

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."

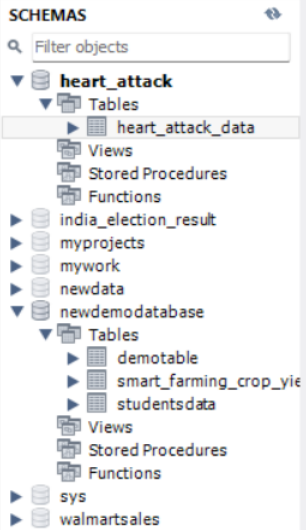


Table:
heart_attack_data

Columns:

Age
Gender
Heart_rate
Systolic_blood_pressure
Diastolic_blood_pressure
Blood_sugar
CK_MB
Troponin
Result
Risk_Level

```
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: | Exports: | Wrap Cell Content: |

TotalRecords
1319

#	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

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.



Local instance MySQL80 x

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_yield

studentsdata

Views

Stored Procedures

Functions

sys

walmarketsales

SQL File 3* x

Limit to 1000 rows

```
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

Risk_Level	Patient_Count
Moderate	232
High	812
Low	275

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

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Read Only Context Help Snippets

Output

Action Output

#	Time	Action	Message	Duration / Fetch
✓ 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
✓ 15	18:28:39	SELECT Risk_Level, COUNT(*) AS Patient_Count FROM heart_attack_data GROUP BY Risk_Level	3 row(s) returned	0.000 sec / 0.000 sec

Query Completed

MySQL Workbench

Local instance MySQL80

FileEditViewQueryDatabaseServerToolsScriptingHelp

Navigator

SCHEMAS

Filter objects

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Tables

demotable

smart_farming_crop_yie

studentsdata

Views

Stored Procedures

Functions

sys

walmar-sales

SQL File 3*

Limit to 1000 rows

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

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 Contents:

Average_Age

56.1933

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

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Result 6

Read Only

Context Help

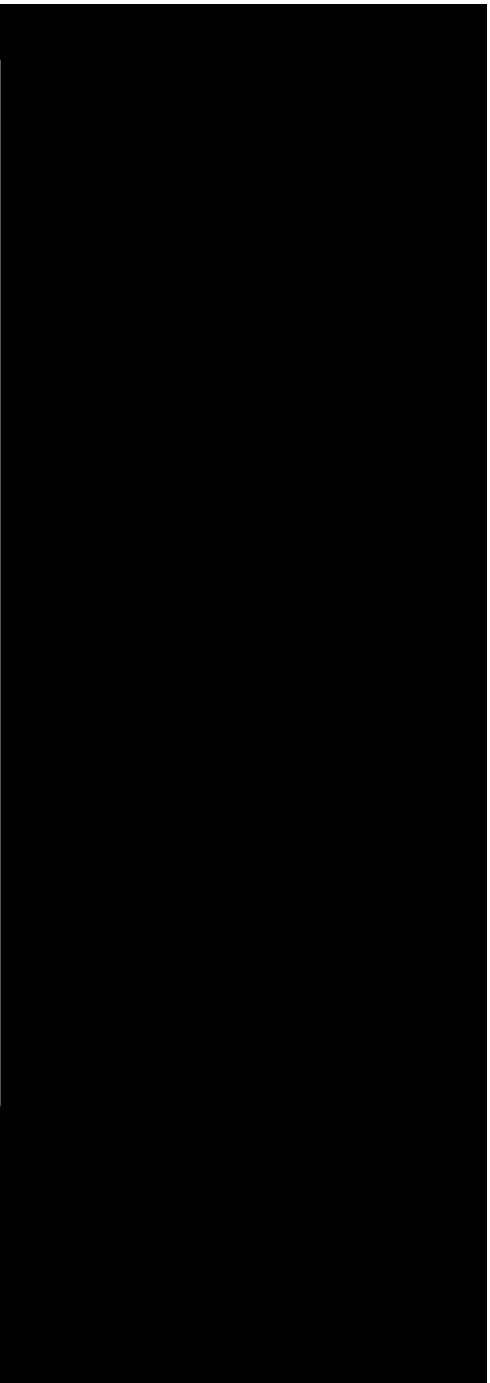
Snippets

Output

Action Output

#	Time	Action	Message	Duration / Fetch
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✓ 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
✓ 15	18:28:39	SELECT Risk_Level, COUNT(*) AS Patient_Count FROM heart_attack_data GROUP BY Risk_L...	3 row(s) returned	0.000 sec / 0.000 sec
✓ 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



Local instance MySQL80 x

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
- walmarthsales

SQL File 3* x

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

Gender	Patient_Count
Male	870
Female	449

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

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Result 7 x

Output

Action Output

#	Time	Action	Message	Duration / Fetch
✓ 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
✓ 15	18:28:39	SELECT Risk_Level, COUNT(*) AS Patient_Count FROM heart_attack_data GROUP BY Risk_L...	3 row(s) returned	0.000 sec / 0.000 sec
✓ 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
✓ 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

MySQL Workbench

Local instance MySQL80

FileEditViewQueryDatabaseServerToolsScriptingHelp

SQL File 3*

Limit to 1000 rows

SCHEMAS

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walmar-sales

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 InfoSession

SQL File 3*

Limit to 1000 rows

66

END AS Gender,

67

AVG(Heart_rate) AS Avg_Heart_Rate

68

FROM

69

heart_attack_data

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GROUP BY

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Gender;

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Result Grid

Filter Rows:

Export:

Wrap Cell Contents:

	Min_Systolic_BP	Max_Systolic_BP	Min_Diastolic_BP	Max_Diastolic_BP
▶	42	223	38	154

Result 9

Read OnlyContext HelpSnippets

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
✓	15 18:28:39	SELECT Risk_Level, COUNT(*) AS Patient_Count FROM heart_attack_data GROUP BY Risk_L...	3 row(s) returned	0.000 sec / 0.000 sec
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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

Query Completed

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.</

MySQL Workbench

Local instance MySQL80

FileEditViewQueryDatabaseServerToolsScriptingHelp

SQL

SQL

File

Print

Save

Save As

Export

Import

Undo

Redo

Limit to 1000 rows

Star

Zoom In

Zoom Out

Find

Find Next

Find Previous

Run

SQL

SQL

File

Print

Save

Save As

Export

Import

Undo

Redo

Limit to 1000 rows

Star

Zoom In

Zoom Out

Find

Find Next

Find Previous

Run

Navigator

SCHEMAS

Filter objects

heart_attack

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heart_attack_data

Views

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studentsdata

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SQL File 3*

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 Contents:

	Heart_Attack_Test_Result	Patient_Count
	negative	509
	positive	810

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

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Result 10

Read Only

Context Help

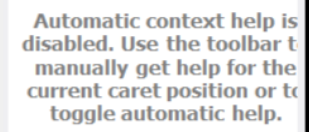
Snippets

Output

Action Output

#	Time	Action	Message	Duration / Fetch
✓ 15	18:28:39	SELECT Risk_Level, COUNT(*) AS Patient_Count FROM heart_attack_data GROUP BY Risk_L...	3 row(s) returned	0.000 sec / 0.000 sec
✓ 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
✓ 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

Query Completed



MySQL Workbench

Local instance MySQL80

FileEditViewQueryDatabaseServerToolsScriptingHelp

SQL File 3*

Limit to 1000 rows

85heart_attack_data

86ORDER BY

87Troponin DESC

88LIMIT 5;

89

90# Q.9 How many patients aged over 60 are in each risk level?

91SELECT

92Risk_Level,

93COUNT(*) AS Patient_Count

94FROM

95heart_attack_data

96WHERE

97Age > 60

98GROUP BY

99Risk_Level;

100

101

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Navigator

SCHEMAS

Filter objects

heart_attack

Tables

heart_attack_data

Views

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myprojects

mywork

newdata

newdemodatabase

Tables

demotable

smart_farming_crop_yie

studentsdata

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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

Result Grid

Filter Rows:

Export:

Wrap Cell Contents:

	Risk_Level	Patient_Count
▶	Moderate	66
	High	367
	Low	81

Result 12

Read Only

Context Help

Snippets

Output

Action Output

#	Time	Action	Message	Duration / Fetch
✓	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

Local instance MySQL80 x

File Edit View Query Database Server Tools Scripting Help

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SQL File 3* x

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;
```

Result Grid

Gender	Avg_Blood_Sugar
Male	146.99310344827586
Female	145.93919821146602

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

Query Completed

SQLAdditions

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Result 13 x

Output

Action Output

#	Time	Action	Message	Duration / Fetch
✓ 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
✓ 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

MySQL Workbench

Local instance MySQL80

FileEditViewQueryDatabaseServerToolsScriptingHelp

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walmarketsales

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

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

SQLAdditions

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Read Only

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
✓ 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
✓ 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

