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Experiment No.	5

AIM:	To learn and apply aggregate functions
Program 1	
PROBLEM STATEMENT :	. Peform aggregate functions on database – Count() , Sum() , Avg() , min() ,max()
Theory :	**Aggregate functions** An aggregate function performs a calculation on a set of values, and returns a single value. Except for COUNT(*), aggregate functions ignore null values. Aggregate functions are often used with the GROUP BY clause of the SELECT statement. All aggregate functions are deterministic. In other words, aggregate functions return the same value each time that they are called, when called with a specific set of input values. See Deterministic and Nondeterministic Functions for more information about function determinism. The OVER clause may follow all aggregate functions, except the STRING_AGG, GROUPING or GROUPING_ID functions. Use aggregate functions as expressions only in the following situations: The select list of a SELECT statement (either a subquery or an outer query). A HAVING clause. **COUNT() Function** The COUNT() function returns the number of rows that matches a specified criterion. **Syntax:**

	SELECT COUNT(column_name) FROM table_name WHERE condition; **AVG Syntax** The AVG() function returns the average value of a numeric column. **Syntax:** SELECT AVG(column_name) FROM table_name WHERE condition; **SUM Syntax** The SUM() function returns the total sum of a numeric column. **Syntax:** SELECT SUM(column_name) FROM table_name WHERE condition; **MIN Syntax** The MIN() function returns the smallest value of the selected column. **Syntax:** SELECT MIN(column_name) FROM table_name WHERE condition; **MAX Syntax** The MAX() function returns the largest value of the selected column.

	Syntax: SELECT MAX(column_name) FROM table_name WHERE condition;
Queries	**Table Hotel_info** **1)Count function** use hotel; select count(h_id) from hotel_info; **Statement:** Here count function counts the number of hotels with the help of h_id(hotel id) **Table**

Result Grid | Filter Rows: | Edit:

H_Name	H_ID	H_Address	H_Num_Emp	H_vacancies
marriot	1234	Pune	3456	5
The Plaza	2345	New York	4567	7
Claridge's	3456	London	5678	7
Raffles	5678	Singapore	6789	8
Taj Mahal Palace	6789	Mumbai	7890	9
Beverly Hills Hotel	8970	Los Angeles	8907	2
NULL	NULL	NULL	NULL	NULL

Output:

Result Grid

count(h_id)
6

2)Avg function

use hotel;
select avg(h_vacancies)
from hotel_info;

Statement:
Here the avg function calculates the average number of vacancies in all hotels

Table

Result Grid | Filter Rows: | Edit:

H_Name	H_ID	H_Address	H_Num_Emp	H_vacancies
marriot	1234	Pune	3456	5
The Plaza	2345	New York	4567	7
Claridge's	3456	London	5678	7
Raffles	5678	Singapore	6789	8
Taj Mahal Palace	6789	Mumbai	7890	9
Beverly Hills Hotel	8970	Los Angeles	8907	2
NULL	NULL	NULL	NULL	NULL

Output:

Result Grid

avg(h_vacancies)
6.3333

3)Sum function

```
use hotel;
select sum(h_num_emp)
from hotel_info;
```

Statement:
Here the sum function calculates the total number of employees in all hotels

Table

Result Grid | Filter Rows: | Edit:

H_Name	H_ID	H_Address	H_Num_Emp	H_vacancies
marriot	1234	Pune	3456	5
The Plaza	2345	New York	4567	7
Claridge's	3456	London	5678	7
Raffles	5678	Singapore	6789	8
Taj Mahal Palace	6789	Mumbai	7890	9
Beverly Hills Hotel	8970	Los Angeles	8907	2
NULL	NULL	NULL	NULL	NULL

Output

Result Grid

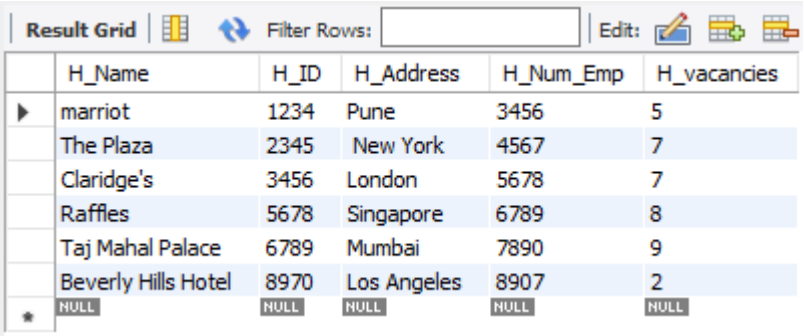
sum(h_num_emp)
37287

4)Min function

```
use hotel;
select h_num_emp,h_name,h_id,h_address
from hotel_info where h_num_emp=(select min(h_num_emp) from
hotel_info) ;
```

Statement:
This function calculates the hotel with minimum number of employees

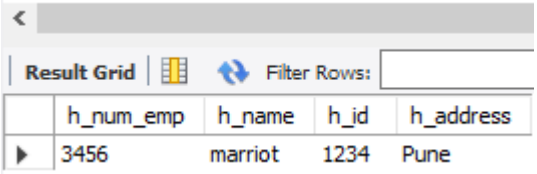
Table



Result Grid | Filter Rows: | Edit:

H_Name	H_ID	H_Address	H_Num_Emp	H_vacancies
marriot	1234	Pune	3456	5
The Plaza	2345	New York	4567	7
Claridge's	3456	London	5678	7
Raffles	5678	Singapore	6789	8
Taj Mahal Palace	6789	Mumbai	7890	9
Beverly Hills Hotel	8970	Los Angeles	8907	2
NULL	NULL	NULL	NULL	NULL

Output



Result Grid | Filter Rows:

h_num_emp	h_name	h_id	h_address
3456	marriot	1234	Pune

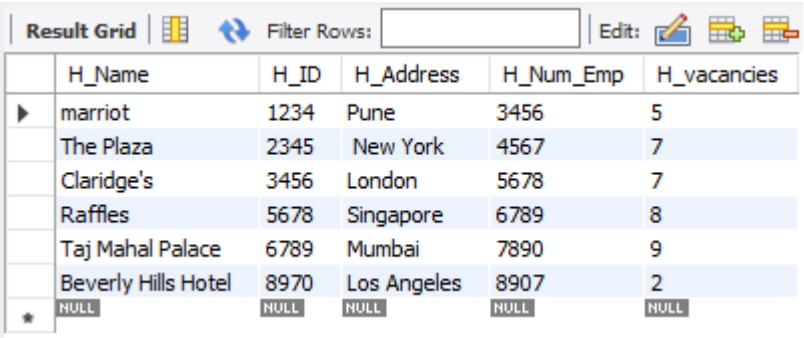
5)Max function

```
use hotel;
select r_price,h_id,r_no,r_type
from room where r_price=(select max(r_price) from room) ;
```

Statement:

This function tells the room with maximum price

Table



Result Grid | Filter Rows: | Edit:

H_Name	H_ID	H_Address	H_Num_Emp	H_vacancies
marriot	1234	Pune	3456	5
The Plaza	2345	New York	4567	7
Claridge's	3456	London	5678	7
Raffles	5678	Singapore	6789	8
Taj Mahal Palace	6789	Mumbai	7890	9
Beverly Hills Hotel	8970	Los Angeles	8907	2
NULL	NULL	NULL	NULL	NULL

Output

Result Grid | Filter Rows:

r_price	h_id	r_no	r_type
2500	6789	15	Luxury Suite

Table Room

1)Count function

```
use hotel;
select count(r_no)
from room;
```

Statement:

Here count function counts the number of rooms with the help of r_no(room number)

Table

Result Grid | Filter Rows: | Ed

R_no	R_vacany	R_price	R_type	H_ID
12	1	1000	Basic	1234
13	0	2000	Deluxe	2345
14	1	1500	Suite	5678
15	0	2500	Luxury Suite	6789
NULL	NULL	NULL	NULL	NULL

Output

Result Grid

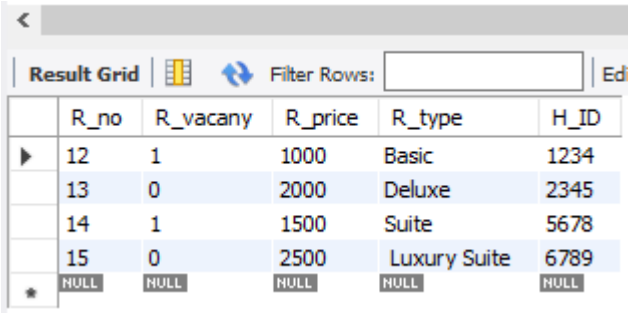
count(r_no)
4

2)Avg function

```
use hotel;
select avg(r_price)
from room;
```

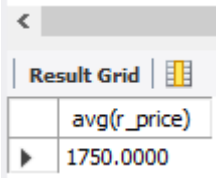
Statement:

Here the avg function calculates the average prices of rooms



R_no	R_vacany	R_price	R_type	H_ID
12	1	1000	Basic	1234
13	0	2000	Deluxe	2345
14	1	1500	Suite	5678
15	0	2500	Luxury Suite	6789
NULL	NULL	NULL	NULL	NULL

Output



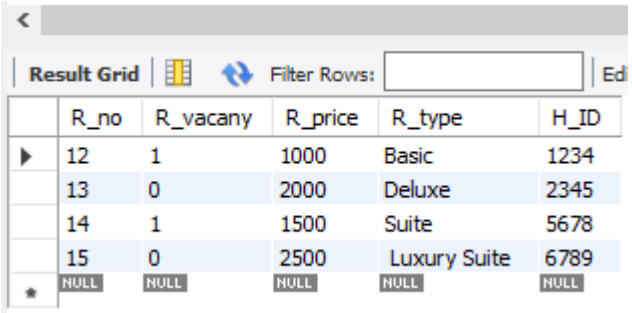
avg(r_price)
1750.0000

3)Sum function

```
use hotel;
select sum(r_price) as room_price
from room;
```

Statement:
Here the sum function calculates the total prices of all rooms

Table



R_no	R_vacany	R_price	R_type	H_ID
12	1	1000	Basic	1234
13	0	2000	Deluxe	2345
14	1	1500	Suite	5678
15	0	2500	Luxury Suite	6789
NULL	NULL	NULL	NULL	NULL

Output

Result Grid

room_price
7000

4)Min function

```
use hotel;
select r_price,h_id,r_no,r_type
from room where r_price=(select min(r_price) from room) ;
```

Statement:
This function calculates the room with minimum price

Table

Result Grid | Filter Rows: | Ed

R_no	R_vacany	R_price	R_type	H_ID
12	1	1000	Basic	1234
13	0	2000	Deluxe	2345
14	1	1500	Suite	5678
15	0	2500	Luxury Suite	6789
NULL	NULL	NULL	NULL	NULL

Output

Result Grid | Filter Rows:

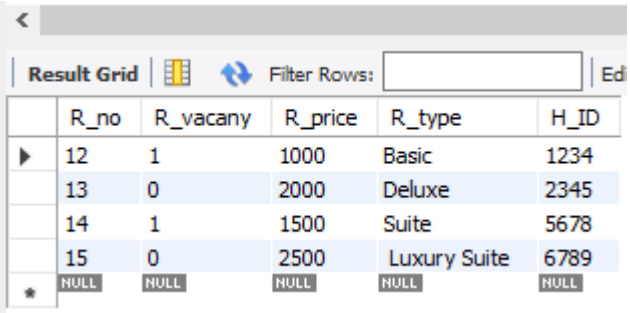
Minimum_price	r_no	h_id
1000	12	1234

5)Max function

```
use hotel;
select r_price,h_id,r_no,r_type
from room where r_price=(select max(r_price) from room) ;
```

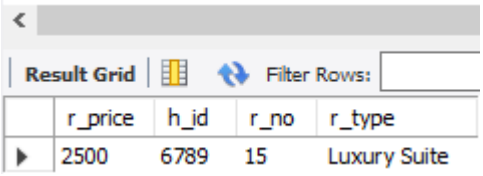
Statement:
This function tells the room with maximum price

Table



R_no	R_vacany	R_price	R_type	H_ID
12	1	1000	Basic	1234
13	0	2000	Deluxe	2345
14	1	1500	Suite	5678
15	0	2500	Luxury Suite	6789
NULL	NULL	NULL	NULL	NULL

Output:



r_price	h_id	r_no	r_type
2500	6789	15	Luxury Suite

Employee Table

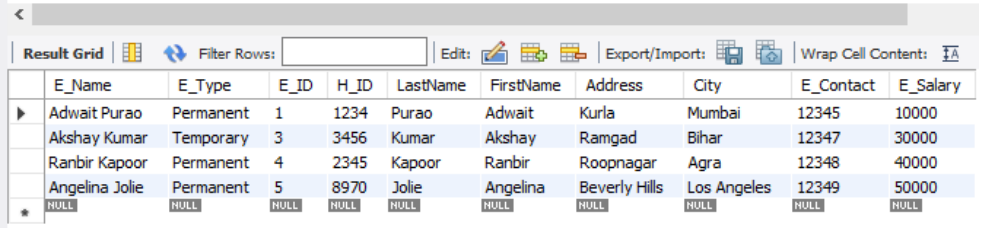
1)Count Function

```
use hotel;
select count(e_salary) as  Number_of_employees,e_type
from employee group by e_type having E_type like 'Temporary';
```

Statement:

Here count function counts the number of temporary employees , here group by takes only temporary employees

Table



E_Name	E_Type	E_ID	H_ID	LastName	FirstName	Address	City	E_Contact	E_Salary
Adwait Purao	Permanent	1	1234	Purao	Adwait	Kurla	Mumbai	12345	10000
Akshay Kumar	Temporary	3	3456	Kumar	Akshay	Ramgad	Bihar	12347	30000
Ranbir Kapoor	Permanent	4	2345	Kapoor	Ranbir	Roopnagar	Agra	12348	40000
Angelina Jolie	Permanent	5	8970	Jolie	Angelina	Beverly Hills	Los Angeles	12349	50000
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Output

Result Grid | Filter Rows:

Number_of_employees	e_type
1	Temporary

2)Avg function

```
use hotel;
select avg(e_salary) as  Average_salary,e_type
from employee group by e_type having E_type like 'Permanent';
```

Statement:
Here the avg function calculates the average salaries of employees who are permanent

Table

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

E_Name	E_Type	E_ID	H_ID	LastName	FirstName	Address	City	E_Contact	E_Salary
Adwait Purao	Permanent	1	1234	Purao	Adwait	Kurla	Mumbai	12345	10000
Akshay Kumar	Temporary	3	3456	Kumar	Akshay	Ramgad	Bihar	12347	30000
Ranbir Kapoor	Permanent	4	2345	Kapoor	Ranbir	Roopnagar	Agra	12348	40000
Angelina Jolie	Permanent	5	8970	Jolie	Angelina	Beverly Hills	Los Angeles	12349	50000
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Output:

Result Grid | Filter Rows:

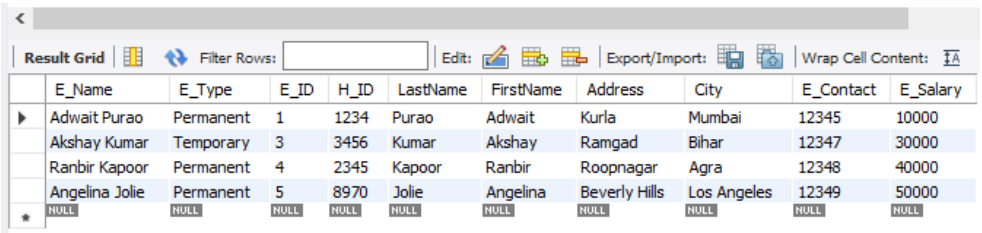
Average_salary	e_type
33333.3333	Permanent

3)Sum function

```
use hotel;
select sum(e_salary) as  Sum_of_salaries,e_type
from employee group by e_type having E_type like 'Permanent';
```

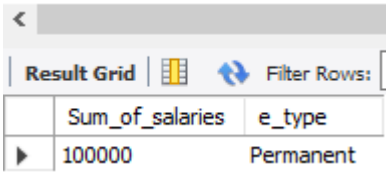
Statement:
Here the sum function calculates the total salaries of permanent employees

Table



E_Name	E_Type	E_ID	H_ID	LastName	FirstName	Address	City	E_Contact	E_Salary
Adwait Purao	Permanent	1	1234	Purao	Adwait	Kurla	Mumbai	12345	10000
Akshay Kumar	Temporary	3	3456	Kumar	Akshay	Ramgad	Bihar	12347	30000
Ranbir Kapoor	Permanent	4	2345	Kapoor	Ranbir	Roopnagar	Agra	12348	40000
Angelina Jolie	Permanent	5	8970	Jolie	Angelina	Beverly Hills	Los Angeles	12349	50000

Output



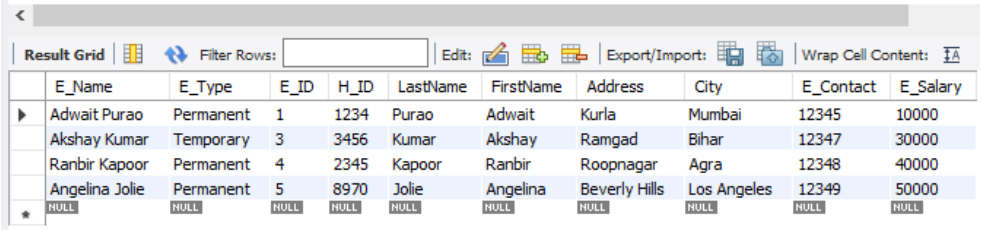
Sum_of_salaries	e_type
100000	Permanent

4)Min function

```
use hotel;
select e_salary,e_name,e_type
from employee where e_salary=(select min(e_salary) from employee) ;
```

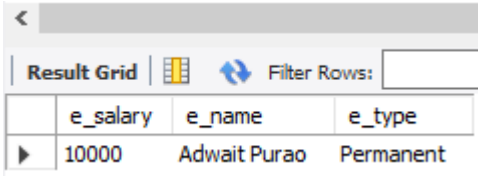
Statement:
This function calculates the employee with minimum salary

Table



E_Name	E_Type	E_ID	H_ID	LastName	FirstName	Address	City	E_Contact	E_Salary
Adwait Purao	Permanent	1	1234	Purao	Adwait	Kurla	Mumbai	12345	10000
Akshay Kumar	Temporary	3	3456	Kumar	Akshay	Ramgad	Bihar	12347	30000
Ranbir Kapoor	Permanent	4	2345	Kapoor	Ranbir	Roopnagar	Agra	12348	40000
Angelina Jolie	Permanent	5	8970	Jolie	Angelina	Beverly Hills	Los Angeles	12349	50000

Output



e_salary	e_name	e_type
10000	Adwait Purao	Permanent

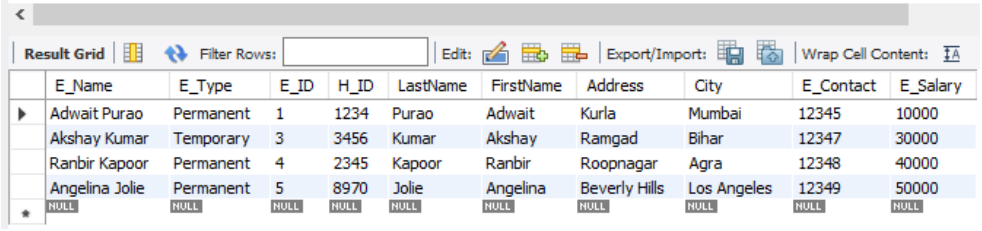
5)Max function

```
use hotel;
select e_salary,e_name,e_type
```

from employee where e_salary=(select max(e_salary) from employee) ;

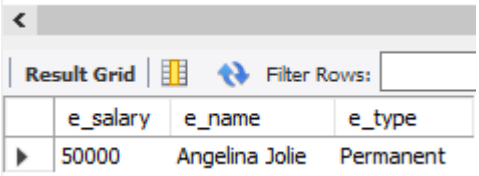
Statement:
This function calculates the employee with the maximum salary

Table



E_Name	E_Type	E_ID	H_ID	LastName	FirstName	Address	City	E_Contact	E_Salary
Adwait Purao	Permanent	1	1234	Purao	Adwait	Kurla	Mumbai	12345	10000
Akshay Kumar	Temporary	3	3456	Kumar	Akshay	Ramgad	Bihar	12347	30000
Ranbir Kapoor	Permanent	4	2345	Kapoor	Ranbir	Roopnagar	Agra	12348	40000
Angelina Jolie	Permanent	5	8970	Jolie	Angelina	Beverly Hills	Los Angeles	12349	50000

Output



e_salary	e_name	e_type
50000	Angelina Jolie	Permanent

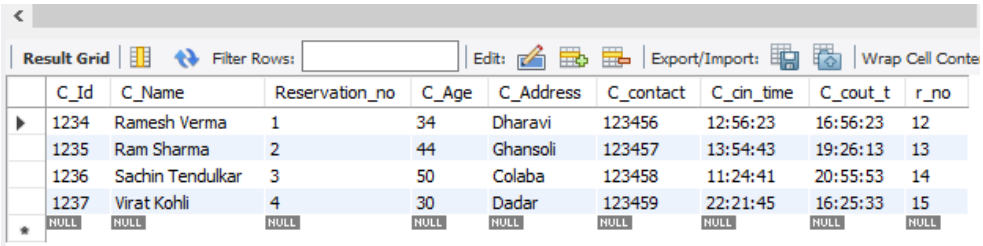
Table Customer

1)Count function

use hotel;
select count(c_id)
from customer

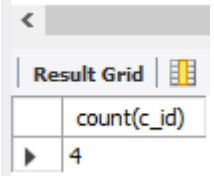
Statement:
Here count function counts the number of customers with the help of c_id(customer id)

Table



C_Id	C_Name	Reservation_no	C_Age	C_Address	C_contact	C_cin_time	C_cout_t	r_no
1234	Ramesh Verma	1	34	Dharavi	123456	12:56:23	16:56:23	12
1235	Ram Sharma	2	44	Ghansoli	123457	13:54:43	19:26:13	13
1236	Sachin Tendulkar	3	50	Colaba	123458	11:24:41	20:55:53	14
1237	Virat Kohli	4	30	Dadar	123459	22:21:45	16:25:33	15

Customer



Result Grid

	count(c_id)
▶	4

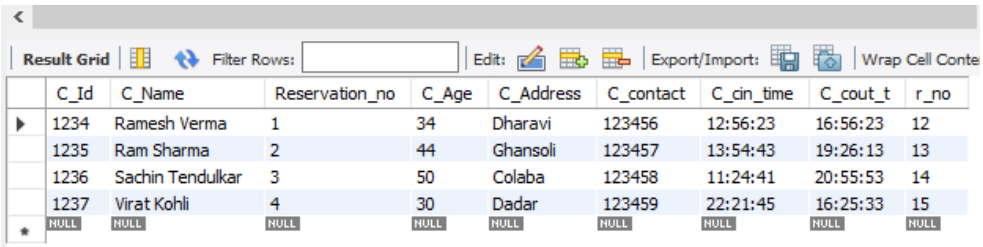
2)Avg function

```
use hotel;
select avg(c_age)
from customer;
```

Statement:

Here the avg function calculates the average ages of all customers

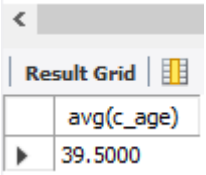
Table



Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Conte

C_Id	C_Name	Reservation_no	C_Age	C_Address	C_contact	C_cin_time	C_cout_t	r_no
1234	Ramesh Verma	1	34	Dharavi	123456	12:56:23	16:56:23	12
1235	Ram Sharma	2	44	Ghansoli	123457	13:54:43	19:26:13	13
1236	Sachin Tendulkar	3	50	Colaba	123458	11:24:41	20:55:53	14
1237	Virat Kohli	4	30	Dadar	123459	22:21:45	16:25:33	15
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Output



Result Grid

avg(c_age)
39.5000

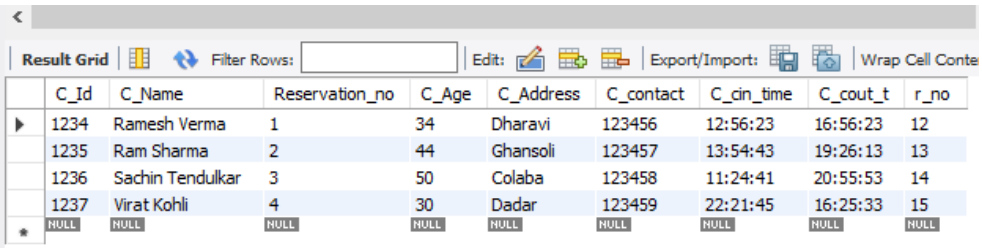
3)Sum function

```
use hotel;
select sum(c_age) As Sum_Of_Ages
from customer;
```

Statement:

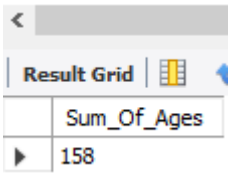
Here the sum function calculates the sum of ages of all customers

Table



C_Id	C_Name	Reservation_no	C_Age	C_Address	C_contact	C_cin_time	C_cout_t	r_no
1234	Ramesh Verma	1	34	Dharavi	123456	12:56:23	16:56:23	12
1235	Ram Sharma	2	44	Ghansoli	123457	13:54:43	19:26:13	13
1236	Sachin Tendulkar	3	50	Colaba	123458	11:24:41	20:55:53	14
1237	Virat Kohli	4	30	Dadar	123459	22:21:45	16:25:33	15

Output



Sum_Of_Ages
158

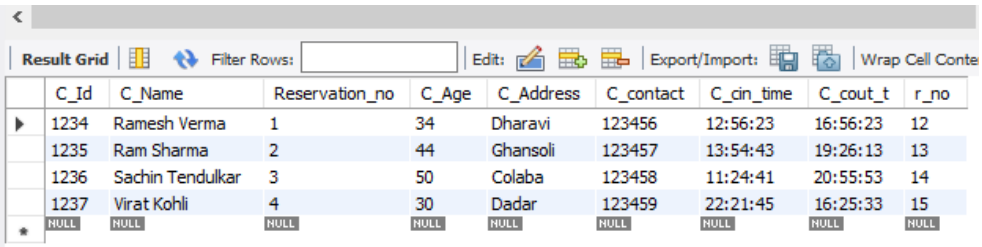
4)Min function

use hotel;
select c_cin_time,c_name,r_no,Reservation_no
from customer where c_cin_time=(select min(c_cin_time) from customer) ;

Statement:

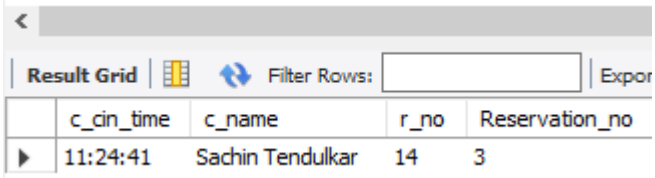
This function tells the name of the customer who arrived the earliest

Table



C_Id	C_Name	Reservation_no	C_Age	C_Address	C_contact	C_cin_time	C_cout_t	r_no
1234	Ramesh Verma	1	34	Dharavi	123456	12:56:23	16:56:23	12
1235	Ram Sharma	2	44	Ghansoli	123457	13:54:43	19:26:13	13
1236	Sachin Tendulkar	3	50	Colaba	123458	11:24:41	20:55:53	14
1237	Virat Kohli	4	30	Dadar	123459	22:21:45	16:25:33	15

Output



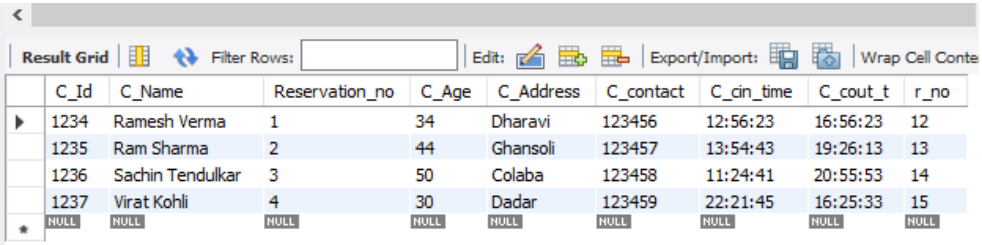
c_cin_time	c_name	r_no	Reservation_no
11:24:41	Sachin Tendulkar	14	3

5)Max function

use hotel;
select c_cin_time,c_name,r_no,Reservation_no
from customer where c_cin_time=(select max(c_cin_time) from customer) ;

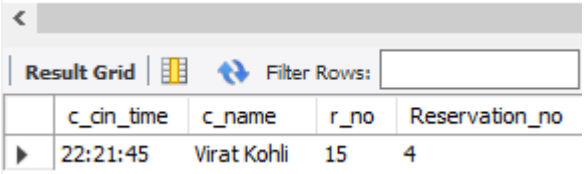
Statement:
This function tells the name of the customer who arrived the earliest

Table



C_Id	C_Name	Reservation_no	C_Age	C_Address	C_contact	C_cin_time	C_cout_t	r_no
1234	Ramesh Verma	1	34	Dharavi	123456	12:56:23	16:56:23	12
1235	Ram Sharma	2	44	Ghansoli	123457	13:54:43	19:26:13	13
1236	Sachin Tendulkar	3	50	Colaba	123458	11:24:41	20:55:53	14
1237	Virat Kohli	4	30	Dadar	123459	22:21:45	16:25:33	15
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Output



c_cin_time	c_name	r_no	Reservation_no
22:21:45	Virat Kohli	15	4

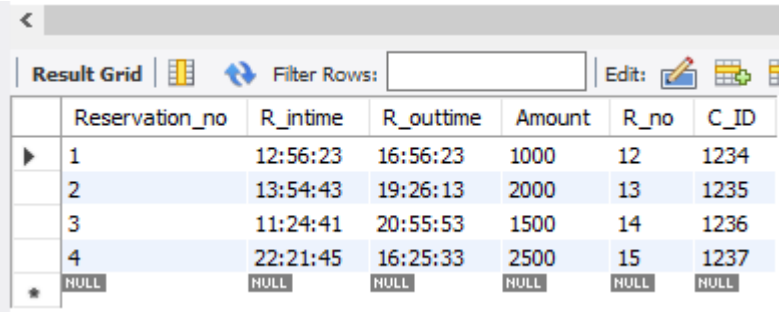
Reservation Table

1)Count function

```
use hotel;
select count(reservation_no) As Number_Of_Reservations
from reservation;
```

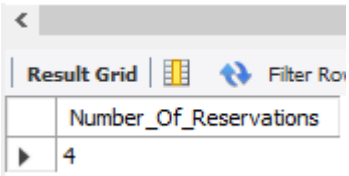
Statement:
Here count function counts the number of reservations with the help of r_no (reservation no.)

Table



Reservation_no	R_intime	R_outtime	Amount	R_no	C_ID
1	12:56:23	16:56:23	1000	12	1234
2	13:54:43	19:26:13	2000	13	1235
3	11:24:41	20:55:53	1500	14	1236
4	22:21:45	16:25:33	2500	15	1237
NULL	NULL	NULL	NULL	NULL	NULL

Output



Number_Of_Reservations
4

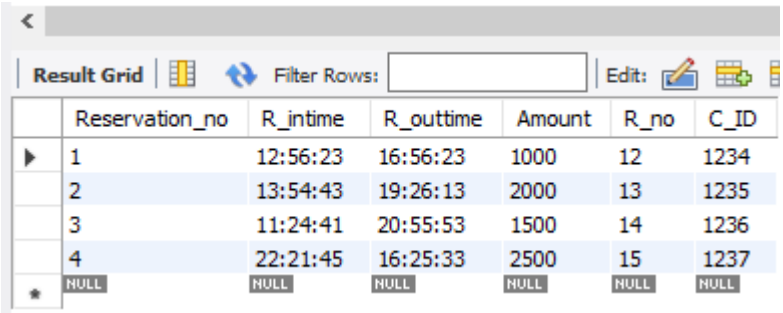
2)Avg function

```
use hotel;
select avg(Amount) As Average_price_of_room
from reservation;
```

Statement:

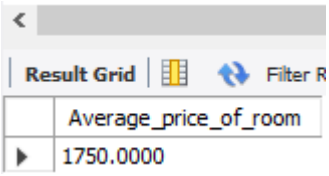
Here the avg function calculates the average prices of rooms

Table



Reservation_no	R_intime	R_outtime	Amount	R_no	C_ID
1	12:56:23	16:56:23	1000	12	1234
2	13:54:43	19:26:13	2000	13	1235
3	11:24:41	20:55:53	1500	14	1236
4	22:21:45	16:25:33	2500	15	1237
NULL	NULL	NULL	NULL	NULL	NULL

Output



Average_price_of_room
1750.0000

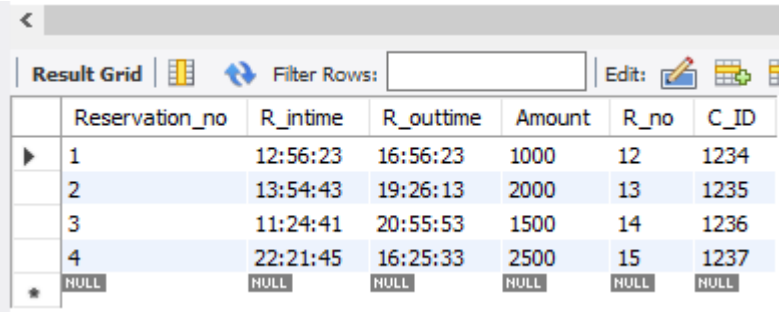
3)Sum function

```
use hotel;
select sum(Amount) As Total_price
from reservation;
```

Statement:

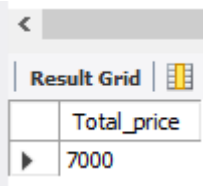
Here the sum function calculates the total price of all rooms

Table



Reservation_no	R_intime	R_outtime	Amount	R_no	C_ID
1	12:56:23	16:56:23	1000	12	1234
2	13:54:43	19:26:13	2000	13	1235
3	11:24:41	20:55:53	1500	14	1236
4	22:21:45	16:25:33	2500	15	1237
NULL	NULL	NULL	NULL	NULL	NULL

Output



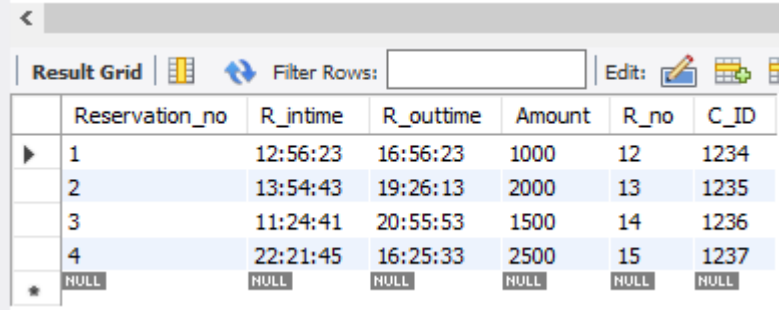
Total_price
7000

4)Min function

use hotel;
select R_outtime as Earliest_Customer,c_id,r_no,Reservation_no from reservation where R_outtime=(select min(R_outtime) from reservation) ;

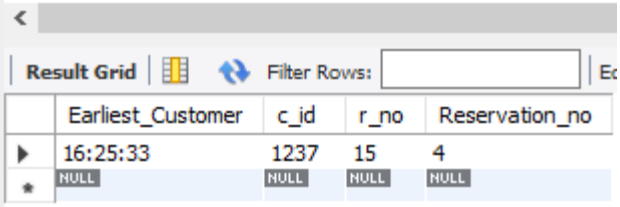
Statement:
This function tells the name of the customer who arrived the earliest

Table



Reservation_no	R_intime	R_outtime	Amount	R_no	C_ID
1	12:56:23	16:56:23	1000	12	1234
2	13:54:43	19:26:13	2000	13	1235
3	11:24:41	20:55:53	1500	14	1236
4	22:21:45	16:25:33	2500	15	1237
NULL	NULL	NULL	NULL	NULL	NULL

Output



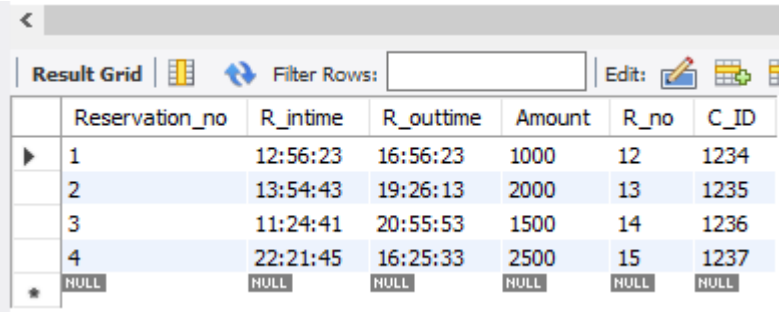
Earliest_Customer	c_id	r_no	Reservation_no
16:25:33	1237	15	4
NULL	NULL	NULL	NULL

5)Max function

use hotel;
select R_outtime as Latest_Customer,c_id,r_no,Reservation_no from reservation where R_outtime=(select max(R_outtime) from reservation) ;

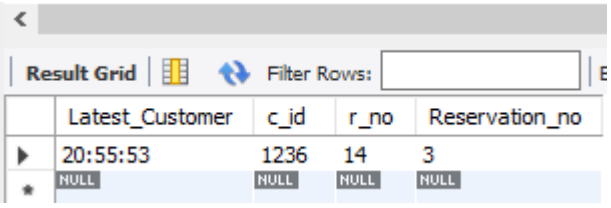
Statement:
This function tells the name of the customer who was latest

Table



Reservation_no	R_intime	R_outtime	Amount	R_no	C_ID
1	12:56:23	16:56:23	1000	12	1234
2	13:54:43	19:26:13	2000	13	1235
3	11:24:41	20:55:53	1500	14	1236
4	22:21:45	16:25:33	2500	15	1237
NULL	NULL	NULL	NULL	NULL	NULL

Output



Latest_Customer	c_id	r_no	Reservation_no
20:55:53	1236	14	3
NULL	NULL	NULL	NULL

Conclusion:
We learned about various types of aggregate functions in SQL . We learned about Sum function, Count function , Avg function , Min function and Max function in this experiment. Aggregate functions help us perform mathematical computations on columns in a relational database . We learnt about the having clause . Hence this experiment gave us a deeper understanding of

aggregate functions.