeverityPatients,
    SUM(CAST(pmt.TotalCharges AS DECIMAL(18,2)) * (pmt.SourceOfPayment1 = 'Medicare')::INT)
    AS MedicareCharges,
    SUM(CAST(pmt.TotalCharges AS DECIMAL(18,2)) * (pmt.SourceOfPayment2 = 'Medicaid')::INT)
    AS MedicaidCharges
FROM hospital.HospitalInfo h
INNER JOIN hospital.PatientAdmission pa ON h.PatientID = pa.PatientID AND h.FacilityID =
pa.FacilityID
LEFT JOIN hospital.APRSeverity apr ON h.PatientID = apr.PatientID AND h.FacilityID =
apr.FacilityID
LEFT JOIN hospital.PaymentInfo pmt ON h.PatientID = pmt.PatientID AND h.FacilityID =
pmt.FacilityID
GROUP BY h.FacilityName
ORDER BY AverageLengthOfStay DESC
LIMIT 10;
```

**Output**

	facilityname	average...	totalpatients	low...	medium...	high...	medicare...	medicaid...
1	St Francis Hospital - St Fr...	11	675	198	446	31	1763511	1503974
2	Delaware Valley Hospital Inc	9	63	18	27	15	425877	58382
3	Glen Cove Hospital	8	1110	335	527	212	27556363.83	2388077.72
4	United Health Services Hosp...	8	1190	366	556	195	6902830.76	2561741.4
5	St Josephs Hospital	7	1262	177	596	406	15392689.34	3772418.89
6	Samaritan Hospital	7	193	37	66	73	2452919.15	915370.66
7	Clifton Springs Hospital an...	7	209	42	103	49	1664709.93	753461.55
8	Ellis Hospital	7	185	50	116	15	168145.42	479981.7
9	Northern Dutchess Hospital	6	241	36	104	80	7664897.08	912329.49
10	Roswell Park Cancer Institu...	6	635	152	260	171	1828365	3258624.03

3. What is the breakdown of average total charges and patient demographics across hospital facilities? List the top hospitals by average total charges, and for each hospital, include the following information: facility name, average total charges, count of male and female patients, count of patients in different age groups (0 to 17, 50 to 69, and 70 or older)

SELECT

h.FacilityName,

ROUND(AVG(pmt.TotalCharges)) AS AverageTotalCharges,

SUM(CASE WHEN pd.Gender = 'M' THEN 1 ELSE 0 END) AS MalePatients,

SUM(CASE WHEN pd.Gender = 'F' THEN 1 ELSE 0 END) AS FemalePatients,

SUM(CASE WHEN pd.AgeGroup = '0 to 17' THEN 1 ELSE 0 END) AS ChildPatients,

SUM(CASE WHEN pd.AgeGroup = '50 to 69' THEN 1 ELSE 0 END) AS AdultPatients,

SUM(CASE WHEN pd.AgeGroup = '70 or Older' THEN 1 ELSE 0 END) AS SeniorPatients

FROM

hospital.HospitalInfo h

JOIN

hospital.PatientAdmission pa ON h.PatientID = pa.PatientID AND h.FacilityID = pa.FacilityID

JOIN

hospital.PaymentInfo pmt ON h.PatientID = pmt.PatientID AND h.FacilityID = pmt.FacilityID

JOIN

hospital.PatientDemographics pd ON h.PatientID = pd.PatientID

JOIN

hospital.APRSeverity apr ON h.PatientID = apr.PatientID AND h.FacilityID = apr.FacilityID

JOIN

hospital.APRMedicalSurgical ams ON h.PatientID = ams.PatientID AND h.FacilityID = ams.FacilityID

GROUP BY

h.FacilityName

ORDER BY

AverageTotalCharges DESC

LIMIT 10;

## Output

	facilityname	averagetotal...	malepatients	femalepatients	child...	adult...	seniorpatients
1	University Hospital	51746	136	78	25	54	50
2	Glen Cove Hospital	45751	539	571	0	491	454
3	Roswell Park Cancer Insti...	44258	405	230	0	401	0
4	Nyack Hospital	41305	200	0	0	0	200
5	Albany Medical Center Hos...	36582	962	148	881	71	37
6	Northern Dutchess Hospital	32524	20	221	24	0	217
7	Buffalo General Hospital	28732	430	317	15	14	12
8	Women And Children's Hosp...	24432	946	20	956	1	0
9	Putnam Hospital Center	21109	77	36	40	18	26
10	Ellis Hospital	20093	87	98	143	15	6

4. Get info of all the patients with APR Medical Surgical Description="Surgical" and there APR Severity of Illness Description,CCS Diagnosis Description,Type of Admission with there Health Service Area

SELECT

hi.HealthServiceArea,

ams.APRMedicalSurgicalDescription,

asv.APRSeverityOfIllnessDescription,

d.CCSDiagnosisDescription,

pa.TypeOfAdmission

FROM

hospital.HospitalInfo hi

LEFT JOIN

hospital.PatientDemographics pd ON hi.PatientID = pd.PatientID

RIGHT JOIN

hospital.APRMedicalSurgical ams ON hi.PatientID = ams.PatientID

LEFT JOIN

hospital.APRSeverity asv ON hi.PatientID = asv.PatientID AND hi.FacilityID = asv.FacilityID

RIGHT JOIN

hospital.DiagnosisCodes d ON hi.PatientID = d.PatientID

INNER JOIN

hospital.PatientAdmission pa ON hi.PatientID = pa.PatientID

WHERE

ams.APRMedicalSurgicalDescription = 'Surgical'

LIMIT 10;

### Output

	healthservicearea	aprmedicalsurgicaldesc...	aprseverityofillnes...	ccsdiagnosisdescription	typeofadmission
1	Long Island	Surgical	Major	CRUSH/INTERNAL INJURY	Emergency
2	Western NY	Surgical	Major	PANCREAS DISORDER	Elective
3	Central NY	Surgical	Moderate	PRECEREBRAL OCCLUSION	Elective
4	Adiron	Surgical	Moderate	APPENDICITIS	Emergency
5	Hudson Valley	Surgical	Minor	OSTEOARTHRITIS	Elective
6	Southern Tier	Surgical	Moderate	OSTEOARTHRITIS	Elective
7	Central NY	Surgical	Minor	PREVIOUS C-SECTION	Elective
8	Western NY	Surgical	Minor	OSTEOARTHRITIS	Elective
9	Central NY	Surgical	Moderate	FEMALE GENITL PROLAPSE	Elective
10	Hudson Valley	Surgical	Moderate	PREG DIABETES/ABN GLUC	Elective

5. Explore the relationship between risk of mortality, type of admission, emergency department indicator, and hospital procedures and diagnoses. For facilities with extreme risk of mortality, list the facility name along with the following information: risk of mortality category, type of admission, emergency department indicator, total number of procedures performed, average length of stay, and total number of diagnoses

SELECT

hi.FacilityName,

arm.APRRiskOfMortality,

pa.TypeOfAdmission,

pa.EmergencyDepartmentIndicator,

COUNT(pc.CCSProcedureCode) AS TotalProcedures,

AVG(CAST(pa.LengthOfStay AS DECIMAL(10,2))) AS AvgLengthOfStay,

SUM(CASE WHEN d.CCSDiagnosisCode IS NOT NULL THEN 1 ELSE 0 END) AS TotalDiagnoses

FROM

hospital.APRRiskMortality arm

LEFT JOIN

hospital.PatientAdmission pa ON arm.PatientID = pa.PatientID AND arm.FacilityID =  
pa.FacilityID

LEFT JOIN

hospital.HospitalInfo hi ON arm.PatientID = hi.PatientID AND arm.FacilityID = hi.FacilityID

LEFT JOIN

hospital.ProcedureCodes pc ON arm.PatientID = pc.PatientID AND arm.FacilityID =  
pc.FacilityID

LEFT JOIN

hospital.DiagnosisCodes d ON arm.PatientID = d.PatientID

GROUP BY

hi.FacilityName, arm.APRRiskOfMortality, pa.TypeOfAdmission,  
pa.EmergencyDepartmentIndicator

HAVING

arm.aprriskofmortality= 'Extreme'

ORDER BY

hi.FacilityName

LIMIT 10;

## Output

	facilityname	aprriskofmortality	typeofadmission	emergencydepar...	totalprocedures
1	Adirondack Medical Center-Saranac Lake Site	Extreme	Emergency	Y	12
2	Albany Medical Center Hospital	Extreme	Elective	N	5
3	Albany Medical Center Hospital	Extreme	Emergency	N	5
4	Albany Medical Center Hospital	Extreme	Emergency	Y	23
5	Albany Medical Center Hospital	Extreme	Newborn	N	3
6	Albany Medical Center Hospital	Extreme	Urgent	N	1
7	Arnot Ogden Medical Center	Extreme	Emergency	Y	2
8	Arnot Ogden Medical Center	Extreme	Urgent	N	4
9	Auburn Memorial Hospital	Extreme	Emergency	N	1
10	Auburn Memorial Hospital	Extreme	Emergency	Y	4

6. Get the CCSDiagnosisDescription, and the average total charges of the facility and the average length of stay

```

SELECT
hi.FacilityName,
d.CCSDiagnosisDescription,
AVG(pi.TotalCharges) AS AvgTotalCharges,
AVG(pa.LengthOfStay) AS AvgLengthOfStay
FROM hospital.HospitalInfo hi
INNER JOIN hospital.PaymentInfo pi
ON hi.PatientID = pi.PatientID AND hi.FacilityID = pi.FacilityID
INNER JOIN hospital.PatientAdmission pa
ON hi.PatientID = pa.PatientID AND hi.FacilityID = pa.FacilityID
INNER JOIN hospital.DiagnosisCodes d
ON hi.PatientID = d.PatientID
GROUP BY hi.FacilityName, d.CCSDiagnosisDescription
ORDER BY AvgTotalCharges DESC, AvgLengthOfStay ASC
LIMIT 10;

```

## Output

	facilityname	ccsdiagnosisdescription	avgtotalcharges	avglengthofstay
1	Albany Medical Center Hospital	SHORT GEST/LOW BRTHWT	666237.095	97
2	University Hospital	PARKINSON'S DISEASE	545055.64	71
3	University Hospital	ASPIRATION PNEUMONITIS	408509.87	79
4	University Hospital	MULTIPLE MYELOMA	327311.28	28
5	Women And Children's Hospital Of Buffalo	SHORT GEST/LOW BRTHWT	296345.74	58
6	Albany Medical Center Hospital	RESP DISTRSS SYNDROME	274689.57	43.666666666666667
7	University Hospital	CHF	244323.91333333333	17.666666666666667
8	Roswell Park Cancer Institute	LEUKEMIAS	218730.7025	25.916666666666667
9	Albany Medical Center Hospital	SPINAL CORD INJURY	218704.2	25
10	Women And Children's Hospital Of Buffalo	LIVER/BILE DUCT CANCER	215651.44	51

7. Examine the relationship between age group, diagnosis, procedures, length of stay, and total charges for patients aged over 50 with a specific diagnosis code 131. List the facility name along with age group, diagnosis code and description, total number of procedures performed, average length of stay, and total charges.

```

SELECT
hi.FacilityName,
pd.AgeGroup,

```

```

dc.ccsdiagnosiscode,
dc.ccsdiagnosisdescription,
COUNT(pc.CCSProcedureCode) AS TotalProcedures,
AVG(CAST(pa.LengthOfStay AS DECIMAL(10,2))) AS AvgLengthOfStay,
SUM(pm.TotalCharges) AS TotalCharges
FROM
    hospital.DiagnosisCodes dc
RIGHT JOIN
    hospital.HospitalInfo hi ON dc.PatientID = hi.PatientID
RIGHT JOIN
    hospital.PatientDemographics pd ON dc.PatientID = pd.PatientID
LEFT JOIN
    hospital.ProcedureCodes pc ON dc.PatientID = pc.PatientID AND hi.FacilityID = pc.FacilityID
LEFT JOIN
    hospital.PatientAdmission pa ON dc.PatientID = pa.PatientID AND hi.FacilityID = pa.FacilityID
LEFT JOIN
    hospital.PaymentInfo pm ON dc.PatientID = pm.PatientID AND hi.FacilityID = pm.FacilityID
WHERE
    pd.AgeGroup > '50' AND dc.ccsdiagnosiscode = 131
GROUP BY
    hi.FacilityName, pd.AgeGroup, dc.ccsdiagnosiscode, dc.ccsdiagnosisdescription
ORDER BY
    hi.FacilityName
LIMIT 10;
Output

```



	facilityname	agegroup	ccsdiagnosiscode	totalprocedures	avglengthofstay	totalcharges
1	Albany Medical Center Hospital	50 to 69	131	1	2	25489.06
2	Albany Medical Center Hospital	70 or Older	131	1	11	107145.79
3	Arnot Ogden Medical Center	50 to 69	131	1	1	5046.79
4	Claxton-Hepburn Medical Center	50 to 69	131	5	6.4	81744.63
5	Clifton Springs Hospital and Cli...	50 to 69	131	4	7.25	250997.13
6	Glen Cove Hospital	50 to 69	131	1	4	17279.2
7	Glen Cove Hospital	70 or Older	131	1	6	22836
8	Lewis County General Hospital	50 to 69	131	2	3.5	17388.16
9	Little Falls Hospital	50 to 69	131	1	1	3605.85
10	Memorial Hosp of Wm F & Gertrude...	50 to 69	131	4	4	43529.5

8. Count the number of patients who are female admitted with APR DRG Description as HIP JOINT REPLACEMENT and get the facility Id and the operators certificate number with total charges and costs?

```

SELECT hi.facilityid, hi.operatingcertificatenumber,
       COUNT(*) AS GenderFCount,
       COUNT(DISTINCT pa.PatientID) AS TotalAdmissions,
       SUM(pi.TotalCharges) AS TotalCharges,
       SUM(pi.TotalCosts) AS TotalCosts
FROM hospital.HospitalInfo hi
JOIN hospital.PatientDemographics pd ON hi.PatientID = pd.PatientID
JOIN hospital.DiagnosisCodes apr ON hi.PatientID = apr.PatientID
JOIN hospital.PatientAdmission pa ON hi.PatientID = pa.PatientID AND hi.FacilityID = pa.FacilityID
JOIN hospital.PaymentInfo pi ON hi.PatientID = pi.PatientID AND hi.FacilityID = pi.FacilityID
WHERE pd.Gender = 'F'
      AND apr.APRDRGDescription = 'HIP JOINT REPLACEMENT'
GROUP BY hi.facilityid, hi.operatingcertificatenumber
LIMIT 10;

```

## Output

	facilityid	operatingcertificatenumber	genderfcount	totaladmissions	totalcharges	totalcosts
1	1	101000	2	2	69978.8	34901.17
2	42	303001	20	20	690155	347627.61
3	98	601000	2	2	41436.66	25255.72
4	103	602001	14	14	357973.82	142532.85
5	114	427000	3	3	77819.12	35248.38
6	116	701000	2	2	47833.46	17811.87
7	118	701001	8	8	249841.69	109155.48
8	192	1327000	8	8	387526.36	185107.88
9	207	1401014	10	10	416747.57	166915.38
10	218	1401013	1	1	27186.88	15709.39

9. What is the average total charges and costs per admission for patients with Insurance company and bluecross insurance and total admissions in that facility across different hospitals?

SELECT

hi.FacilityID,  
hi.FacilityName,  
pi.sourceofpayment1 AS InsuranceType,  
ROUND(AVG(pi.totalcharges), 2) AS AvgTotalCharges,  
ROUND(AVG(pi.totalcosts), 2) AS AvgTotalCosts,  
COUNT(DISTINCT pa.PatientID) AS TotalAdmissions,  
AVG(CAST(pa.LengthOfStay AS DECIMAL)) AS AvgLengthOfStay

FROM

hospital.HospitalInfo hi

JOIN

hospital.PaymentInfo pi ON hi.PatientID = pi.PatientID AND hi.FacilityID = pi.FacilityID

JOIN

hospital.PatientAdmission pa ON hi.PatientID = pa.PatientID AND hi.FacilityID = pa.FacilityID

JOIN

hospital.PatientDemographics pd ON hi.PatientID = pd.PatientID

WHERE

pi.sourceofpayment1 IN ('Insurance Company', 'Blue Cross')  
AND pd.Gender = 'F' -- Example additional condition: filter by gender

GROUP BY

hi.FacilityID,  
hi.FacilityName,  
pi.sourceofpayment1

LIMIT 10;

**Output**

	facilityid	facilityname	insur...	avgtotalch...	avgtotalcosts	totaladmissions	avglengthofstay
1	1	Albany Medical Center Ho...	Blue Cross	26129.99	7373.14	29	4.7931034482758621
2	1	Albany Medical Center Ho...	Insurance Co...	27899.47	9191.08	75	4.186666666666667
3	37	Cuba Memorial Hospital I...	Blue Cross	981.6	1345.76	12	1.3333333333333333
4	37	Cuba Memorial Hospital I...	Insurance Co...	969.6	1545.07	2	1.5
5	39	Memorial Hosp of Wm F & ...	Blue Cross	5310.52	3415.39	271	2.7232472324723247
6	39	Memorial Hosp of Wm F & ...	Insurance Co...	4555.84	3233.08	119	2.4033613445378151
7	42	United Health Services H...	Blue Cross	19347.16	8961.04	172	6.2151162790697674
8	42	United Health Services H...	Insurance Co...	15830.57	7235.42	81	5.6049382716049383
9	66	Olean General Hospital	Blue Cross	3075.45	1865.22	59	2.2033898305084746
10	66	Olean General Hospital	Insurance Co...	3605.8	2012.88	174	2.6494252873563218

10. What is the average total cost, total charges and the charge difference for the specific insurance type for both male and female with their average length of stay where the Average Total Charges are higher than the overall Average Total Charges, from the hospital database?

SELECT

hi.FacilityID,

hi.FacilityName,

pi.SourceOfPayment1 AS InsuranceType,

ROUND(AVG(pi.TotalCharges), 2) AS AvgTotalCharges,

ROUND(AVG(pi.TotalCosts), 2) AS AvgTotalCosts,

ROUND(AVG(pi.TotalCharges) - (SELECT AVG(TotalCharges) FROM hospital.PaymentInfo), 2) AS ChargeDifference,

COUNT(CASE WHEN pd.Gender = 'M' THEN 1 END) AS MaleCount,

COUNT(CASE WHEN pd.Gender = 'F' THEN 1 END) AS FemaleCount,

ROUND(AVG(CAST(pa.LengthOfStay AS INT)), 2) AS AvgLengthOfStay

FROM

hospital.HospitalInfo hi

INNER JOIN

hospital.PatientDemographics pd ON hi.PatientID = pd.PatientID

INNER JOIN

hospital.PaymentInfo pi ON hi.PatientID = pi.PatientID AND hi.FacilityID = pi.FacilityID

INNER JOIN

hospital.PatientAdmission pa ON hi.PatientID = pa.PatientID AND hi.FacilityID = pa.FacilityID

LEFT JOIN

```
(SELECT PatientID, CCSDiagnosisDescription
FROM hospital.DiagnosisCodes
GROUP BY PatientID, CCSDiagnosisDescription
ORDER BY COUNT(*) DESC
LIMIT 1) dc ON hi.PatientID = dc.PatientID
```

LEFT JOIN

```
(SELECT PatientID, CCSProcedureDescription
FROM hospital.ProcedureCodes
GROUP BY PatientID, CCSProcedureDescription
ORDER BY COUNT(*) DESC
LIMIT 1) pc ON hi.PatientID = pc.PatientID
```

GROUP BY

```
hi.FacilityID,
hi.FacilityName,
pi.SourceOfPayment1,
CCSDiagnosisDescription,
CCSProcedureDescription
```

LIMIT 10;

**Output**

	❏ faci...	❏ facilityname	❏ insurance...	❏ avgto...	❏ av...	❏ charge...	❏ male...	❏ femalecount	❏ avgleng...
1	1	Albany Medical Cen...	Blue Cross	27081.33	8460.3	11068.4	255	29	4.38
2	1	Albany Medical Cen...	CHAMPUS	36727.18	11484.76	20714.26	6	1	5.14
3	1	Albany Medical Cen...	Insurance Company	29578.29	9230	13565.37	525	75	4.46
4	1	Albany Medical Cen...	Medicaid	84979.19	19836.72	68966.26	128	15	12.5
5	1	Albany Medical Cen...	Medicare	38781.72	13566.25	22768.8	23	25	6.58
6	1	Albany Medical Cen...	Other Federal Pr...	13787	7491.89	-2225.93	1	0	2
7	1	Albany Medical Cen...	Other Non-Federa...	53422.71	21302.75	37409.79	5	2	8.29
8	1	Albany Medical Cen...	Self-Pay	25865.67	8543.05	9852.74	18	1	4.37
9	1	Albany Medical Cen...	Workers Compensa...	17739.97	6587.77	1727.04	1	0	2
10	37	Cuba Memorial Hosp...	Blue Cross	985.07	1345.77	-15027.86	10	12	1.36

11. Which facilities have the highest total charges and total patients in that facility with averages charges per patients?

SELECT

```

    HI.FacilityName,
    SUM(PI.TotalCharges) AS TotalCharges,
    COUNT(DISTINCT PD.PatientID) AS TotalPatients,
    ROUND(SUM(PI.TotalCharges) / COUNT(DISTINCT PD.PatientID), 2) AS AvgChargesPerPatient
FROM
    hospital.PaymentInfo PI
JOIN
    hospital.HospitalInfo HI ON PI.PatientID = HI.PatientID AND PI.FacilityID = HI.FacilityID
JOIN
    hospital.PatientDemographics PD ON PI.PatientID = PD.PatientID
JOIN
    hospital.PatientAdmission PA ON PI.PatientID = PA.PatientID AND PI.FacilityID = PA.FacilityID
GROUP BY
    HI.FacilityName
ORDER BY
    TotalCharges DESC
LIMIT 10;

```

## Output

	facilityname	totalcharges	totalpatients	avgchargesperpatient
1	Glen Cove Hospital	50783394.47	1110	45750.81
2	Albany Medical Center Hospital	40605643.35	1110	36581.66
3	Roswell Park Cancer Institute	28103718.97	635	44257.83
4	Women And Children's Hospital Of Buffalo	23601290.76	966	24431.98
5	United Health Services Hospitals Inc. - Binghamton General Hospi...	23414154.39	1190	19675.76
6	Buffalo General Hospital	21462728.82	747	28731.9
7	St Josephs Hospital	21282713.11	1262	16864.27
8	St. Mary's Healthcare	19742091.07	1724	11451.33
9	Auburn Memorial Hospital	13445224.25	1351	9952.05
10	Woman's Christian Association	13286731.35	951	13971.33

12. Which healthcare facilities have the most diverse range of diagnoses with count of patients and unique admission types in the facility?

```

SELECT
    HI.FacilityName,
    COUNT(DISTINCT DC.CCSDiagnosisCode) AS UniqueDiagnosesCount,

```

```

COUNT(DISTINCT PD.PatientID) AS TotalPatients,
COUNT(DISTINCT PA.TypeOfAdmission) AS UniqueAdmissionTypes
FROM
    hospital.HospitalInfo HI
JOIN
    hospital.DiagnosisCodes DC ON HI.PatientID = DC.PatientID
JOIN
    hospital.PatientDemographics PD ON HI.PatientID = PD.PatientID
JOIN
    hospital.PatientAdmission PA ON HI.PatientID = PA.PatientID AND HI.FacilityID = PA.FacilityID
GROUP BY
    HI.FacilityName
ORDER BY
    UniqueDiagnosesCount DESC
LIMIT 10;

```

### Output

	facilityname	unique diagnoses count	total patients	unique admission types
1	St. Mary's Healthcare	156	1724	4
2	Albany Medical Center Hospital	151	1118	4
3	Woman's Christian Association	140	951	4
4	Auburn Memorial Hospital	130	1351	5
5	St Josephs Hospital	127	1262	3
6	Adirondack Medical Center-Saranac Lake Site	123	937	5
7	Women And Children's Hospital Of Buffalo	121	966	4
8	Nathan Littauer Hospital	120	1088	3
9	Olean General Hospital	120	1350	3
10	Mount St Marys Hospital and Health Center	119	724	4

13. List the top 10 diagnoses along with the number of occurrences and their associated procedure descriptions. add patient id , facility id, facility name and hospital county apply distinct on hospital county

```

SELECT
    DC.PatientID,
    DC.CCSDiagnosisCode,
    DC.CCSDiagnosisDescription,
    COUNT(PC.CCSProcedureCode) AS Occurrences,
    HI.FacilityID,
    HI.FacilityName,

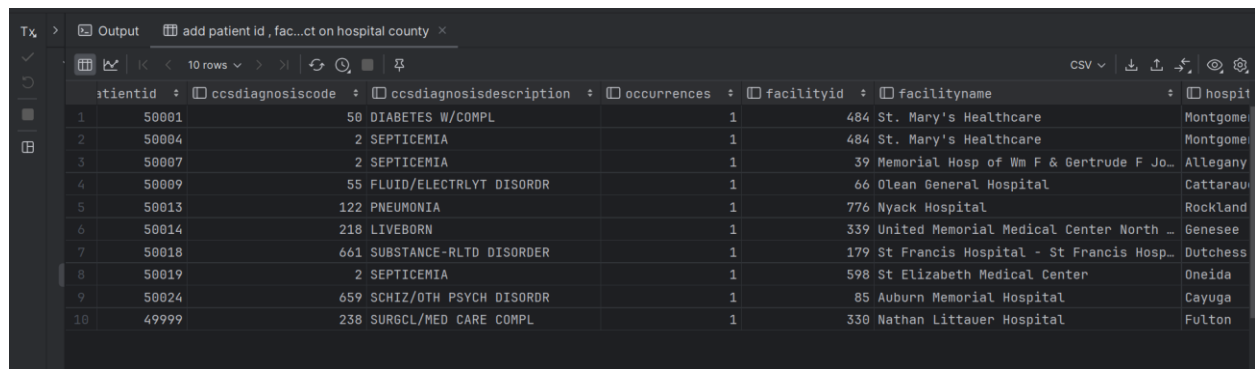
```

```

    HI.HospitalCounty
FROM
    hospital.DiagnosisCodes DC
LEFT JOIN
    hospital.ProcedureCodes PC ON DC.PatientID = PC.PatientID
LEFT JOIN
    hospital.HospitalInfo HI ON DC.PatientID = HI.PatientID
GROUP BY
    DC.PatientID, DC.CCSDiagnosisCode, DC.CCSDiagnosisDescription, HI.FacilityID,
    HI.FacilityName, HI.HospitalCounty
ORDER BY
    Occurrences DESC
LIMIT 10;

```

## Output



The screenshot shows a database query output window with a table containing 10 rows of patient data. The table has columns for PatientID, CCSDiagnosisCode, CCSDiagnosisDescription, Occurrences, FacilityID, FacilityName, and HospitalCounty. The data is sorted by Occurrences in descending order.

PatientID	CCSDiagnosisCode	CCSDiagnosisDescription	Occurrences	FacilityID	FacilityName	HospitalCounty
50001	50	DIABETES W/COMPL	1	484	St. Mary's Healthcare	Montgomery
50004	2	SEPTICEMIA	1	484	St. Mary's Healthcare	Montgomery
50007	2	SEPTICEMIA	1	39	Memorial Hosp of Wm F & Gertrude F Jo...	Allegany
50009	55	FLUID/ELECTRLYT DISORDR	1	66	Olean General Hospital	Cattaraugus
50013	122	PNEUMONIA	1	776	Nyack Hospital	Rockland
50014	218	LIVEBORN	1	339	United Memorial Medical Center North ...	Genesee
50018	661	SUBSTANCE-RLTD DISORDER	1	179	St Francis Hospital - St Francis Hosp...	Dutchess
50019	2	SEPTICEMIA	1	598	St Elizabeth Medical Center	Oneida
50024	659	SCHIZ/OTH PSYCH DISORDR	1	85	Auburn Memorial Hospital	Cayuga
49999	238	SURGCL/MED CARE COMPL	1	330	Nathan Littauer Hospital	Fulton

14. Find the number of patients for each APR DRG description, categorized by ethnicity.

```

SELECT
    D.APRDRGDescription,
    P.Ethnicity,
    COUNT(DISTINCT P.PatientID) AS PatientCount
FROM
    hospital.DiagnosisCodes D
JOIN
    hospital.PatientDemographics P ON D.PatientID = P.PatientID
LEFT JOIN
    hospital.HospitalInfo H ON D.PatientID = H.PatientID
LEFT JOIN
    hospital.ProcedureCodes PC ON D.PatientID = PC.PatientID
WHERE
    H.HealthServiceArea IS NOT NULL

```

```

AND PC.CCSProcedureCode IS NOT NULL
AND P.AgeGroup IN ('18 to 29', '30 to 49') -- Filter by age group
AND P.Gender = 'F' -- Filter by gender
GROUP BY
    D.APRDRGDescription,
    P.Ethnicity
HAVING
    COUNT(DISTINCT H.FacilityID) > 1 -- Only include patients who visited multiple facilities
ORDER BY
    D.APRDRGDescription DESC,
    P.Ethnicity
LIMIT 10;

```

## Output



aprdrgdescription	ethnicity	patientcount
1 VIRAL MENINGITIS	Not Span/Hispanic	5
2 VIRAL ILLNESS	Not Span/Hispanic	4
3 VERTIGO & OTHER LABYRINTH DISORDERS	Not Span/Hispanic	4
4 VAGINAL DELIVERY W STERILIZATION &/OR D&C	Not Span/Hispanic	43
5 VAGINAL DELIVERY W STERILIZATION &/OR D&C	Spanish/Hispanic	3
6 VAGINAL DELIVERY W COMPLICATING PROCEDURES EXC STERILIZATION &/OR D&C	Not Span/Hispanic	4
7 VAGINAL DELIVERY	Not Span/Hispanic	1499
8 VAGINAL DELIVERY	Spanish/Hispanic	106
9 VAGINAL DELIVERY	Unknown	39
10 UTERINE & ADNEXA PROCEDURES FOR OVARIAN & ADNEXAL MALIGNANCY	Not Span/Hispanic	7

15. What are the top 10 health service areas, facilities, and their corresponding patient statistics, including patient count, types of admission count, total charges, total costs, maximum APR risk of mortality, maximum APR severity of illness, and maximum APR medical-surgical description?

```

SELECT
    hi.HealthServiceArea,
    hi.FacilityID,
    hi.FacilityName,
    COUNT(DISTINCT hi.PatientID) AS PatientCount,
    COUNT(DISTINCT pa.TypeOfAdmission) AS TypeOfAdmissionCount,
    SUM(pi.TotalCharges) AS TotalCharges,
    SUM(pi.TotalCosts) AS TotalCosts,
    MAX(risk.APRRiskOfMortality) AS MaxAPRRiskOfMortality,
    MAX(severity.APRSeverityOfIllnessDescription) AS MaxAPRSeverityOfIllness,
    MAX(surgical.APRMedicalSurgicalDescription) AS MaxAPRMedicalSurgical
FROM

```



```

hospital.HospitalInfo hi
JOIN hospital.PatientAdmission pa ON hi.PatientID = pa.PatientID AND hi.FacilityID =
pa.FacilityID
JOIN hospital.PaymentInfo pi ON hi.PatientID = pi.PatientID AND hi.FacilityID = pi.FacilityID
LEFT JOIN hospital.APRRiskMortality risk ON hi.PatientID = risk.PatientID AND hi.FacilityID =
risk.FacilityID
LEFT JOIN hospital.APRSeverity severity ON hi.PatientID = severity.PatientID AND hi.FacilityID =
severity.FacilityID
LEFT JOIN hospital.APRMedicalSurgical surgical ON hi.PatientID = surgical.PatientID AND
hi.FacilityID = surgical.FacilityID
GROUP BY
    hi.HealthServiceArea,
    hi.FacilityID,
    hi.FacilityName
LIMIT 10;

```

## Output

	hea...	faci...	facilityname	pa...	typ...	totalc...	tota...	maxap...	max...	maxaprseverityof
1	Adiron	1	Albany Medical C...	1110	4	40605643.35	11834464.53	Moderate	Surgical	Moderate
2	Adiron	174	Delaware Valley ...	63	3	850012	511555.73	Moderate	Medical	Moderate
3	Adiron	303	Elizabethtown Co...	84	3	665425.38	1009808.24	Moderate	Medical	Moderate
4	Adiron	309	Moses-Ludington ...	254	2	2077111.2	1868205.76	Moderate	Medical	Moderate
5	Adiron	324	Adirondack Medic...	937	5	9314918.52	5052931.39	Moderate	Surgical	Moderate
6	Adiron	330	Nathan Littauer ...	1008	3	11172061.56	5402607.93	Moderate	Surgical	Moderate
7	Adiron	484	St. Mary's Healt...	1724	4	19742091.07	10687149.56	Moderate	Surgical	Moderate
8	Adiron	756	Samaritan Hospit...	193	3	3571020.77	1389403.78	Moderate	Surgical	Moderate
9	Adiron	829	Ellis Hospital	185	4	3717114.04	1252931.66	Moderate	Surgical	Moderate
10	Adiron	851	Cobleskill Regio...	145	2	1083077.06	849606.32	Moderate	Surgical	Moderate

16. Calculate the total charges for patients with a specific CCS Procedure description, considering only facilities with a high APR Risk of Mortality level.

```

SELECT
    PI.PatientID,
    PI.FacilityID,
    PI.FacilityName,
    PC.CCSProcedureDescription,
    SUM(PI.TotalCharges) AS TotalCharges
FROM
    hospital.PaymentInfo PI
JOIN
    hospital.ProcedureCodes PC ON PI.PatientID = PC.PatientID AND PI.FacilityID = PC.FacilityID
JOIN (

```

```

SELECT
    PatientID,
    FacilityID
FROM
    hospital.APRRRiskMortality
WHERE
    APRRRiskOfMortality = 'Major'
) HighRiskFacilities ON PI.PatientID = HighRiskFacilities.PatientID AND PI.FacilityID =
HighRiskFacilities.FacilityID
WHERE
    PC.CCSProcedureDescription = 'CARDIAC PACEMAKER/DEFIB'
GROUP BY
    PI.PatientID,
    PI.FacilityID,
    PI.FacilityName,
    PC.CCSProcedureDescription
ORDER BY
    TotalCharges DESC
LIMIT 10;

```

## Output

	patientid	facilityid	facilityname	ccsproceduredescription	totalcharges
1	79434	245	University Hospital	CARDIAC PACEMAKER/DEFIB	125497.11
2	77303	207	Buffalo General Hospital	CARDIAC PACEMAKER/DEFIB	105240.97
3	78194	103	Woman's Christian Association	CARDIAC PACEMAKER/DEFIB	99648.91
4	98274	484	St. Mary's Healthcare	CARDIAC PACEMAKER/DEFIB	82553.35
5	58795	393	Nicholas H Noyes Memorial Hospital	CARDIAC PACEMAKER/DEFIB	79885.45
6	88995	776	Nyack Hospital	CARDIAC PACEMAKER/DEFIB	78636
7	66941	1	Albany Medical Center Hospital	CARDIAC PACEMAKER/DEFIB	71547.29
8	75007	776	Nyack Hospital	CARDIAC PACEMAKER/DEFIB	64408
9	81456	103	Woman's Christian Association	CARDIAC PACEMAKER/DEFIB	47897.88
10	73911	103	Woman's Christian Association	CARDIAC PACEMAKER/DEFIB	43782.38

17. Track the changes in the most common diagnoses and procedures across different years.

## -- DiagnosesTrends

```

SELECT
    'Diagnosis' AS TrendType,
    DC.CCSDiagnosisCode AS TrendCode,
    DC.CCSDiagnosisDescription AS TrendDescription,
    PA.DischargeYear,
    COUNT(PC.CCSProcedureCode) AS Occurrences
FROM

```

```

    hospital.DiagnosisCodes DC
JOIN hospital.PatientAdmission PA ON DC.PatientID = PA.PatientID
LEFT JOIN hospital.ProcedureCodes PC ON DC.PatientID = PC.PatientID AND PA.FacilityID =
PC.FacilityID
GROUP BY
    DC.CCSDiagnosisCode, DC.CCSDiagnosisDescription, PA.DischargeYear

UNION

```

```
-- ProceduresTrends
```

```
SELECT
```

```

    'Procedure' AS TrendType,
    PC.CCSProcedureCode AS TrendCode,
    PC.CCSProcedureDescription AS TrendDescription,
    PA.DischargeYear,
    COUNT(DC.CCSDiagnosisCode) AS Occurrences

```

```
FROM
```

```
    hospital.ProcedureCodes PC
```

```

JOIN hospital.PatientAdmission PA ON PC.PatientID = PA.PatientID AND PC.FacilityID =
PA.FacilityID

```

```
LEFT JOIN hospital.DiagnosisCodes DC ON PC.PatientID = DC.PatientID
```

```
GROUP BY
```

```
    PC.CCSProcedureCode, PC.CCSProcedureDescription, PA.DischargeYear
```

```
ORDER BY
```

```
    DischargeYear, Occurrences DESC
```

```
LIMIT 10;
```

## Output

	trendtype	trendcode	trenddescription	dischargeyear	occurrences
1	Procedure	0	NO PROC	2010	8939
2	Diagnosis	218	LIVEBORN	2010	4061
3	Procedure	115	CIRCUMCISION	2010	1846
4	Procedure	231	OTHER THERAPEUTIC PRCS	2010	1749
5	Procedure	219	ALCO/DRUG REHAB/DETOX	2010	1260
6	Diagnosis	657	MOOD DISORDERS	2010	1124
7	Diagnosis	122	PNEUMONIA	2010	865
8	Diagnosis	254	REHAB/PROSTH FIT/ADJUST	2010	860
9	Procedure	134	CESAREAN SECTION	2010	840
10	Diagnosis	660	ALCOHOL-RELATD DISORDER	2010	820

18. How many emergency admissions were made to each facility in the hospital? List the Facility ID, Facility Name, and the count of emergency admissions for each facility and count of total diagnosis and procedures for each facility?

SELECT

```

    hi.FacilityID,
    hi.FacilityName,
    COUNT(DISTINCT pa.PatientID) AS TotalPatientsAdmitted,
    COUNT(*) AS EmergencyAdmissions,
    SUM(CAST(pc.CCSPProcedureCode AS DECIMAL)) AS TotalProceduresPerformed,
    COUNT(DISTINCT dc.CCSDiagnosisCode) AS TotalDiagnoses

```

FROM

```

    hospital.HospitalInfo hi

```

JOIN

```

    hospital.PatientAdmission pa ON hi.PatientID = pa.PatientID AND hi.FacilityID = pa.FacilityID

```

JOIN

```

    hospital.PatientDemographics pd ON hi.PatientID = pd.PatientID

```

JOIN

```

    hospital.ProcedureCodes pc ON hi.PatientID = pc.PatientID AND hi.FacilityID = pc.FacilityID

```

JOIN

```

    hospital.DiagnosisCodes dc ON hi.PatientID = dc.PatientID

```

WHERE

```

    pa.TypeOfAdmission = 'Emergency'

```

GROUP BY

```

    hi.FacilityID,
    hi.FacilityName

```

ORDER BY

```

    EmergencyAdmissions DESC

```

LIMIT 10;

## Output

	facilityid	facilityname	totalpatientsadmitted	emergencyadmissions	totalprocedures...	totaldiagnoses
1	484	St. Mary's Healthcare	1064	1064	70861	117
2	118	St Josephs Hospital	920	920	179518	112
3	85	Auburn Memorial Hospital	705	705	32309	115
4	42	United Health Services Ho...	683	683	43077	79
5	393	Nicholas H Noyes Memorial...	622	622	47878	94
6	1	Albany Medical Center Hos...	598	598	36800	127
7	208	Women And Children's Hosp...	595	595	33775	94
8	330	Nathan Littauer Hospital	567	567	31138	98
9	362	Little Falls Hospital	493	493	58448	74
10	66	O'Leary General Hospital	465	465	13653	95

19. Give SQL Query for patient id, age group, gender, type of admission is elective, patient disposition, discharge year, emergency discharge indicator is N , source of payment1, APR risk of mortality is minor, CCS diagnosis code, APR MDC code, APR DRG code

SELECT

PD.PatientID,  
PD.AgeGroup,  
PD.Gender,  
PA.TypeOfAdmission,  
PA.PatientDisposition,  
PA.DischargeYear,  
PA.EmergencyDepartmentIndicator,  
PI.SourceOfPayment1,  
RM.APRRiskOfMortality,  
DC.CCSDiagnosisCode,  
MDC.APRMDCCode,  
DC.APRDRGCode

FROM

hospital.PatientDemographics PD

JOIN hospital.PatientAdmission PA ON PD.PatientID = PA.PatientID

JOIN hospital.PaymentInfo PI ON PD.PatientID = PI.PatientID

LEFT JOIN hospital.APRRiskMortality RM ON PD.PatientID = RM.PatientID AND PA.FacilityID = RM.FacilityID

JOIN hospital.DiagnosisCodes DC ON PD.PatientID = DC.PatientID

JOIN hospital.APRMDC MDC ON PD.PatientID = MDC.PatientID

WHERE

PA.TypeOfAdmission = 'Elective'

AND PA.EmergencyDepartmentIndicator = 'N'

AND RM.APRRiskOfMortality = 'Minor'

LIMIT 10;

**Output**

APR risk of mortalit...DC code, APR DRG code												
	pa...	ag...	ge...	typ...	pati...	di...	em...	sourc...	ap...	ccsd...	ap...	...
1	91822	70 or Old...	F	Elective	Home w/ Hom...	2010	N	Medicare	Minor	254	23	860
2	72448	70 or Old...	F	Elective	Inpatient R...	2010	N	Medicare	Minor	203	8	301
3	83298	30 to 49	M	Elective	Home or Sel...	2010	N	Other Federa...	Minor	143	6	227
4	61571	0 to 17	M	Elective	Home or Sel...	2010	N	Insurance Co...	Minor	214	6	221
5	68098	30 to 49	M	Elective	Short-term ...	2010	N	Blue Cross	Minor	81	1	58
6	80607	30 to 49	M	Elective	Short-term ...	2010	N	Blue Cross	Minor	254	23	860
7	56949	0 to 17	M	Elective	Home or Sel...	2010	N	Insurance Co...	Minor	<null>	1	53
8	66954	30 to 49	F	Elective	Home or Sel...	2010	N	Medicare	Minor	205	8	321
9	73530	30 to 49	F	Elective	Home or Sel...	2010	N	Insurance Co...	Minor	170	13	513
10	52444	50 to 69	M	Elective	Home or Sel...	2010	N	Insurance Co...	Minor	42	4	121

20. Retrieve patient information, including age group, CCS procedure description, total charges, APR risk of mortality, and facility name, specifically for patients undergoing "THERAPEUTIC RADIOLOGY" with a minor APR Risk of Mortality.

SELECT

PD.PatientID,  
PD.AgeGroup,  
PC.CCSProcedureDescription,  
PI.TotalCharges,  
ARM.APRRiskOfMortality,  
HI.FacilityName

FROM

hospital.PatientDemographics AS PD

LEFT JOIN

hospital.ProcedureCodes AS PC ON PD.PatientID = PC.PatientID

LEFT JOIN

hospital.APRRiskMortality AS ARM ON PD.PatientID = ARM.PatientID AND PC.FacilityID = ARM.FacilityID

RIGHT JOIN

hospital.PaymentInfo AS PI ON PD.PatientID = PI.PatientID AND PC.FacilityID = PI.FacilityID  
JOIN

hospital.HospitalInfo AS HI ON PD.PatientID = HI.PatientID AND PC.FacilityID = HI.FacilityID

WHERE

PC.CCSProcedureDescription = 'THERAPEUTIC RADIOLOGY'  
AND ARM.APRRiskOfMortality = 'Minor';

**Output**

Output					
APR risk of mortalit...DC code, APR DRG code					
"THERAPEUTIC RADIOLO...PR Risk of Mortality. x					
CSV					
patientid	agegroup	ccsproceduredescription	totalcharges	aprriskofmortality	facilityname
1	56803 30 to 49	THERAPEUTIC RADIOLOGY	5745.50 Minor		Auburn Memorial Hospital
2	51553 30 to 49	THERAPEUTIC RADIOLOGY	1879.19 Minor		Highland Hospital
3	57495 30 to 49	THERAPEUTIC RADIOLOGY	9813.33 Minor		Highland Hospital
4	95022 30 to 49	THERAPEUTIC RADIOLOGY	10104.79 Minor		Highland Hospital

## Index

### -- Create index

```
CREATE INDEX idx_HospitalInfo_PatientID ON hospital.HospitalInfo (PatientID);
```

### -- Select statement using the index

```
SELECT hi.FacilityID, hi.FacilityName, COUNT(*) AS TotalAdmissions
FROM hospital.HospitalInfo AS hi
JOIN hospital.PatientAdmission AS pa ON hi.PatientID = pa.PatientID
GROUP BY hi.FacilityID, hi.FacilityName
ORDER BY TotalAdmissions DESC;
```

## Output

	facilityid	facilityname	totaladmissions
1	484	St. Mary's Healthcare	1724
2	85	Auburn Memorial Hospital	1351
3	66	Olean General Hospital	1350
4	118	St Josephs Hospital	1262
5	42	United Health Services Hospitals Inc. - Binghamton General Hospital	1190
6	1	Albany Medical Center Hospital	1110
7	490	Glen Cove Hospital	1110
8	98	Brooks Memorial Hospital	1013
9	330	Nathan Littauer Hospital	1008
10	39	Memorial Hosp of Wm F & Gertrude F Jones A/K/A Jones Memorial Hosp	1004

```
CREATE INDEX idx_ProcedureCodes_FacilityID ON hospital.ProcedureCodes (FacilityID);
```

### -- Select statement using the index

```
SELECT pc.CCSPProcedureCode, pc.CCSPProcedureDescription, COUNT(*) AS ProcedureCount
FROM hospital.ProcedureCodes AS pc
JOIN hospital.HospitalInfo AS hi ON pc.PatientID = hi.PatientID AND pc.FacilityID = hi.FacilityID
JOIN hospital.PatientDemographics AS pd ON pc.PatientID = pd.PatientID
WHERE pd.AgeGroup = '50 to 69'
```

GROUP BY pc.CCSProcedureCode, pc.CCSProcedureDescription

ORDER BY ProcedureCount DESC

LIMIT 10;

### Output

	ccsprocedurecode	ccsproceduredescription	procedurecount
1	0	NO PROC	1219
2	231	OTHER THERAPEUTIC PRCS	342
3	152	ARTHROPLASTY KNEE	279
4	213	PHYS THER EXER, MANIPUL	278
5	219	ALCO/DRUG REHAB/DETOX	264
6	153	HIP REPLACEMENT,TOT/PRT	142
7	222	BLOOD TRANSFUSION	102
8	216	RESP INTUB/MECH VENTIL	92
9	70	UP GASTRO ENDOSC/BIOPSY	82
10	218	PSYCHO/PSYCHI EVAL/THER	64

### List of each of the created tables snapshots

SQL Query to show how many rows in the base table

```
select count(*) from hospital.baseTable;
```

Since that each record in the basetable corresponds to a unique patient each patient's information is matched with their respective records in the related tables, resulting in the same count of records across all tables we have created.

	count
1	26980

### Displaying first 5 rows from the table Patient Demographics

```
select * from hospital.patientdemographics
```

```
LIMIT 5;
```



	patientid	agegroup	gender	race	ethnicity	birthweight	abortedindicator
1	75022	18 to 29	F	White	Not Span/Hispanic	0	N
2	70901	50 to 69	M	White	Not Span/Hispanic	0	N
3	76338	70 or Older	M	White	Not Span/Hispanic	0	N
4	91822	70 or Older	F	White	Not Span/Hispanic	0	N
5	72448	70 or Older	F	White	Not Span/Hispanic	0	N

## Displaying first 5 rows from the table Hospital Info

```
select * from hospital.HospitalInfo
```

```
LIMIT 5;
```

	patientid	facilityid	healthservicearea	hospitalcounty	facilityname
1	49999	330	Adiron	Fulton	Nathan Littauer Hospital
2	50001	484	Adiron	Montgomery	St. Mary's Healthcare
3	50004	484	Adiron	Montgomery	St. Mary's Healthcare
4	50007	39	Western NY	Allegany	Memorial Hosp of Wm F & Gertrude F Jones A/K/A...
5	50009	66	Western NY	Cattaraugus	Olean General Hospital

## Displaying first 5 rows from the table Patient Admission

```
select * from hospital.PatientAdmission
```

```
LIMIT 5;
```

	patientid	facilityid	lengthofstay	typeofadmission	patientdisposition	dischargeyear
1	75022	1	1	Emergency	Home or Self Care	2010
2	70901	1	15	Emergency	Home w/ Home Health Services	2010
3	76338	1	3	Emergency	Home w/ Home Health Services	2010
4	91822	1	5	Elective	Home w/ Home Health Services	2010
5	72448	1	4	Elective	Inpatient Rehabilitation Facility	2010

## Displaying first 5 rows from the table Diagnosis Codes

```
select * from hospital.DiagnosisCodes
```

```
LIMIT 5;
```

	patientid	ccsdiagnosiscode	ccsdiagnosisdescription	apdrgrcode	apdrgrdescription
1	75022	135	INTESTINAL INFECTION	249	NON-BACTERIAL GASTROENTERITIS, NAUSEA &
2	70901	231	OTHER FRACTURE	912	MUSCULOSKELETAL & OTHER PROCEDURES FOR M
3	76338	42	SECONDARY MALIGNANCY	240	DIGESTIVE MALIGNANCY
4	91822	254	REHAB/PROSTH FIT/ADJUST	860	REHABILITATION
5	72448	203	OSTEOARTHRITIS	301	HIP JOINT REPLACEMENT

### Displaying first 5 rows from the table Procedure Codes

```
select * from hospital.ProcedureCodes
```

```
LIMIT 5;
```

	patientid	facilityid	ccsprocedurecode	ccsproceduredescription
1	75022	1	0	NO PROC
2	70901	1	61	OT OR PRCS VES NOT HEAD
3	76338	1	0	NO PROC
4	91822	1	215	OT PHYS THER/REHAB
5	72448	1	153	HIP REPLACEMENT,TOT/PRT

### Displaying first 5 rows from the table APR Severity

```
select * from hospital.APRSeverity
```

```
LIMIT 5;
```

	patientid	facilityid	aprseverityofillnesscode	aprseverityofillnessdescription
1	75022	1	1	Minor
2	70901	1	3	Major
3	76338	1	3	Major
4	91822	1	2	Moderate
5	72448	1	1	Minor

### Displaying first 5 rows from the table APR Risk Mortality

```
select * from hospital.APRRiskMortality
```

```
LIMIT 5;
```

	patientid	facilityid	aprriskofmortality
1	75022	1	Minor
2	70901	1	Extreme
3	76338	1	Major
4	91822	1	Minor
5	72448	1	Minor

### Displaying first 5 rows from the table APRMDC

```
select * from hospital.APRMDC LIMIT 5;
```

	patientid	aprmddcode	aprmdddescription
1	75022	6	Diseases and Disorders of the Digestive System
2	70901	25	Multiple Significant Trauma
3	76338	6	Diseases and Disorders of the Digestive System
4	91822	23	Rehabilitation, Aftercare, Other Factors InflU...
5	72448	8	Diseases and Disorders of the Musculoskeletal ...

### Displaying first 5 rows from the table APR Medical Surgical

```
select * from hospital.APRMedicalSurgical
```

```
LIMIT 5;
```

	patientid	facilityid	aprmedicalsurgicaldescription
1	75022	1	Medical
2	70901	1	Surgical
3	76338	1	Medical
4	91822	1	Medical
5	72448	1	Surgical

### Displaying first 5 rows from the table Payment Info

```
select * from hospital.PaymentInfo
```

```
LIMIT 5;
```

	patientid	facilityid	facilityname	sourceofpayment1	sourceofpayment2
1	75022	1	Albany Medical Center Hospital	Blue Cross	Self-Pay
2	70901	1	Albany Medical Center Hospital	Insurance Company	Medicare
3	76338	1	Albany Medical Center Hospital	Medicare	Blue Cross
4	91822	1	Albany Medical Center Hospital	Medicare	Insurance Company
5	72448	1	Albany Medical Center Hospital	Medicare	Insurance Company