Aggregation and Grouping

Database for Software Developers

Md. Emran Hasan
Anis Uddin Ahmad

Aggregation

id	last_name	first_name	extension	email	office_code	reports_to	job_title
1002	Murphy	Diane	x5800	dmurphy@classicmodelcars.com	1		President
1056	Patterson	Mary	x4611	mpatterso@classicmodelcars.com	1	1002	VP Sales
1076	Firrelli	Jeff	x9273	jfirrelli@classicmodelcars.com	1	1002	VP Marketing
1088	Patterson	William	x4871	wpatterson@classicmodelcars.com	6	1056	Sales Manager (APAC)
1102	Bondur	Gerard	x5408	gbondur@classicmodelcars.com	4	1056	Sale Manager (EMEA)
1143	Bow	Anthony	x5428	abow@classicmodelcars.com	1	1056	Sales Manager (NA)
1165	Jennings	Leslie	x3291	ljennings@classicmodelcars.com	1	1143	Sales Rep
1166	Thompson	Leslie	x4065	lthompson@classicmodelcars.com	1	1143	Sales Rep
1188	Firrelli	Julie	x2173	jfirrelli@classicmodelcars.com	2	1143	Sales Rep
1216	Patterson	Steve	x4334	spatterson@classicmodelcars.com	2	1143	Sales Rep
1286	Tseng	Foon Yue	x2248	ftseng@classicmodelcars.com	3	1143	Sales Rep
1323	Vanauf	George	x4102	gvanauf@classicmodelcars.com	3	1143	Sales Rep
1337	Bondur	Loui	x6493	lbondur@classicmodelcars.com	4	1102	Sales Rep
1370	Hernandez	Gerard	x2028	ghernande@classicmodelcars.com	4	1102	Sales Rep
1401	Castillo	Pamela	x2759	pcastillo@classicmodelcars.com	4	1102	Sales Rep

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1401	Castillo	Pamela	x2759	pcastillo@classicmodelcars.com	4	1102	Sales Rep

Aggregation

```
CONCAT(first_name, last_name)
```

```
SUBSTRING(email, INSTR(email, '@') + 1)
```

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1088	[illegible]	[illegible]	[illegible]	[illegible]on@clas[illegible]	[illegible]	[illegible]	[illegible] (APAC)
1102	[illegible]	[illegible]	[illegible]	[illegible]ur@classi[illegible]	[illegible]	[illegible]	[illegible] (EMEA)
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Aggregation

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_1949	1952 Alpine Renault 1300	Classic Cars	Classic Metal Creations	7305	98.58	214.30
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
S10_4698	2003 Harley-Davidson Eagle Dr	Motorcycles	Red Start Diecast	5582	91.02	193.66
S10_4757	1972 Alfa Romeo GTA	Classic Cars	Motor City Art Classics	3252	85.68	136.00
S10_4962	1962 LanciaA Delta 16V	Classic Cars	Second Gear Diecast	6791	103.42	147.74
S12_1099	1968 Ford Mustang	Classic Cars	Autoart Studio Design	68	95.34	194.57
S12_1108	2001 Ferrari Enzo	Classic Cars	Second Gear Diecast	3619	95.59	207.80
S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67
S12_2823	2002 Suzuki XREO	Motorcycles	Unimax Art Galleries	9997	66.27	150.62
S12_3148	1969 Corvair Monza	Classic Cars	Welly Diecast Productions	6906	89.14	151.08
S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44

Aggregation

COUNT()

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Aggregation

COUNT() SUM()

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Aggregation

Performs a function/calculation
on a column (across multiple records)
and returns a single value

Aggregation

Performs a function/calculation
on a column (across multiple records)
and returns a single value

COUNT GROUP_CONCAT SUM AVG MIN MAX

Aggregation

Performs a function/calculation
on a column (across multiple records)
and returns a single value

COUNT GROUP_CONCAT

SUM AVG

MIN MAX

Aggregation

FUNC_NAME(*expression*)

Aggregation

```
FUNC_NAME(expression)
```

```sql
SELECT COUNT(*) FROM PRODUCTS;
```

Aggregation

```
FUNC_NAME(expression)

SELECT COUNT(*) FROM PRODUCTS;

SELECT SUM(qty_in_stock) FROM PRODUCTS;
```

Aggregation

```
FUNC_NAME(expression)

SELECT COUNT(*) FROM PRODUCTS;

SELECT SUM(qty_in_stock) FROM PRODUCTS;

SELECT
    MAX(buy_price) max_price,
    MIN(buy_price) min_price,
    ROUND(AVG(buy_price), 2) average_price
FROM products;
```

Aggregation with Filtering

Aggregation with Filtering

```
SELECT SUM(qty_in_stock) FROM PRODUCTS;
```

SUM()

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_1949	1952 Alpine Renault 1300	Classic Cars	Classic Metal Creations	7305	98.58	214.30
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S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44

Aggregation with Filtering

```
SELECT SUM(qty_in_stock) FROM PRODUCTS WHERE product_line= 'Motorcycles';
```

SUM()

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
S10_4698	2003 Harley-Davidson Eagle Dr	Motorcycles	Red Start Diecast	5582	91.02	193.66
S12_2823	2002 Suzuki XREO	Motorcycles	Unimax Art Galleries	9997	66.27	150.62

Aggregation with Filtering

order_id	product_code	quantity_ordered	price_each
10100	S18_1749	30	136.00
10100	S18_2248	50	55.09
10100	S18_4409	22	75.46
10100	S24_3969	49	35.29
10101	S18_2325	25	108.06
10101	S18_2795	26	167.06
10101	S24_1937	45	32.53
10101	S24_2022	46	44.35
10102	S18_1342	39	95.55
10102	S18_1367	41	43.13
10103	S10_1949	26	214.30
10103	S10_4962	42	119.67

Aggregation with Filtering

```
SELECT order_id, quantity_ordered * price_each AS row_total
FROM orderd_items
WHERE order_id = 10100;
```

order_id	product_code	quantity_ordered	price_each
10100	S18_1749	30	136.00
10100	S18_2248	50	55.09
10100	S18_4409	22	75.46
10100	S24_3969	49	35.29
10101	S18_2325	25	108.06
10101	S18_2795	26	167.06
10101	S24_1937	45	32.53
10101	S24_2022	46	44.35
10102	S18_1342	39	95.55
10102	S18_1367	41	43.13
10103	S10_1949	26	214.30
10103	S10_4962	42	119.67

Aggregation with Filtering

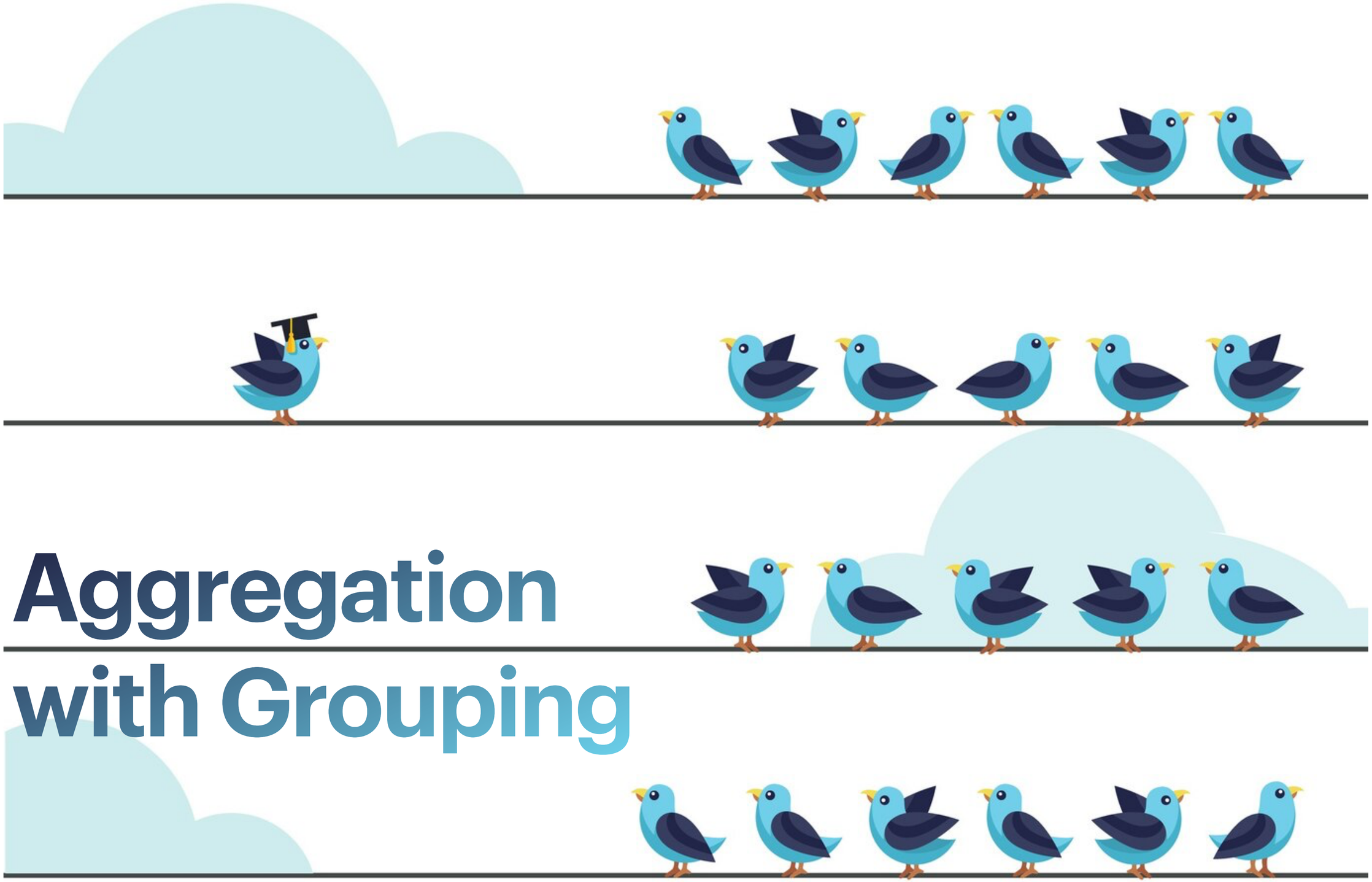
```
SELECT order_id, quantity_ordered * price_each AS row_total
FROM orderd_items
WHERE order_id = 10100;
```

order_id	product_code	quantity_ordered	price_each	row_total
10100	S18_1749	30	136.00	4080.00
10100	S18_2248	50	55.09	2754.50
10100	S18_4409	22	75.46	1660.12
10100	S24_3969	49	35.29	1729.21

Aggregation with Filtering

```
SELECT order_id, SUM(quantity_ordered * price_each) AS total
FROM orderd_items
WHERE order_id = 10100;
```

order_id	total
10100	10223.83



Aggregation with Grouping

Aggregation with Grouping

What if we want to get stock of each product line?

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S10_1949	1952 Alpine Renault 1300	Classic Cars	Classic Metal Creations	7305	98.58	214.30
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S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44

Aggregation with Grouping

```
SELECT SUM(qty_in_stock)
FROM products;
```

SUM()

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
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S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44

Aggregation with Grouping

```
SELECT product_line, SUM(qty_in_stock)
FROM products
GROUP BY product_line;
```

SUM()

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
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Aggregation with Grouping

```
SELECT product_line, SUM(qty_in_stock)
FROM products
GROUP BY product_line;
```

	SUM()
product_line	**qty_in_stock**
Motorcycles	219183
Classic Cars	69401
Trucks and Buses	35851

Aggregation with Grouping

Get total payments per customer within a specified year.

customer_id	check_number	payment_date	amount
103	HQ336336	2004-10-19	6066.78
103	JM555205	2003-06-05	14571.44
103	OM314933	2004-12-18	1676.14
112	BO864823	2004-12-17	14191.12
112	HQ55022	2003-06-06	32641.98
112	ND748579	2004-08-20	33347.88
114	GG31455	2003-05-20	45864.03
114	MA765515	2004-12-15	82261.22
114	NP603840	2024-01-13	7565.08
114	NR27552	2023-12-28	44894.74

Aggregation with Grouping

Get total payments per customer within a specified year.

```
SELECT customer_id, SUM(amount) total
FROM payments
WHERE payment_date
  BETWEEN '2004-01-01' AND '2004-12-31'
GROUP BY customer_id;
```

customer_id	check_number	payment_date	amount
103	HQ336336	2004-10-19	6066.78
103	JM555205	2003-06-05	14571.44
103	OM314933	2004-12-18	1676.14
112	BO864823	2004-12-17	14191.12
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112	ND748579	2004-08-20	33347.88
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114	NR27552	2023-12-28	44894.74

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103	HQ336336	2004-10-19	6066.78
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114	MA765515	2004-12-15	82261.22

Aggregation with Grouping

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```
SELECT customer_id, SUM(amount) total
FROM payments
WHERE payment_date
  BETWEEN '2004-01-01' AND '2004-12-31'
GROUP BY customer_id;
```

customer_id	total
103	7742.92
112	47539.00
114	82261.22

Usages of DISTINCT

Aggregation with Grouping

```
SELECT product_line, SUM(qty_in_stock), COUNT(vendor)
FROM products
GROUP BY product_line;
```

COUNT() SUM()

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
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COUNT() SUM()

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S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
S12_2823	2002 Suzuki XREO	Motorcycles	Unimax Art Galleries	9997	66.27	150.62
S10_4698	2003 Harley-Davidson Eagle D	Motorcycles	Red Start Diecast	5582	91.02	193.66
S10_1949	1952 Alpine Renault 1300	Classic Cars	Classic Metal Creations	7305	98.58	214.30
S10_4757	1972 Alfa Romeo GTA	Classic Cars	Motor City Art Classics	3252	85.68	136.00
S10_4962	1962 LanciaA Delta 16V	Classic Cars	Second Gear Diecast	6791	103.42	147.74
S12_1099	1968 Ford Mustang	Classic Cars	Autoart Studio Design	68	95.34	194.57
S12_1108	2001 Ferrari Enzo	Classic Cars	Second Gear Diecast	3619	95.59	207.80
S12_3148	1969 Corvair Monza	Classic Cars	Welly Diecast Productions	6906	89.14	151.08
S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44
S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67

Aggregation with Grouping

```
SELECT product_line, SUM(qty_in_stock), COUNT(DISTINCT vendor)
FROM products
GROUP BY product_line;
```

COUNT(DISTINCT) SUM()

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
S12_2823	2002 Suzuki XREO	Motorcycles	Unimax Art Galleries	9997	66.27	150.62
S10_4698	2003 Harley-Davidson Eagle D	Motorcycles	Red Start Diecast	5582	91.02	193.66
S10_1949	1952 Alpine Renault 1300	Classic Cars	Classic Metal Creations	7305	98.58	214.30
S10_4757	1972 Alfa Romeo GTA	Classic Cars	Motor City Art Classics	3252	85.68	136.00
S10_4962	1962 LanciaA Delta 16V	Classic Cars	Second Gear Diecast	6791	103.42	147.74
S12_1099	1968 Ford Mustang	Classic Cars	Autoart Studio Design	68	95.34	194.57
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S12_3148	1969 Corvair Monza	Classic Cars	Welly Diecast Productions	6906	89.14	151.08
S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44
S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67

Aggregation with conditional values

Aggregation with Conditional Values

Company wants to send gifts to all employees. We will use DHL for non-USA employees and USMail for USA employees.

How many DHL booking do we need?

Aggregation with Conditional Values

Company wants to send gifts to all employees. We will use DHL for non-USA employees and USMail for USA employees.

How many DHL booking do we need?

```
SELECT o.country
FROM employees e
JOIN offices o ON o.code = e.office_code;
```

Aggregation with Conditional Values

Company wants to send gifts to all employees. We will use DHL for non-USA employees and USMail for USA employees.

How many DHL booking do we need?

```
SELECT
    SUM(IF(o.country = 'USA', 0, 1)) DHL
FROM employees e
JOIN offices o ON o.code = e.office_code;
```

Aggregation with Conditional Values

Company wants to send gifts to all employees. We will use DHL for non-USA employees and USMail for USA employees.

How many DHL booking do we need?

And how many for USMail?

```
SELECT
    SUM(IF(o.country = 'USA', 0, 1)) DHL
    SUM(IF(o.country = 'USA', 1, 0)) USMail
FROM employees e
JOIN offices o ON o.code = e.office_code;
```

Aggregation with Conditional Values

Shipment cost is $100 within USA and $300 outside USA.

How can we gat total orders and their shipment costs by sales person (i.e. employee)?

```
SELECT c.sales_rep_id,
    COUNT(DISTINCT o.id) total_orders,
    SUM(IF(c.country = 'USA', 100, 300)) total_shipment_cost
FROM orders o
JOIN customers c ON c.id = o.customer_id
GROUP BY c.sales_rep_id;
```

Aggregation with GROUP_CONCAT

Aggregation with GROUP_CONCAT

We have total payments per customer within a specified year.

```
SELECT customer_id, SUM(amount) total
FROM payments
WHERE YEAR(payment_date) = '2004'
GROUP BY customer_id;
```

customer_id	check_number	payment_date	amount
103	HQ336336	2004-10-19	6066.78
103	OM314933	2004-12-18	1676.14
112	BO864823	2004-12-17	14191.12
112	ND748579	2004-08-20	33347.88
114	MA765515	2004-12-15	82261.22

Aggregation with GROUP_CONCAT

We have total payments per customer within a specified year.

Now, we want to see the list of check numbers with it.

```
SELECT customer_id, SUM(amount) total
FROM payments
WHERE YEAR(payment_date) = '2004'
GROUP BY customer_id;
```

customer_id	check_number	payment_date	amount
103	HQ336336	2004-10-19	6066.78
103	OM314933	2004-12-18	1676.14
112	BO864823	2004-12-17	14191.12
112	ND748579	2004-08-20	33347.88
114	MA765515	2004-12-15	82261.22

Aggregation with GROUP_CONCAT

We have total payments per customer within a specified year.

Now, we want to see the list of check numbers with it.

```
SELECT customer_id, check_number, SUM(amount) total
FROM payments
WHERE YEAR(payment_date) = '2004'
GROUP BY customer_id;
```

customer_id	check_number	total
103	???	7742.92
112	???	47539.00
114	???	82261.22

Aggregation with GROUP_CONCAT

We have total payments per customer within a specified year.
Now, we want to see the list of check numbers with it.

```
SELECT customer_id, GROUP_CONCAT(check_number), SUM(amount) total
FROM payments
WHERE YEAR(payment_date) = '2004'
GROUP BY customer_id;
```

customer_id	check_number	total
103	HQ336336,OM314933	7742.92
112	BO864823,ND748579	47539.00
114	MA765515	82261.22

Handling
ONLY_FULL_GROUP_BY

Handling ONLY_FULL_GROUP_BY

```
SELECT product_line, vendor, SUM(qty_in_stock)
FROM products
GROUP BY product_line;
```

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
S12_2823	2002 Suzuki XREO	Motorcycles	Unimax Art Galleries	9997	66.27	150.62
S10_4698	2003 Harley-Davidson Eagle D	Motorcycles	Red Start Diecast	5582	91.02	193.66
S10_1949	1952 Alpine Renault 1300	Classic Cars	Classic Metal Creations	7305	98.58	214.30
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S12_1108	2001 Ferrari Enzo	Classic Cars	Second Gear Diecast	3619	95.59	207.80
S12_3148	1969 Corvair Monza	Classic Cars	Welly Diecast Productions	6906	89.14	151.08
S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44
S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67

Handling ONLY_FULL_GROUP_BY

```
SELECT product_line, vendor, SUM(qty_in_stock)
FROM products
GROUP BY product_line;
```

SUM()

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
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S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67

Handling ONLY_FULL_GROUP_BY

```
SELECT product_line, vendor, SUM(qty_in_stock)
FROM products
GROUP BY product_line;
```

code	title	product_line	vendor (???)	qty_in_stock (SUM())	buy_price	MSRP
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Handling ONLY_FULL_GROUP_BY

```
SELECT product_line, vendor, SUM(qty_in_stock)
FROM products
GROUP BY product_line;
```

...incompatible with sql_mode=**only_full_group_by**

???

SUM()

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
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Handling ONLY_FULL_GROUP_BY

```
SELECT product_line, vendor, SUM(qty_in_stock)
FROM products
GROUP BY product_line;
```

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S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67

Handling ONLY_FULL_GROUP_BY

```
SELECT product_line, vendor, SUM(qty_in_stock)
FROM products
GROUP BY product_line;
```

COUNT/GROUP_CONCAT/…() ANY_VALUE()

??? SUM()

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
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Handling ONLY_FULL_GROUP_BY

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
			???	SUM()		
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
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S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44
S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67

Handling ONLY_FULL_GROUP_BY

- Disable ONLY_FULL_GROUP_BY

code	title	product_line	vendor (???)	qty_in_stock (SUM())	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
S12_2823	2002 Suzuki XREO	Motorcycles	Unimax Art Galleries	9997	66.27	150.62
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S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44
S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67

Handling ONLY_FULL_GROUP_BY

- Disable ONLY_FULL_GROUP_BY
- Adding an Aggregate function

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
			???	SUM()		
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
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S10_4757	1972 Alfa Romeo GTA	Classic Cars	Motor City Art Classics	3252	85.68	136.00
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S12_3148	1969 Corvair Monza	Classic Cars	Welly Diecast Productions	6906	89.14	151.08
S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44
S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67

Handling ONLY_FULL_GROUP_BY

- Disable ONLY_FULL_GROUP_BY
- Use ANY_VALUE()
- Adding an Aggregate function

code	title	product_line	vendor	qty_in_stock	buy_price	MSRP
			???	SUM()		
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
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S12_3380	1968 Dodge Charger	Classic Cars	Welly Diecast Productions	9123	75.16	117.44
S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67

Handling ONLY_FULL_GROUP_BY

- Disable ONLY_FULL_GROUP_BY
- Use ANY_VALUE()
- Adding an Aggregate function
- Add column in GROUP BY

code	title	product_line	vendor (???)	qty_in_stock (SUM())	buy_price	MSRP
S10_1678	1969 Harley Davidson Ultimate	Motorcycles	Min Lin Diecast	7933	48.81	95.70
S10_2016	1996 Moto Guzzi 1100i	Motorcycles	Highway 66 Mini Classics	6625	68.99	118.94
S12_2823	2002 Suzuki XREO	Motorcycles	Unimax Art Galleries	9997	66.27	150.62
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S12_1666	1958 Setra Bus	Trucks and Buses	Welly Diecast Productions	1579	77.90	136.67

Multiple GROUP BY

Multiple GROUP BY

We have total payments per customer within a specified year.
Now, we want to see the list of check numbers with it.

```
SELECT customer_id, GROUP_CONCAT(check_number), SUM(amount) total
FROM payments
WHERE YEAR(payment_date) = '2004'
GROUP BY customer_id;
```

customer_id	check_number	total
103	HQ336336,OM314933	7742.92
112	BO864823,ND748579	47539.00
114	MA765515	82261.22

Multiple GROUP BY

per year

We have total payments per customer ~~within a specified year~~.

Now, we want to see the list of check numbers with it.

```
SELECT customer_id, GROUP_CONCAT(check_number), SUM(amount) total
FROM payments
WHERE YEAR(payment_date) = '2004'
GROUP BY customer_id;
```

customer_id	check_number	total
103	HQ336336,OM314933	7742.92
112	BO864823,ND748579	47539.00
114	MA765515	82261.22

Multiple GROUP BY

We have total payments per customer, per year

Now, we want to see the list of check numbers with it.

```
SELECT customer_id,
    YEAR(payment_date) payment_year,
    GROUP_CONCAT(check_number),
    SUM(amount) total
FROM payments
GROUP BY customer_id, payment_year;
```

customer_id	check_number	total
103	HQ336336,OM314933	7742.92
112	BO864823,ND748579	47539.00
114	MA765515	82261.22

Multiple GROUP BY

We have total payments per customer, per year

Now, we want to see the list of check numbers with it.

```
SELECT customer_id,
    YEAR(payment_date) payment_year,
    GROUP_CONCAT(check_number),
    SUM(amount) total
FROM payments
GROUP BY customer_id, payment_year;
```

customer_id	check_number	total
103	HQ336336,OM314933	7742.92
112	BO864823,ND748579	47539.00
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Multiple GROUP BY

We have total payments per customer, per year

Now, we want to see the list of check numbers with it.

```
SELECT customer_id,
    YEAR(payment_date) payment_year,
    GROUP_CONCAT(check_number),
    SUM(amount) total
FROM payments
GROUP BY customer_id, payment_year;
```

customer_id	payment_year	check_number	total
103	2003	JM555205	14571.44
103	2004	HQ336336,OM314933	7742.92
112	2003	HQ55022	32641.98
112	2004	BO864823,ND748579	47539.00
114	2003	GG31455	45864.03

Questions?