

Aggregation in SQL

QUESTION 1

Count how many cities are there in each country?

ANSWER

The screenshot shows the MySQL Workbench interface with a query editor and results grid.

Query Editor:

```
MySQL Workbench - pw_skills_DA_Batch
File Edit View Query Database Server Tools Scripting Help
Navigator
SCHEMAS
Filter objects
college
company_db
company_md
db_name
employee
mitesh
orders
pw_skills
pwskills
sakila
sys
world
Tables
city
country
countrylanguage
Views
Stored Procedures
Functions
xyz

SQL File 15* x
1 • use world ;
2 • select * from country;
3 • select name from country;
4 • select sum(population)/100000000 as pop_bn from country;
5 • select count(name) as no_of_countries from country;
6 • select count(distinct continent) as no_of_continents from country;
7 • USE world;
8
9 • SELECT CountryCode, COUNT(*) AS total_cities
10 FROM city
11 GROUP BY CountryCode;
12
```

Result Grid:

CountryCode	total_cities
ABW	1
AFG	4
AGO	5
AIA	2
ALB	1
AND	1
ANT	1
ARE	5
ARG	57

Output:

#	Time	Action	Message	Duration / Fetch
16	13:47:57	select count(name) as no_of_countries from country	1 row(s) returned	0.000 sec / 0.000 sec
17	13:47:57	select count(distinct continent) as no_of_continents from country	1 row(s) returned	0.000 sec / 0.000 sec
18	18:55:54	SELECT CountryCode, COUNT(*) AS total_cities FROM city GROUP BY CountryCode	232 row(s) returned	0.032 sec / 0.000 sec

QUESTION 2**Display all continents having more than 30 countries.****ANSWER**

The screenshot shows the MySQL Workbench interface. The top bar displays the title "MySQL Workbench" and the database "pw_skills_DA_Batch". The menu bar includes File, Edit, View, Query, Database, Server, Tools, Scripting, and Help. The toolbar contains various icons for file operations like Open, Save, Print, and Database. The Navigator pane on the left lists schemas: college, company_db, company_md, db_name, employee, mitesh, orders, pw_skills, pwskills, sakila, sys, and world. Under the world schema, tables like city, country, and countrylanguage are listed, along with Views, Stored Procedures, and Functions. The main SQL Editor pane contains the following code:

```
3 • select name from country;
4 • select sum(population)/100000000 as pop_bn from country;
5 • select count(name) as no_of_countries from country;
6 • select count(distinct continent) as no_of_continents from country;
7 • USE world;
8
9 • SELECT CountryCode, COUNT(*) AS total_cities
10 FROM city
11 GROUP BY CountryCode;
12
13 ## QUESTION 2
14
15 • USE world;
16
17 • SELECT Continent, COUNT(*) AS total_countries
18 FROM country;
```

The Result Grid pane below shows the output of the last query:

Continent	total_countries
North America	37
Asia	51
Africa	58
Europe	46

The Output pane at the bottom shows the execution log:

#	Time	Action	Message	Duration / Fetch
17	13:47:57	select count(distinct continent) as no_of_continents from country	1 row(s) returned	0.000 sec / 0.000 sec
18	18:55:54	SELECT CountryCode, COUNT(*) AS total_cities FROM city GROUP BY CountryCode	232 row(s) returned	0.032 sec / 0.000 sec
19	19:02:26	SELECT Continent, COUNT(*) AS total_countries FROM country GROUP BY Continent HAVING COUNT(*) > 30	4 row(s) returned	0.016 sec / 0.000 sec

QUESTION 3**List regions whose total population exceeds 200 million****ANSWER**

The screenshot shows the MySQL Workbench interface with the following details:

- SQL Editor:** The query window displays the following SQL code:

```
17 •  SELECT Continent, COUNT(*) AS total_continents
18   FROM country
19   GROUP BY Continent
20   HAVING COUNT(*) > 30;
21
22 ## QUESTION 3
23
24 •  USE world;
25
26 •  SELECT Region, SUM(Population) AS total_population
27   FROM country
28   GROUP BY Region
29   HAVING SUM(Population) > 200000000;
30
31
```
- Result Grid:** The results of the second query are shown in a grid:

Region	total_population
Southern and Central Asia	1490776000
South America	345780000
Eastern Africa	24699000
Western Africa	221672000
Eastern Europe	307026000
North America	309632000
Southeast Asia	518541000
Eastern Asia	1507328000
- Action Output:** The log shows the execution of three queries:

#	Time	Action	Message	Duration / Fetch
18	18:55:54	SELECT CountryCode, COUNT(*) AS total_cities FROM city GROUP BY CountryCode	232 row(s) returned	0.032 sec / 0.000 sec
19	19:02:26	SELECT Continent, COUNT(*) AS total_continents FROM country GROUP BY Continent HAVING COUNT(*) ... 4 row(s) returned		0.016 sec / 0.000 sec
20	19:03:58	SELECT Region, SUM(Population) AS total_population FROM country GROUP BY Region HAVING SUM(P... 8 row(s) returned		0.000 sec / 0.000 sec

QUESTION 4**Find the top 5 continents by average GNP per country****ANSWER**

The screenshot shows the MySQL Workbench interface with the following details:

- File Menu:** File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Toolbar:** Standard MySQL icons for connection, schema browser, and query execution.
- Navigator:** Shows the database schema with the **world** schema expanded, displaying tables like `city`, `country`, and `countrylanguage`.
- SQL Editor:** A tab titled "SQL File 15*" containing the following SQL code:

```
25
26 •  SELECT Region, SUM(Population) AS total_population
27   FROM country
28   GROUP BY Region
29   HAVING SUM(Population) > 20000000;
30
31
32 ## QUESTION 4
33 •  USE world;
34
35 •  SELECT Continent, AVG(GNP) AS avg_gnp
36   FROM country
37   GROUP BY Continent
38   ORDER BY avg_gnp DESC
39   LIMIT 5;
40
```
- Result Grid:** A table showing the average GNP for each continent.

Continent	avg_gnp
North America	261854.789189
Europe	206497.065217
Asia	150105.725490
South America	107991.000000
Oceania	14991.953571
- Action Output:** A log of the executed SQL statements and their execution times.

#	Time	Action	Message	Duration / Fetch
19	19:02:26	SELECT Continent, COUNT(*) AS total_countries FROM country GROUP BY Continent HAVING COUNT(*) > 5	4 row(s) returned	0.016 sec / 0.000 sec
20	19:03:58	SELECT Region, SUM(Population) AS total_population FROM country GROUP BY Region HAVING SUM(Population) > 20000000	8 row(s) returned	0.000 sec / 0.000 sec
21	19:06:15	SELECT Continent, AVG(GNP) AS avg_gnp FROM country GROUP BY Continent ORDER BY avg_gnp DESC LIMIT 5;	5 row(s) returned	0.000 sec / 0.000 sec

QUESTION 5

Find the total number of official languages spoken in each continent.

ANSWER

The screenshot shows the MySQL Workbench interface with the following details:

- File Menu:** File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Toolbar:** Standard MySQL Workbench toolbar icons.
- Navigator:** Shows the database schema.
 - SCHEMAS:** college, company_db, company_md, db_name, employee, mitesh, orders, pw_skills, pwskills, sakila, sys, world.
 - Tables under world:** city, country, countrylanguage, Views, Stored Procedures, Functions.
 - xyz:** A table listed under world.
- SQL Editor:** SQL File 15* contains the following SQL code:

```
37 GROUP BY Continent
38 ORDER BY avg_gnp DESC
39 LIMIT 5;
40
41 ## QUESTION 5
42
43 • USE world;
44
45 • SELECT c.Continent,
46     COUNT(DISTINCT cl.Language) AS total_official_languages
47 FROM country c
48 JOIN countrylanguage cl
49 ON c.Code = cl.CountryCode
50 WHERE cl.Official = 'T'
51 GROUP BY c.Continent;
52
```
- Result Grid:** Shows the output of the query.

Continent	total_official_languages
Asia	38
Europe	36
North America	7
Africa	20
Oceania	13
South America	6
- Action Output:** Shows the log of actions taken during the session.

#	Time	Action	Message	Duration / Fetch
20	19:03:58	SELECT Region, SUM(Population) AS total_population FROM country GROUP BY Region HAVING SUM(P... 8 row(s) returned		0.000 sec / 0.000 sec
21	19:06:15	SELECT Continent, AVG(GNP) AS avg_gnp FROM country GROUP BY Continent ORDER BY avg_gnp DE... 5 row(s) returned		0.000 sec / 0.000 sec
22	19:08:26	SELECT c.Continent, COUNT(DISTINCT cl.Language) AS total_official_languages FROM country c JO... 6 row(s) returned		0.031 sec / 0.000 sec

QUESTION 6**Find the maximum and minimum GNP for each continent****ANSWER**

MySQL Workbench

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

- college
- company_db
- company_md
- db_name
- employee
- mitesh
- orders
- pw_skills
- pwskills
- sakila
- sys
- world
 - Tables
 - city
 - country
 - countrylanguage
 - Views
 - Stored Procedures
 - Functions
- xyz

Administration Schemas

No object selected

SQL File 15* x

```
46 COUNT(DISTINCT cl.Language) AS total_official_languages
47 FROM country c
48 JOIN countrylanguage cl
49 ON c.Code = cl.CountryCode
50 WHERE cl.Official = 'T'
51 GROUP BY c.Continent;
52
53 ## QUESTION 6
54 • USE world;
55
56 • SELECT Continent,
57     MAX(GNP) AS max_gnp,
58     MIN(GNP) AS min_gnp
59 FROM country
60 GROUP BY Continent;
61
```

Result Grid | Filter Rows: Export: Wrap Cell Content: Result Grid Form Editor

Continent	max_gnp	min_gnp
North America	8510700.00	0.00
Asia	3787042.00	0.00
Africa	116729.00	0.00
Europe	2133367.00	0.00
South America	776739.00	0.00
Oceania	351182.00	0.00
Antarctica	0.00	0.00

Result 20 x

Output

Action Output

#	Time	Action	Message	Duration / Fetch
21	19:06:15	SELECT Continent, AVG(GNP) AS avg_gnp FROM country GROUP BY Continent ORDER BY avg_gnp DE...	5 row(s) returned	0.000 sec / 0.000 sec
22	19:08:26	SELECT c.Continent, COUNT(DISTINCT cl.Language) AS total_official_languages FROM country c JO...	6 row(s) returned	0.031 sec / 0.000 sec
23	19:09:51	SELECT Continent, MAX(GNP) AS max_gnp, MIN(GNP) AS min_gnp FROM country GROUP BY C...	7 row(s) returned	0.016 sec / 0.000 sec

Object Info Session

QUESTION 7

Find the country with the highest average city population.

ANSWER

The screenshot shows the MySQL Workbench interface with the following details:

- File Menu:** File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Navigator:** Shows the database schema with the **world** database selected, containing tables like **city**, **country**, and **countrylanguage**.
- SQL Editor:** SQL File 15* contains the following query:

```
61
62  ## QUESTION 7
63  USE world;
64
65  • SELECT c.Name AS country_name,
66      AVG(ci.Population) AS avg_city_population
67  FROM country c
68  JOIN city ci
69  ON c.Code = ci.CountryCode
70  GROUP BY c.Name
71  ORDER BY avg_city_population DESC
72
73
74
75
76
```
- Result Grid:** Shows the result of the query:

country_name	avg_city_population
Singapore	4017733.0000
- Output Window:** Action Output shows the execution log:

#	Time	Action	Message	Duration / Fetch
22	19:08:26	SELECT c.Continent, COUNT(DISTINCT cl.Language) AS total_official_languages FROM country c JOIN city ci ON c.Id = ci.CountryCode GROUP BY c.Continent	6 row(s) returned	0.031 sec / 0.000 sec
23	19:09:51	SELECT Continent, MAX(GNP) AS max_gnp, MIN(GNP) AS min_gnp FROM country GROUP BY Continent	7 row(s) returned	0.016 sec / 0.000 sec
24	19:11:26	SELECT c.Name AS country_name, AVG(ci.Population) AS avg_city_population FROM country c JOIN city ci ON c.Id = ci.CountryCode GROUP BY c.Name	1 row(s) returned	0.031 sec / 0.000 sec

QUESTION 8**List continents where the average city population is greater than 200,000****ANSWER**

The screenshot shows the MySQL Workbench interface with the following details:

- SQL Editor:** The main window displays the following SQL query:

```
69  ON c.Code = ci.CountryCode
70  GROUP BY c.Name
71  ORDER BY avg_city_population DESC
72  LIMIT 1;
73
74  ## QUESTION 8
75 • USE world;
76
77 • SELECT c.Continent,
78      AVG(ci.Population) AS avg_city_population
79  FROM country c
80  JOIN city ci
81  ON c.Code = ci.CountryCode
82  GROUP BY c.Continent
83  HAVING AVG(ci.Population) > 200000;
84
```
- Result Grid:** Below the editor, the results of the query are shown in a grid:

Continent	avg_city_population
North America	289587.5749
Asia	395019.3109
Africa	371143.6585
Europe	287684.6766
South America	366037.9979
Oceania	252475.4364
- Action Output:** The bottom section shows the execution log:

#	Time	Action	Message	Duration / Fetch
23	19:09:51	SELECT c.Continent, MAX(GNP) AS max_gnp, MIN(GNP) AS min_gnp FROM country c GROUP BY C...	7 row(s) returned	0.016 sec / 0.000 sec
24	19:11:26	SELECT c.Name AS country_name, AVG(ci.Population) AS avg_city_population FROM country c JOIN city ci ON c...	1 row(s) returned	0.031 sec / 0.000 sec
25	19:13:35	SELECT c.Continent, AVG(ci.Population) AS avg_city_population FROM country c JOIN city ci ON c...	6 row(s) returned	0.031 sec / 0.000 sec

QUESTION 9

: Find the total population and average life expectancy for each continent, ordered by average life expectancy descending.

ANSWER

The screenshot shows the MySQL Workbench interface with a query editor window titled "SQL File 15*". The code in the editor is:

```
79   FROM country c
80   JOIN city ci
81   ON c.Code = ci.CountryCode
82   GROUP BY c.Continent
83   HAVING AVG(ci.Population) > 200000;
84
85  ## QUESTION 9
86 •  USE world;
87
88 •  SELECT Continent,
89        SUM(Population) AS total_population,
90        AVG(LifeExpectancy) AS avg_life_expectancy
91   FROM country
92   GROUP BY Continent
93   ORDER BY avg_life_expectancy DESC;
94
```

The "Result Grid" pane displays the following data:

Continent	total_population	avg_life_expectancy
Europe	730074600	75.14773
North America	48293000	72.99189
South America	345780000	70.94615
Oceania	30401150	69.71500
Asia	3705025700	67.44118
Africa	784475000	52.57193
Antarctica	0	NULL

The "Object Info" and "Session" panes at the bottom show the execution history and session details respectively.

QUESTION 10

Find the top 3 continents with the highest average life expectancy, but only include those where the total population is over 200 million

ANSWER

The screenshot shows the MySQL Workbench interface with the following details:

- SQL Editor:** Contains the following SQL query:

```
91 FROM country
92 GROUP BY Continent
93 ORDER BY avg_life_expectancy DESC;
94
95 ## QUESTION 10
96 • USE world;
97
98 • SELECT Continent,
99     SUM(Population) AS total_population,
100    AVG(LifeExpectancy) AS avg_life_expectancy
101   FROM country
102  GROUP BY Continent
103  HAVING SUM(Population) > 20000000
104  ORDER BY avg_life_expectancy DESC
105 LIMIT 3;
```
- Result Grid:** Displays the results of the query:

Continent	total_population	avg_life_expectancy
Europe	730074600	75.14773
North America	482993000	72.99189
South America	345780000	70.94615
- Output Pane:** Shows the execution log:

#	Time	Action	Message	Duration / Fetch
25	19:13:35	SELECT c.Continent, AVG(c.Population) AS avg_city_population FROM country c JOIN city ci ON c...	6 row(s) returned	0.031 sec / 0.000 sec
26	19:15:47	SELECT Continent, SUM(Population) AS total_population, AVG(LifeExpectancy) AS avg_life_expe...	7 row(s) returned	0.000 sec / 0.000 sec
27	19:17:11	SELECT Continent, SUM(Population) AS total_population, AVG(LifeExpectancy) AS avg_life_expe...	3 row(s) returned	0.000 sec / 0.000 sec