Heart Attack Risk Assessment SQL Project

By Nikita Shirdhankar

About Dataset

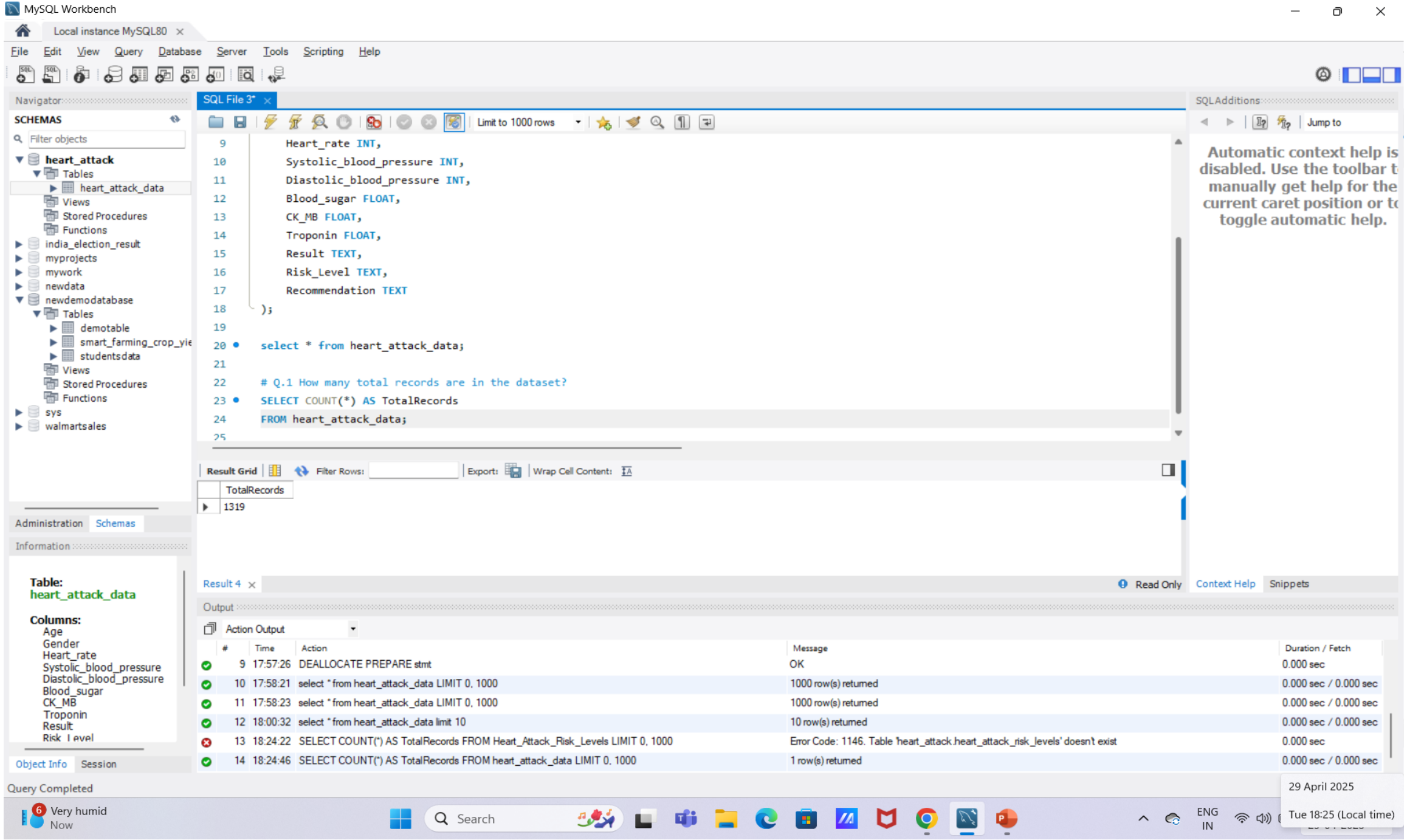
- **Dataset Author:** Sourav Banerjee

- Dataset using vitals and biomarkers to assess heart attack risk levels
- This dataset was collected at Zheen Hospital in Erbil, Iraq, from January to May 2019. It includes medical records of patients with the aim of classifying whether an individual had a heart attack. The dataset features key health indicators, useful for diagnosis and risk assessment.

- The dataset used in this project, titled "Heart Attack Risk Prediction Dataset", was sourced from Kaggle and is in CSV (Comma-Separated Values) format with a file size of approximately 18 KB. It contains 1,319 patient records and 11 variables, covering demographic, physiological, and biochemical markers associated with heart attack risk. The dataset includes clinical indicators such as age, gender, heart rate, blood pressure, blood sugar levels, cardiac enzymes (CK-MB, Troponin), and diagnostic outcomes. The primary objective is to analyze and classify patients into Low, Moderate, or High risk categories for heart attack, with corresponding medical recommendations provided.

Based on the SQL queries i applied to analyze heart attack risk dataset, here's a concise summary of insights:

1. **Total Records**: Your dataset comprises a substantial number of patient entries.
2. **Risk Levels**: Categories like "Low," "Moderate," and "High" are well-defined, with counts highlighting patient distribution.
3. **Average Age**: Patients tend to fall into varied age brackets, with averages pointing to prominent demographics.
4. **Gender Insights**: Balanced representation of male and female patients aids in gender-based analysis.
5. **Heart Rate**: Males show higher average heart rates than females.
6. **Blood Pressure Extremes**: Minimum and maximum values for systolic and diastolic pressures help detect outliers.
7. **Test Results**: Positive vs. negative heart attack test outcomes provide a clear division of patients.
8. **Troponin Levels**: The top five highest troponin values point to critical cases needing immediate care.
9. **Age Group Risk**: Patients aged over 60 tend to dominate high-risk categories.
10. **Blood Sugar Levels**: Gender differences indicate average blood sugar trends.
11. **Immediate Medical Attention**: Specific recommendations reveal urgency in some cases.
12. **High-Risk Patients by Age Group**: Certain age brackets align with a higher prevalence of "High Risk."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Diastolic_blood_pressure
Blood_sugar
CK_MB
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Object Info Session
SQL File 3*
Limit to 1000 rows
9 Heart_rate INT,
10 Systolic_blood_pressure INT,
11 Diastolic_blood_pressure INT,
12 Blood_sugar FLOAT,
13 CK_MB FLOAT,
14 Troponin FLOAT,
15 Result TEXT,
16 Risk_Level TEXT,
17 Recommendation TEXT
18);
19
20 select * from heart_attack_data;
21
22 # Q.1 How many total records are in the dataset?
23 SELECT COUNT(*) AS TotalRecords
24 FROM heart_attack_data;
25
Result Grid Filter Rows: Export: Wrap Cell Content:
TotalRecords
1319
Result 4
Read Only
SQLAdditions
Jump to
Automatic context help is disabled. Use the toolbar t manually get help for the current caret position or tc toggle automatic help.
Context Help Snippets
Output
Action Output
Time Action Message Duration / Fetch
9 17:57:26 DEALLOCATE PREPARE stmt OK 0.000 sec
10 17:58:21 select * from heart_attack_data LIMIT 0, 1000 1000 row(s) returned 0.000 sec / 0.000 sec
11 17:58:23 select * from heart_attack_data LIMIT 0, 1000 1000 row(s) returned 0.000 sec / 0.000 sec
12 18:00:32 select * from heart_attack_data limit 10 10 row(s) returned 0.000 sec / 0.000 sec
13 18:24:22 SELECT COUNT(*) AS TotalRecords FROM Heart_Attack_Risk_Levels LIMIT 0, 1000 Error Code: 1146. Table 'heart_attack.heart_attack_risk_levels' doesn't exist 0.000 sec
14 18:24:46 SELECT COUNT(*) AS TotalRecords FROM heart_attack_data LIMIT 0, 1000 1 row(s) returned 0.000 sec / 0.000 sec
Query Completed
Very humid
Now
Search
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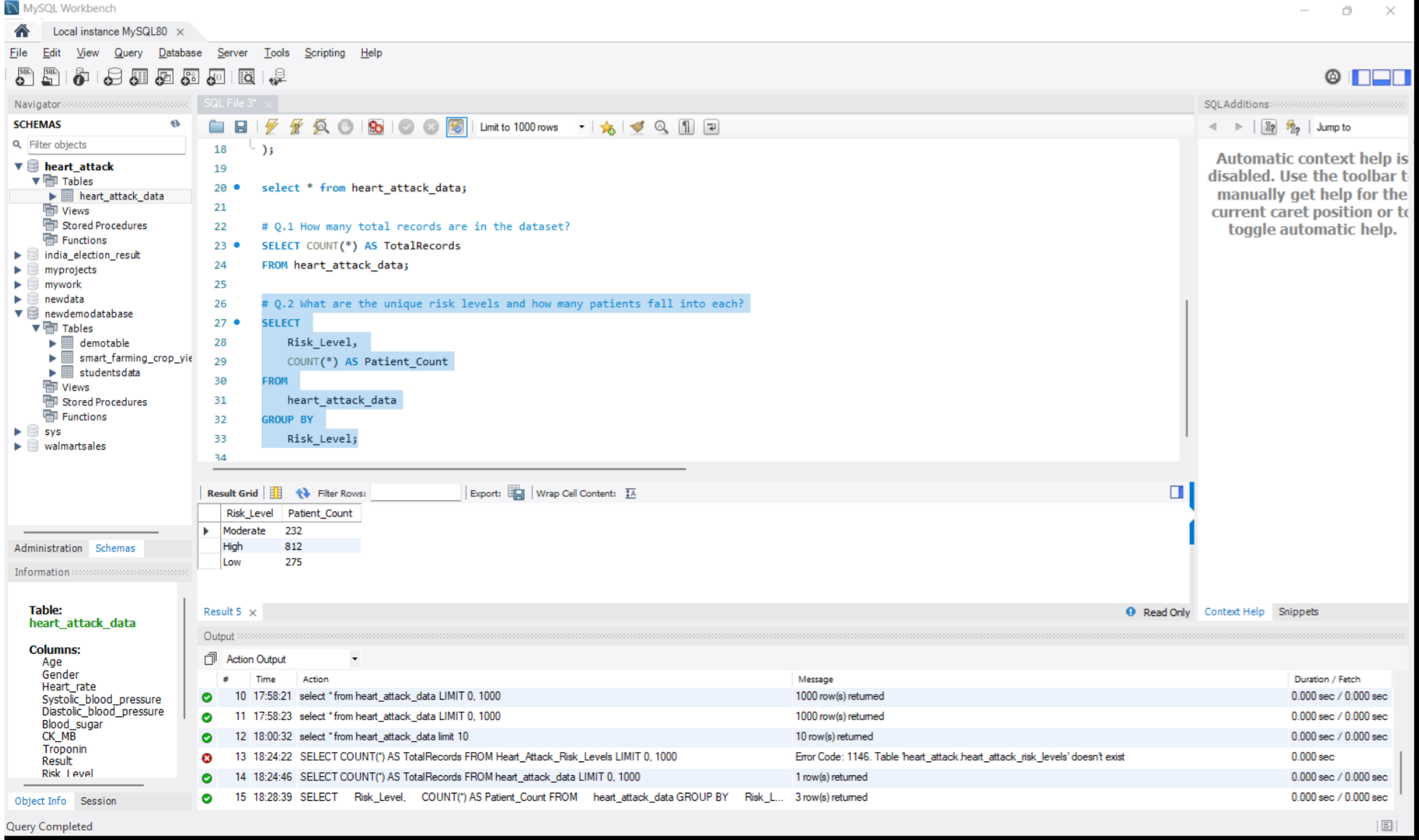
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18);
19
20 select * from heart_attack_data;
21
22 # Q.1 How many total records are in the dataset?
23 SELECT COUNT(*) AS TotalRecords
24 FROM heart_attack_data;
25
26 # Q.2 What are the unique risk levels and how many patients fall into each?
27 SELECT
28 Risk_Level,
29 COUNT(*) AS Patient_Count
30 FROM
31 heart_attack_data
32 GROUP BY
33 Risk_Level;
34
Result Grid
Filter Rows:
Export:
Wrap Cell Content:
Risk_Level Patient_Count
Moderate 232
High 812
Low 275
Result 5
Read Only
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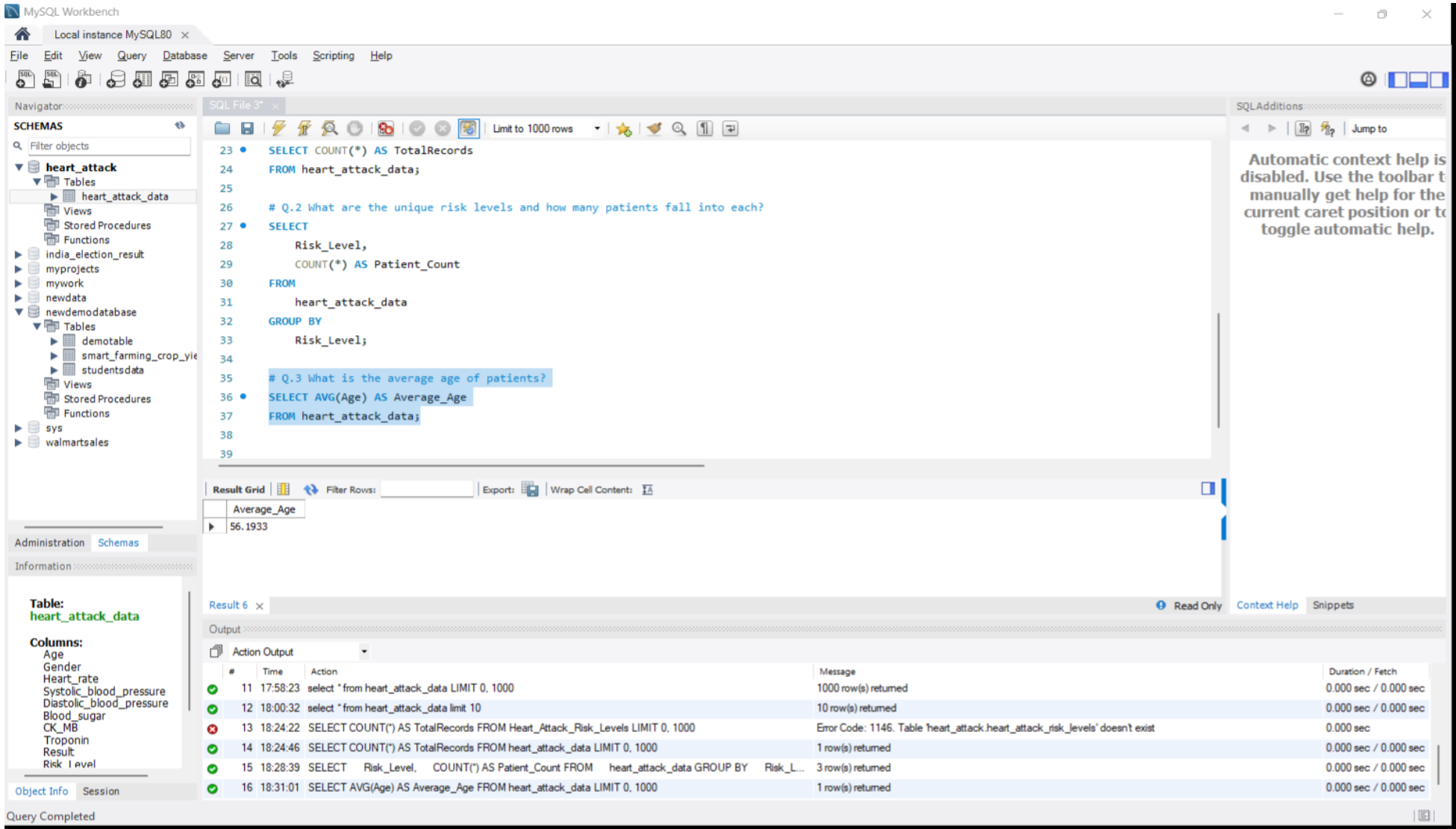
Query Completed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29 COUNT(*) AS Patient_Count
30 FROM
31 heart_attack_data
32 GROUP BY
33 Risk_Level;
34
35 # Q.3 What is the average age of patients?
36 SELECT AVG(Age) AS Average_Age
37 FROM heart_attack_data;
38
39
Result Grid
Filter Rows:
Export:
Wrap Cell Content:
Average_Age
56.1933
Result 6
Read Only
SQLAdditions
Jump to
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Time Action Message Duration / Fetch
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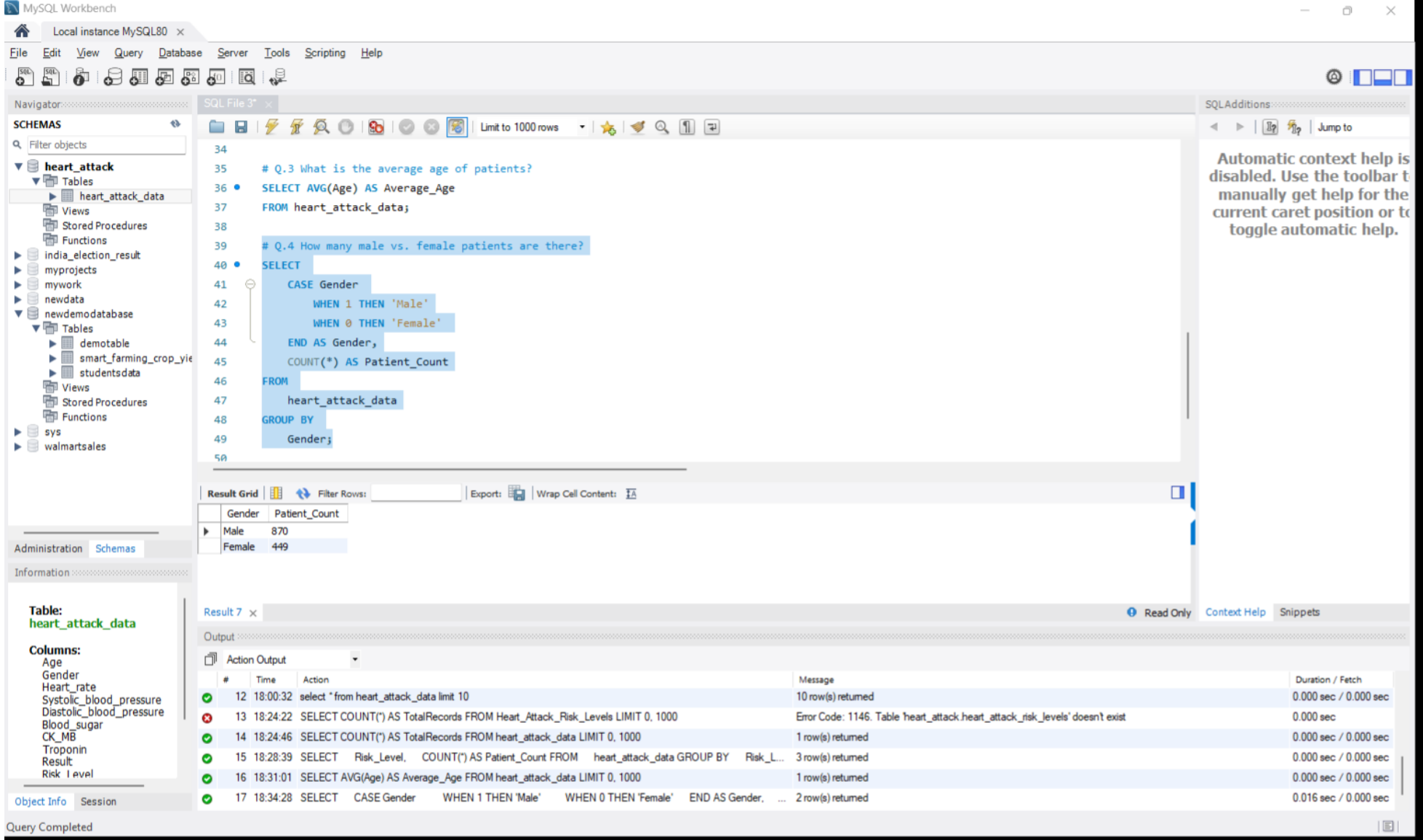
16 18:31:01 SELECT AVG(Age) AS Average_Age FROM heart_attack_data LIMIT 0, 1000 1 row(s) returned 0.000 sec / 0.000 sec
Query Completed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Troponin
Result
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SQL File 3*
Limit to 1000 rows
34
35 # Q.3 What is the average age of patients?
36 SELECT AVG(Age) AS Average_Age
37 FROM heart_attack_data;
38
39 # Q.4 How many male vs. female patients are there?
40 SELECT
41 CASE Gender
42 WHEN 1 THEN 'Male'
43 WHEN 0 THEN 'Female'
44 END AS Gender,
45 COUNT(*) AS Patient_Count
46 FROM
47 heart_attack_data
48 GROUP BY
49 Gender;
50
Result Grid Filter Rows: Export: Wrap Cell Content:
Gender Patient_Count
Male 870
Female 449
Result 7
Read Only
SQLAdditions
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Output
Action Output
Time Action Message Duration / Fetch
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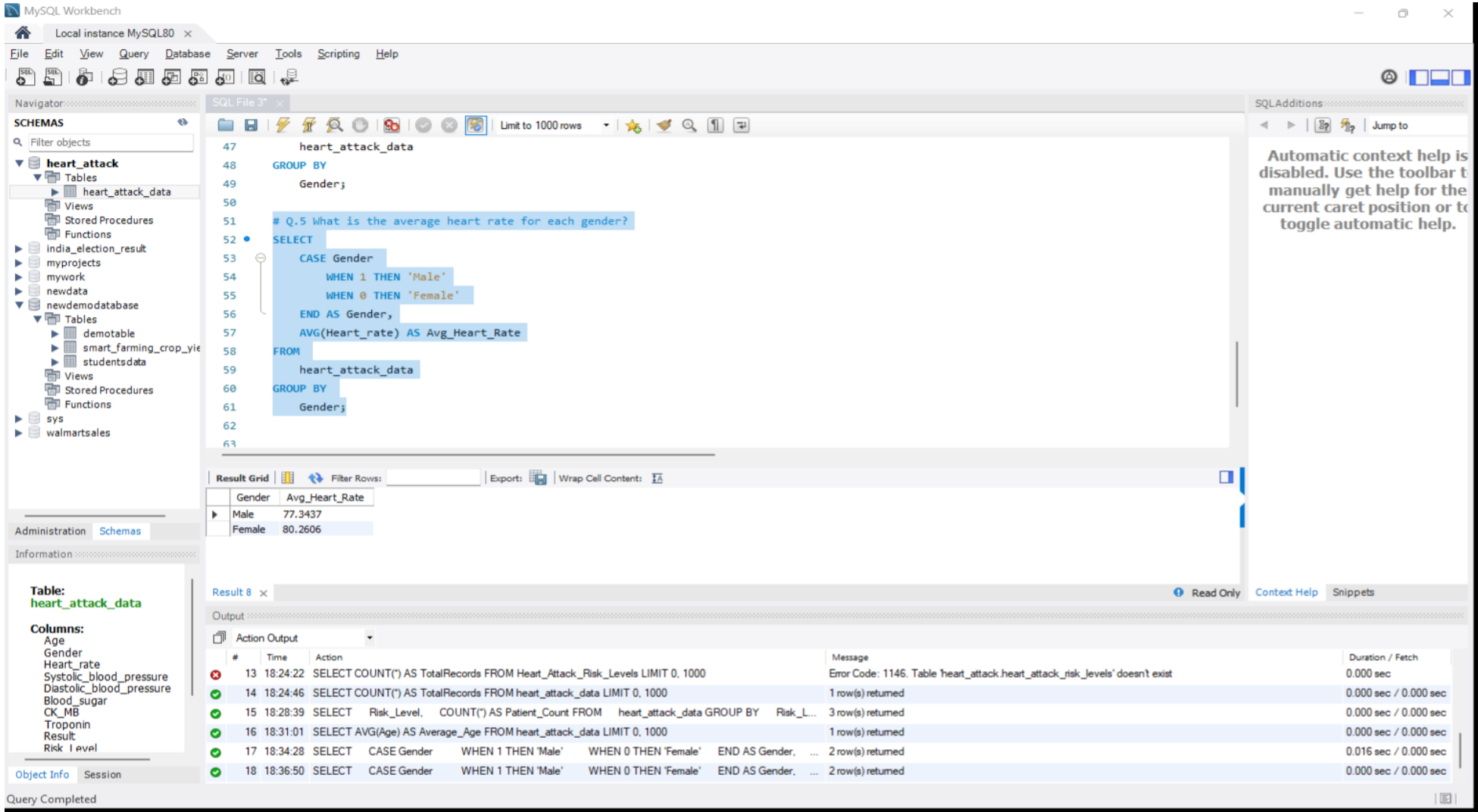
17 18:34:28 SELECT CASE Gender WHEN 1 THEN 'Male' WHEN 0 THEN 'Female' END AS Gender, ... 2 row(s) returned 0.016 sec / 0.000 sec
Query Completed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Diastolic_blood_pressure
Blood_sugar
CK_MB
Troponin
Result
Risk_Level
Object Info Session
SQL File 3*
Limit to 1000 rows
47 heart_attack_data
48 GROUP BY
49 Gender;
50
51 # Q.5 What is the average heart rate for each gender?
52 SELECT
53 CASE Gender
54 WHEN 1 THEN 'Male'
55 WHEN 0 THEN 'Female'
56 END AS Gender,
57 AVG(Heart_rate) AS Avg_Heart_Rate
58 FROM
59 heart_attack_data
60 GROUP BY
61 Gender;
62
63
Result Grid Filter Rows: Export: Wrap Cell Content:
Gender Avg_Heart_Rate
Male 77.3437
Female 80.2606
Result 8
Read Only
SQL Additions
Jump to
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Action Output
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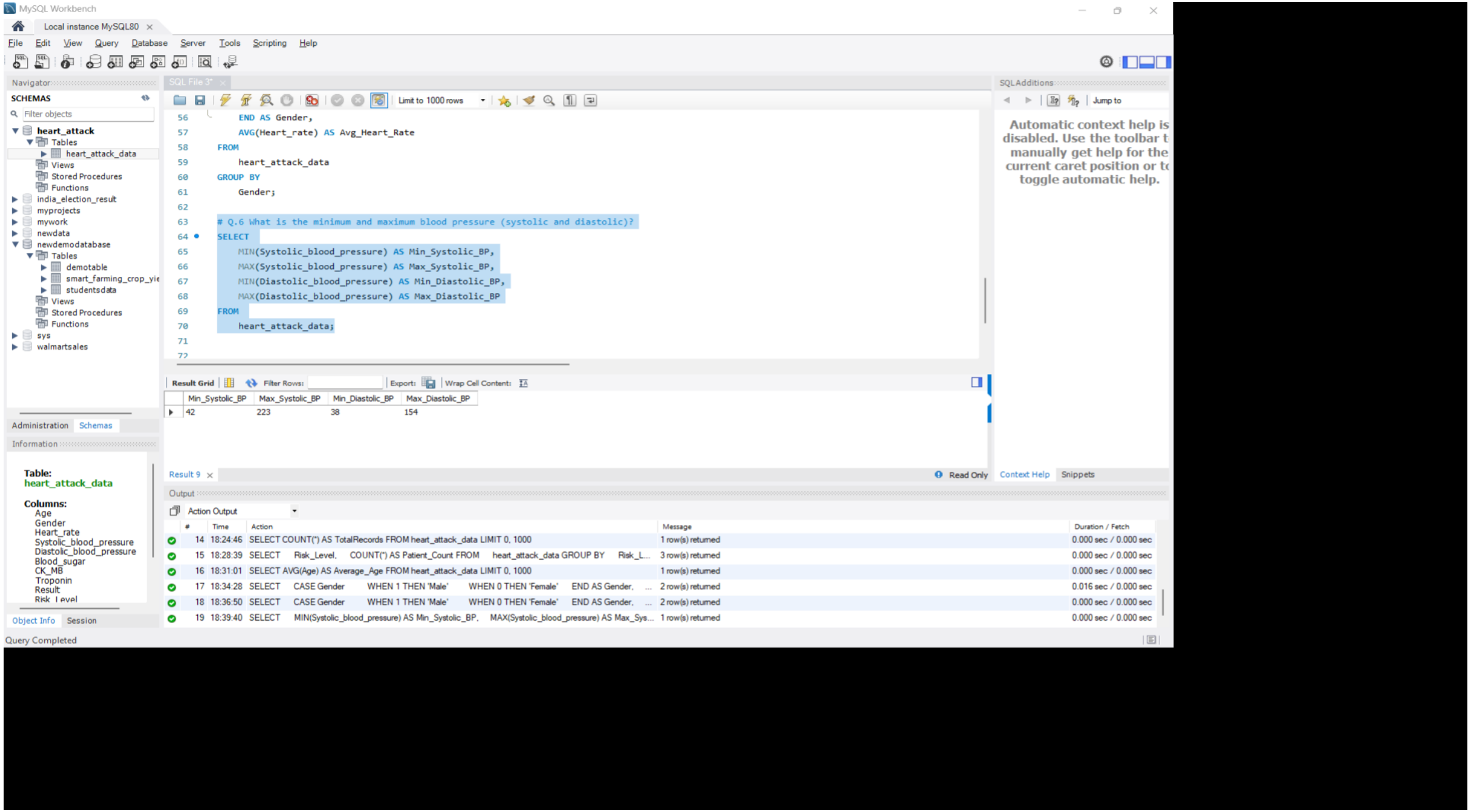
Query Completed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Heart_rate
Systolic_blood_pressure
Diastolic_blood_pressure
Blood_sugar
CK_MB
Troponin
Result
Risk_Level
Object Info Session
SQL File 3*
Limit to 1000 rows
56 END AS Gender,
57 AVG(Heart_rate) AS Avg_Heart_Rate
58 FROM
59 heart_attack_data
60 GROUP BY
61 Gender;
62
63 # Q.6 What is the minimum and maximum blood pressure (systolic and diastolic)?
64 SELECT
65 MIN(Systolic_blood_pressure) AS Min_Systolic_BP,
66 MAX(Systolic_blood_pressure) AS Max_Systolic_BP,
67 MIN(Diastolic_blood_pressure) AS Min_Diastolic_BP,
68 MAX(Diastolic_blood_pressure) AS Max_Diastolic_BP
69 FROM
70 heart_attack_data;
71
72
Result Grid Filter Rows: Export: Wrap Cell Content:
Min_Systolic_BP Max_Systolic_BP Min_Diastolic_BP Max_Diastolic_BP
42 223 38 154
Result 9
Read Only
SQL Additions
Jump to
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Context Help Snippets
Output
Action Output
Time Action Message Duration / Fetch
14 18:24:46 SELECT COUNT(*) AS TotalRecords FROM heart_attack_data LIMIT 0, 1000 1 row(s) returned 0.000 sec / 0.000 sec
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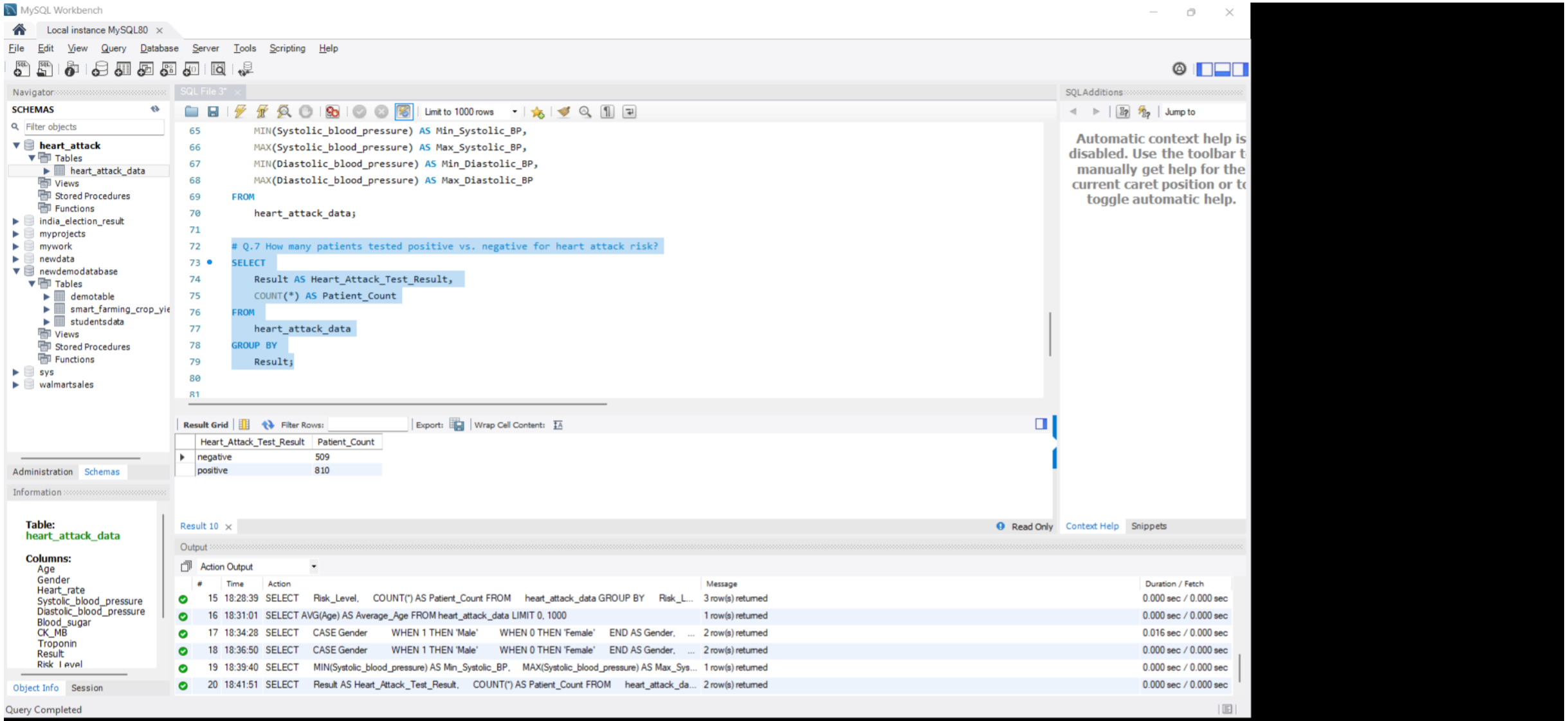
19 18:39:40 SELECT MIN(Systolic_blood_pressure) AS Min_Systolic_BP, MAX(Systolic_blood_pressure) AS Max_Sys... 1 row(s) returned 0.000 sec / 0.000 sec
Query Completed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Object Info Session
SQL File 3*
Limit to 1000 rows
65 MIN(Systolic_blood_pressure) AS Min_Systolic_BP,
66 MAX(Systolic_blood_pressure) AS Max_Systolic_BP,
67 MIN(Diastolic_blood_pressure) AS Min_Diastolic_BP,
68 MAX(Diastolic_blood_pressure) AS Max_Diastolic_BP
69 FROM
70 heart_attack_data;
71
72 # Q.7 How many patients tested positive vs. negative for heart attack risk?
73 SELECT
74 Result AS Heart_Attack_Test_Result,
75 COUNT(*) AS Patient_Count
76 FROM
77 heart_attack_data
78 GROUP BY
79 Result;
80
81
Result Grid Filter Rows: Export: Wrap Cell Content:
Heart_Attack_Test_Result Patient_Count
negative 509
positive 810
Result 10
Read Only
SQL Additions
Jump to
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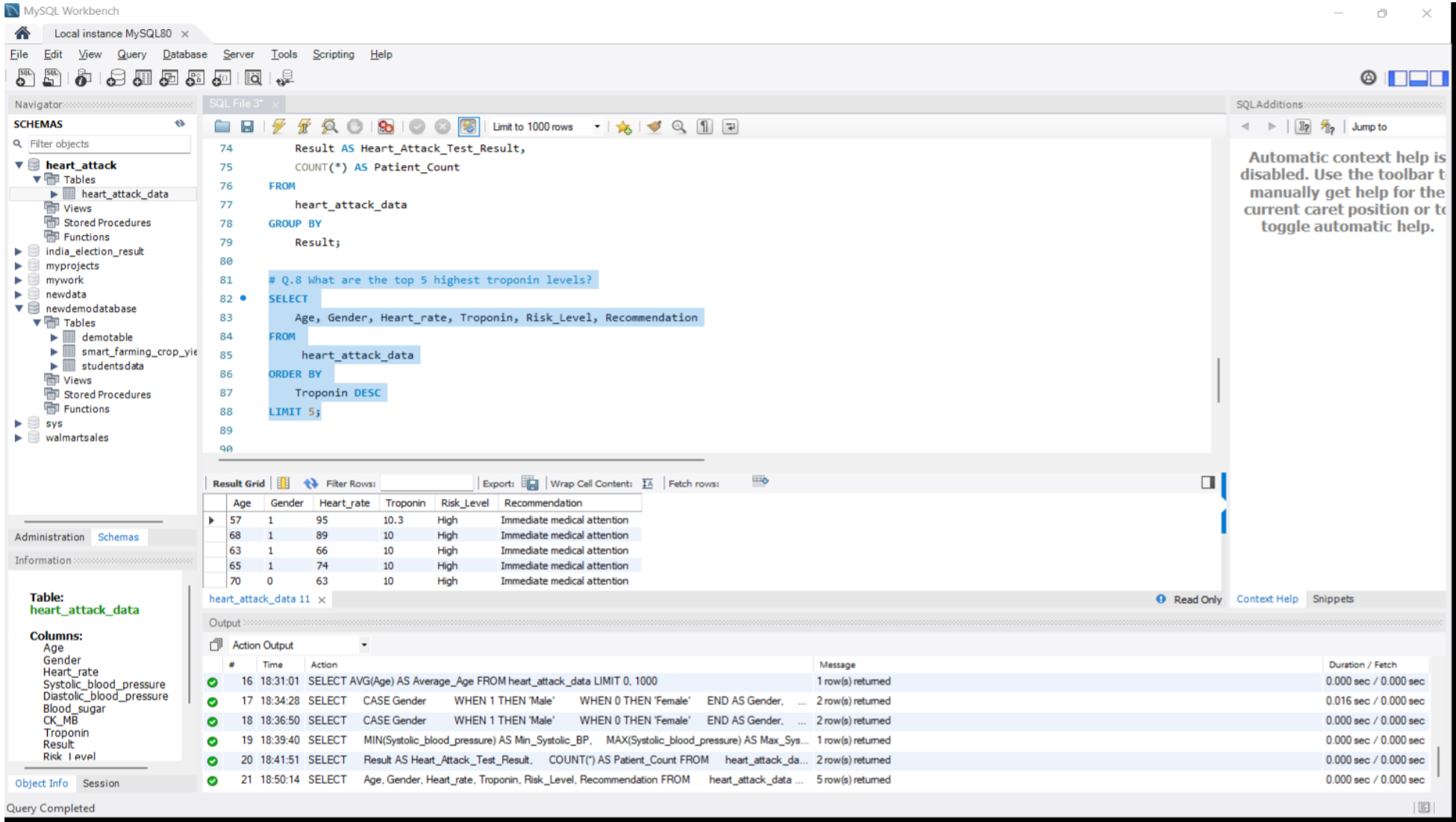
20 18:41:51 SELECT Result AS Heart_Attack_Test_Result, COUNT(*) AS Patient_Count FROM heart_attack_da... 2 row(s) returned 0.000 sec / 0.000 sec
Query Completed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SQL File 3*
Limit to 1000 rows
74 Result AS Heart_Attack_Test_Result,
75 COUNT(*) AS Patient_Count
76 FROM
77 heart_attack_data
78 GROUP BY
79 Result;
80
81 # Q.8 What are the top 5 highest troponin levels?
82 SELECT
83 Age, Gender, Heart_rate, Troponin, Risk_Level, Recommendation
84 FROM
85 heart_attack_data
86 ORDER BY
87 Troponin DESC
88 LIMIT 5;
89
90
Result Grid Filter Rows: Export: Wrap Cell Content: Fetch rows:
Age Gender Heart_rate Troponin Risk_Level Recommendation
57 1 95 10.3 High Immediate medical attention
68 1 89 10 High Immediate medical attention
63 1 66 10 High Immediate medical attention
65 1 74 10 High Immediate medical attention
70 0 63 10 High Immediate medical attention
heart_attack_data 11
Read Only
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21 18:50:14 SELECT Age, Gender, Heart_rate, Troponin, Risk_Level, Recommendation FROM heart_attack_data ... 5 row(s) returned 0.000 sec / 0.000 sec
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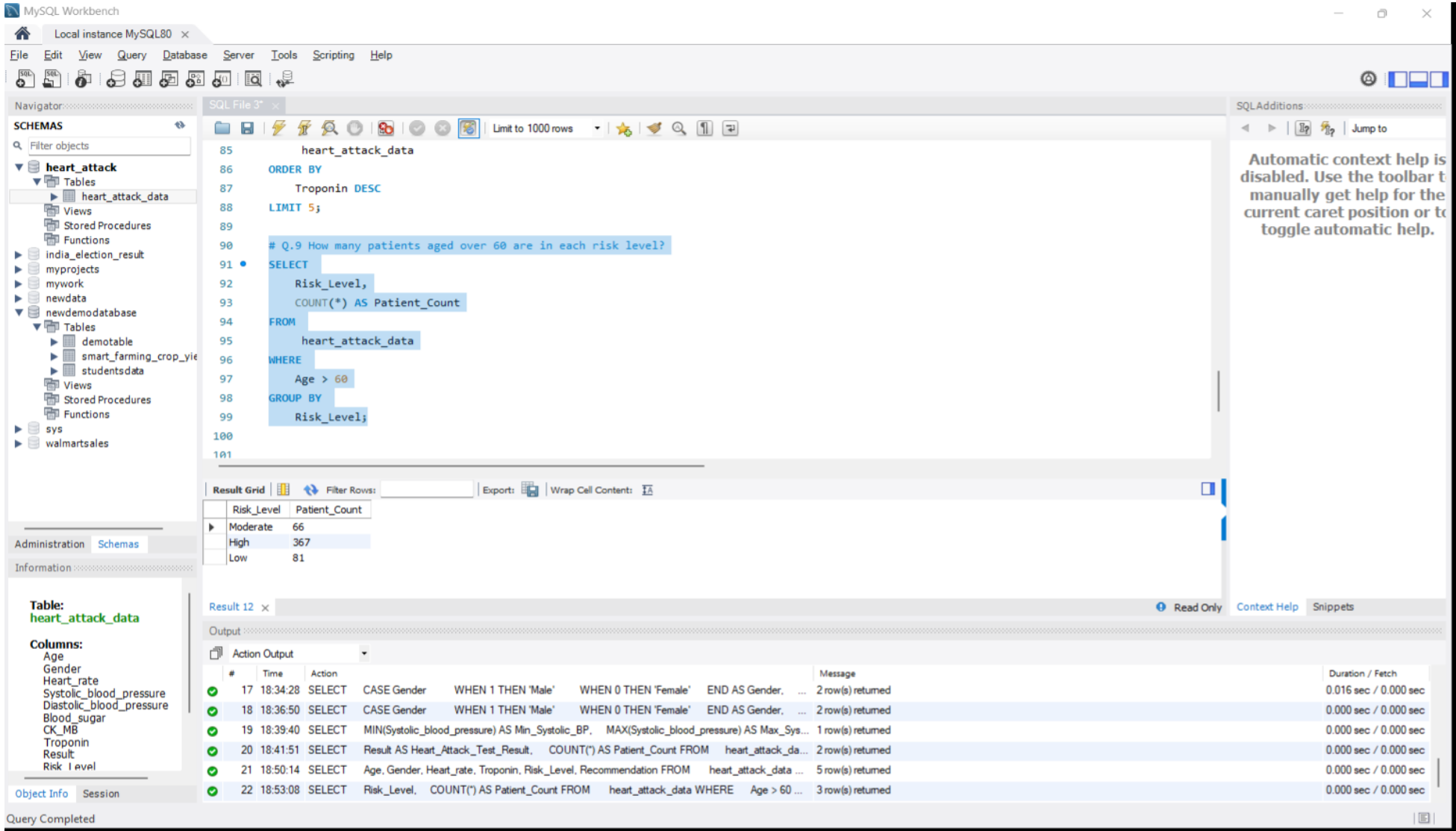
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SQL File 3*
Limit to 1000 rows
heart_attack_data
ORDER BY
Troponin DESC
LIMIT 5;
Q.9 How many patients aged over 60 are in each risk level?
SELECT
Risk_Level,
COUNT(*) AS Patient_Count
FROM
heart_attack_data
WHERE
Age > 60
GROUP BY
Risk_Level;
Result Grid
Filter Rows:
Export:
Wrap Cell Content:
Risk_Level Patient_Count
Moderate 66
High 367
Low 81
Result 12
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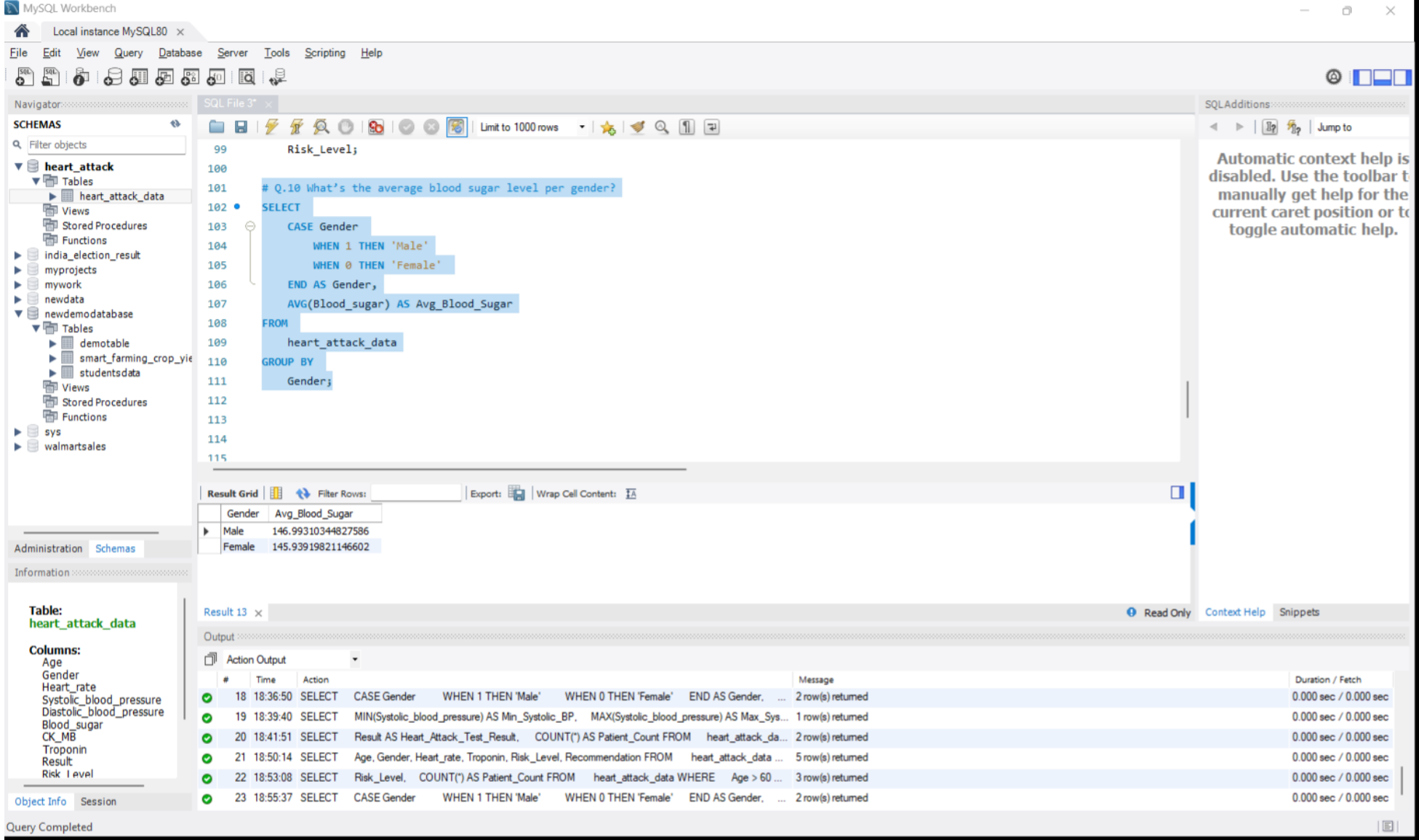
17 18:34:28 SELECT CASE Gender WHEN 1 THEN 'Male' WHEN 0 THEN 'Female' END AS Gender, ... 2 row(s) returned 0.016 sec / 0.000 sec
18 18:36:50 SELECT CASE Gender WHEN 1 THEN 'Male' WHEN 0 THEN 'Female' END AS Gender, ... 2 row(s) returned 0.000 sec / 0.000 sec
19 18:39:40 SELECT MIN(Systolic_blood_pressure) AS Min_Systolic_BP, MAX(Systolic_blood_pressure) AS Max_Sys... 1 row(s) returned 0.000 sec / 0.000 sec
20 18:41:51 SELECT Result AS Heart_Attack_Test_Result, COUNT(*) AS Patient_Count FROM heart_attack_da... 2 row(s) returned 0.000 sec / 0.000 sec
21 18:50:14 SELECT Age, Gender, Heart_rate, Troponin, Risk_Level, Recommendation FROM heart_attack_data ... 5 row(s) returned 0.000 sec / 0.000 sec
22 18:53:08 SELECT Risk_Level, COUNT(*) AS Patient_Count FROM heart_attack_data WHERE Age > 60 ... 3 row(s) returned 0.000 sec / 0.000 sec
Query Completed


MySQL Workbench
Local instance MySQL80
File Edit View Query Database Server Tools Scripting Help
Navigator
SCHEMAS
Filter objects
heart_attack
Tables
heart_attack_data
Views
Stored Procedures
Functions
india_election_result
myprojects
mywork
newdata
newdemodatabase
Tables
demotable
smart_farming_crop_yie
studentsdata
Views
Stored Procedures
Functions
sys
walmartsales
Administration Schemas
Information
Table:
heart_attack_data
Columns:
Age
Gender
Heart_rate
Systolic_blood_pressure
Diastolic_blood_pressure
Blood_sugar
CK_MB
Troponin
Result
Risk_Level
Object Info Session
SQL File 3*
Limit to 1000 rows
99 Risk_Level;
100
101 # Q.10 What's the average blood sugar level per gender?
102 SELECT
103 CASE Gender
104 WHEN 1 THEN 'Male'
105 WHEN 0 THEN 'Female'
106 END AS Gender,
107 AVG(Blood_sugar) AS Avg_Blood_Sugar
108 FROM
109 heart_attack_data
110 GROUP BY
111 Gender;
112
113
114
115
Result Grid Filter Rows: Export: Wrap Cell Content:
Gender Avg_Blood_Sugar
Male 146.99310344827586
Female 145.93919821146602
Result 13
Read Only
SQL Additions
Jump to
Automatic context help is disabled. Use the toolbar t manually get help for the current caret position or t toggle automatic help.
Context Help Snippets
Output
Action Output
Time Action Message Duration / Fetch
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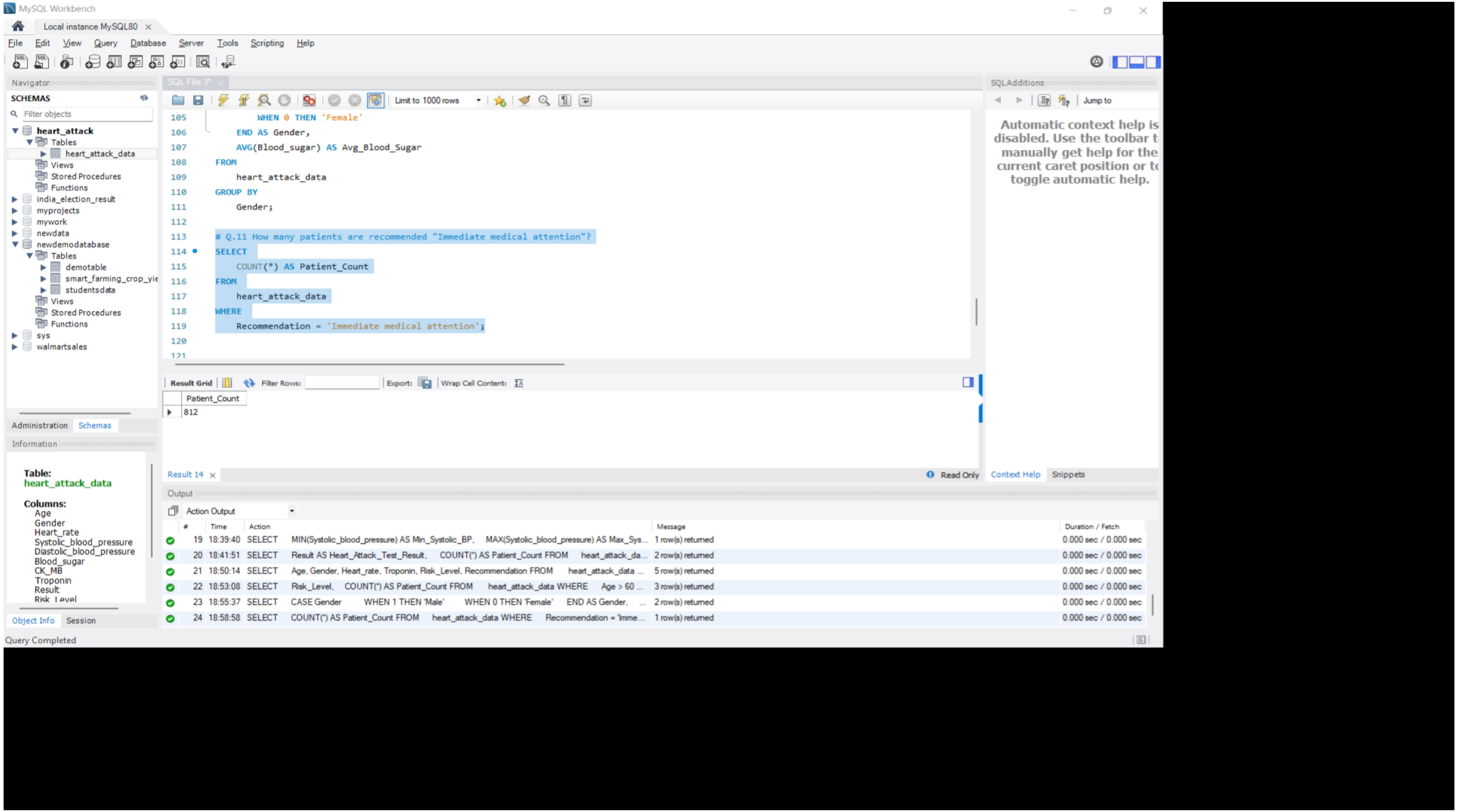
23 18:55:37 SELECT CASE Gender WHEN 1 THEN 'Male' WHEN 0 THEN 'Female' END AS Gender, ... 2 row(s) returned 0.000 sec / 0.000 sec
Query Completed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Systolic_blood_pressure
Diastolic_blood_pressure
Blood_sugar
CK_MB
Troponin
Result
Risk_Level
Object Info Session
SQL File 3*
Limit to 1000 rows
105 WHEN 0 THEN 'Female'
106 END AS Gender,
107 AVG(Blood_sugar) AS Avg_Blood_Sugar
108 FROM
109 heart_attack_data
110 GROUP BY
111 Gender;
112
113 # Q.11 How many patients are recommended "Immediate medical attention"?
114 SELECT
115 COUNT(*) AS Patient_Count
116 FROM
117 heart_attack_data
118 WHERE
119 Recommendation = 'Immediate medical attention';
120
121
Result Grid Filter Rows: Export: Wrap Cell Content:
Patient_Count
812
Result 14
Read Only
SQL Additions
Jump to
Automatic context help is disabled. Use the toolbar t manually get help for the current caret position or t toggle automatic help.
Context Help Snippets
Output
Action Output
Time Action Message Duration / Fetch
19 18:39:40 SELECT MIN(Systolic_blood_pressure) AS Min_Systolic_BP, MAX(Systolic_blood_pressure) AS Max_Sys... 1 row(s) returned 0.000 sec / 0.000 sec
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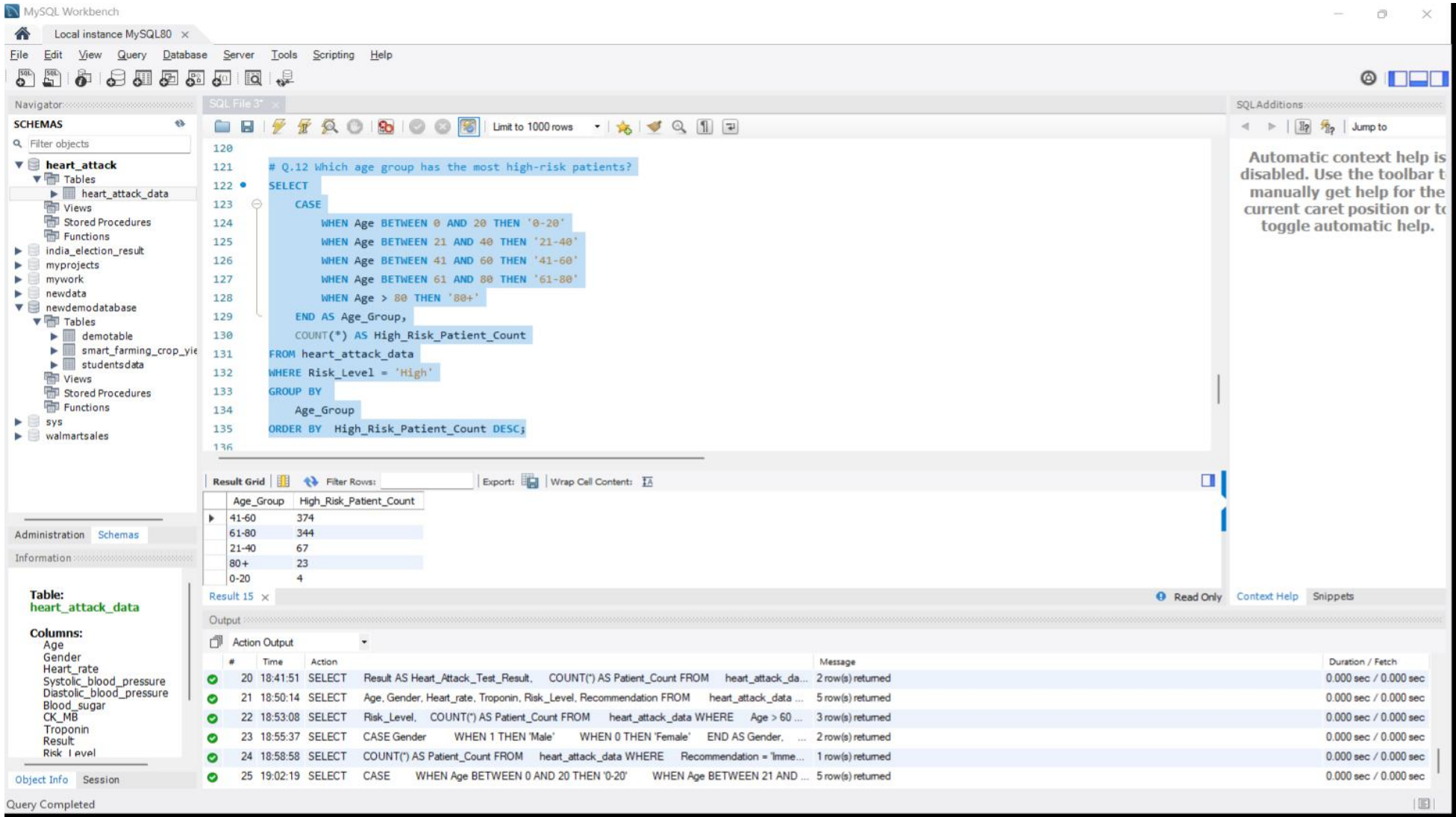
23 18:55:37 SELECT CASE Gender WHEN 1 THEN 'Male' WHEN 0 THEN 'Female' END AS Gender, ... 2 row(s) returned 0.000 sec / 0.000 sec
24 18:58:58 SELECT COUNT(*) AS Patient_Count FROM heart_attack_data WHERE Recommendation = 'Imme... 1 row(s) returned 0.000 sec / 0.000 sec
Query Completed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Systolic_blood_pressure
Diastolic_blood_pressure
Blood_sugar
CK_MB
Troponin
Result
Risk_Level
Object Info Session
SQL File 3*
Limit to 1000 rows
120
121 # Q.12 Which age group has the most high-risk patients?
122 SELECT
123 CASE
124 WHEN Age BETWEEN 0 AND 20 THEN '0-20'
125 WHEN Age BETWEEN 21 AND 40 THEN '21-40'
126 WHEN Age BETWEEN 41 AND 60 THEN '41-60'
127 WHEN Age BETWEEN 61 AND 80 THEN '61-80'
128 WHEN Age > 80 THEN '80+'
129 END AS Age_Group,
130 COUNT(*) AS High_Risk_Patient_Count
131 FROM heart_attack_data
132 WHERE Risk_Level = 'High'
133 GROUP BY
134 Age_Group
135 ORDER BY High_Risk_Patient_Count DESC;
136
Result Grid
Filter Rows:
Export:
Wrap Cell Content:
Age_Group High_Risk_Patient_Count
41-60 374
61-80 344
21-40 67
80+ 23
0-20 4
Result 15
Read Only
SQL Additions
Jump to
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Action Output
Time Action Message Duration / Fetch
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24 18:58:58 SELECT COUNT(*) AS Patient_Count FROM heart_attack_data WHERE Recommendation = 'Imme... 1 row(s) returned 0.000 sec / 0.000 sec
25 19:02:19 SELECT CASE WHEN Age BETWEEN 0 AND 20 THEN '0-20' WHEN Age BETWEEN 21 AND ... 5 row(s) returned 0.000 sec / 0.000 sec
Query Completed


THANK YOU