Quality Control and Cost Reduction Data(what failed, why)

```
MariaDB [spm]> SELECT
    ->     qm.component_id,
    ->     qm.component,
    ->     qc.quality_control_type,
    ->     qc.result,
    ->     qc.reason,
    ->     qm.manufacturer,
    ->     qm.manufacturer_id,
    ->     qm.manufacturing_cost
    -> FROM
    ->     quality_control qc
    -> JOIN
    ->     quality_manufacturing qm ON qc.component_id = qm.component_id
    -> WHERE
    ->     qc.result = 'Fail';
```

component_id	component	quality_control_type	result	reason	manufacturer	manufacturer_id	manufacturing_cost
7642	Storage SSD	Structure Integrity: Checking if parts have the right structure	Fail	SSD fails to read or write data, or its speed is significantly below expectations	Storage SSD: Western Digital	03EF	5.78
6154	Battery	Structure Integrity: Checking if parts have the right structure	Fail	Battery capacity significantly degrades, leading to short usage times or failure to hold a charge.	Battery: LG Chem	08IJ	7.92
9270	Camera	Structure Integrity: Checking if parts have the right structure	Fail	The camera produces blurry, distorted, or low-quality images or fails to function.	Camera: Canon	06KL	5.45
4765	W-Fi Chipsets	Structure Integrity: Checking if parts have the right structure	Fail	Wi-Fi chipset fails to connect, drops connections, or delivers slow speeds.	Wi-Fi Chipsets: Qualcomm	08OP	9.78
5628	Processor CPU	Structure Integrity: Checking if parts have the right structure	Fail	The laptop's CPU underperforms, overheats, or crashes during benchmark tests.	Processor CPU: Intel	11UV	5.67
1275	Display	Structure Integrity: Checking if parts have the right structure	Fail	The laptop's display has dead pixels, flickers, or displays distorted images.	Display: Sharp	14AB	7.99
3891	Battery	Structure Integrity: Checking if parts have the right structure	Fail	The laptop's battery capacity significantly degrades, leading to short usage times or failure to hold a charge	Battery: Sony Energy	15CD	5.36
6950	Storage SSD	Structure Integrity: Checking if parts have the right structure	Fail	Structural damage in the SSD results in performance issues or failure.	Memory RAM: Team Group	22QR	8.79
2386	Camera	Structure Integrity: Checking if parts have the right structure	Fail	Structural damage in the camera results in blurry or distorted images or camera malfunction.	Battery: Sanyo	25WX	7.45
7254	Display	Structure Integrity: Checking if parts have the right structure	Fail	Watch display structural damage in the display results in dead pixels, flickering, or distorted images.	Memory RAM: Patriot	32KL	8.45
5417	Battery	Structure Integrity: Checking if parts have the right structure	Fail	Watch battery has structural damage, leads to a capacity decrease with inability to hold a charge.	Storage SSD: Toshiba	33MN	5.10

```
11 rows in set (0.001 sec)
```

Cost for manufacturer by id:

```
MariaDB [spm]> SELECT manufacturer_id, AVG(manufacturing_cost) AS avg_cost
    -> FROM quality_manufacturing
    -> GROUP BY manufacturer_id
    -> ORDER BY avg_cost ASC;
```

manufacturer_id	avg_cost
33MN	5.100000
23ST	5.210000
15CD	5.360000
06KL	5.450000
11UV	5.670000
03EF	5.780000
28CD	5.890000
19KL	5.980000
29EF	6.120000
01AB	6.240000
35QR	6.340000
18IJ	6.450000

Average manufacturing cost for each manufacturer, helping identify manufacturers with lower average costs for potential cost optimization in manufacturing.

```
MariaDB [spm]> SELECT manufacturer_id, manufacturer, AVG(manufacturing_cost) AS avg_cost
    -> FROM quality_manufacturing
    -> GROUP BY manufacturer_id, manufacturer
    -> ORDER BY avg_cost ASC;
```

manufacturer_id	manufacturer	avg_cost
33MN	Storage SSD: Toshiba	5.100000
23ST	Storage SSD: Seagate	5.210000
15CD	Battery: Sony Energy	5.360000
06KL	Camera: Canon	5.450000
11UV	Processor CPU: Intel	5.670000
03EF	Storage SSD: Western Digital	5.780000
28CD	Wi-Fi Chipsets: Marvell	5.890000
19KL	Keyboard: SteelSeries	5.980000
29EF	Keyboard: Corsair (again)	6.120000

Manufacturers facing quality issues, including failure reasons and components affected.

```
MariaDB [spm]> SELECT
    ->      qm.manufacturer_id,
    ->      qm.manufacturer,
    ->      qc.component_id,
    ->      qc.quality_control_type,
    ->      qc.result,
    ->      qc.reason
    -> FROM
    ->      quality_control qc
    -> JOIN
    ->      quality_manufacturing qm ON qc.component_id = qm.component_id
    -> WHERE
    ->      qc.result = 'Fail';
```

manufacturer_id	manufacturer	component_id	quality_control_type	result	reason
03EF	Storage SSD: Western Digital	7642	Structure Integrity: Checking if parts have the right structure	Fail	SSD fails to read or write data, or its speed is significantly below expectations
05IJ	Battery: LG Chem	6154	Structure Integrity: Checking if parts have the right structure	Fail	Battery capacity significantly degrades, leading to short usage times or failure to hold a charge.
06KL	Camera: Canon	9270	Structure Integrity: Checking if parts have the right structure	Fail	The camera produces blurry, distorted, or low-quality images or fails to function.
08OP	Wi-Fi Chipsets: Qualcomm	4765	Structure Integrity: Checking if parts have the right structure	Fail	Wi-Fi chipset fails to connect, drops connections, or delivers slow speeds.
11UV	Processor CPU: Intel	5628	Structure Integrity: Checking if parts have the right structure	Fail	The laptop's CPU underperforms, overheats, or crashes during benchmark tests.
14AB	Display: Sharp	1275	Structure Integrity: Checking if parts have the right structure	Fail	The laptop's display has dead pixels, flickers, or displays distorted images.
15CD	Battery: Sony Energy	3891	Structure Integrity: Checking if parts have the right structure	Fail	The laptop's battery capacity significantly degrades, leading to short usage times or failure to hold a charge
22QR	Memory RAM: Team Group	6950	Structure Integrity: Checking if parts have the right structure	Fail	Structural damage in the SSD results in performance issues or failure.
25WX	Battery: Sanyo	2386	Structure Integrity: Checking if parts have the right structure	Fail	Structural damage in the camera results in blurry or distorted images or camera malfunction.
32KL	Memory RAM: Patriot	7254	Structure Integrity: Checking if parts have the right structure	Fail	Watch display structural damage in the display results in dead pixels, flickering, or distorted images.
33MN	Storage SSD: Toshiba	5417	Structure Integrity: Checking if parts have the right structure	Fail	Watch battery has structural damage, leads to a capacity decrease with inability to hold a charge.

```
11 rows in set (0.001 sec)
```

Average manufacturing cost for each manufacturer, helping identify manufacturers with lower average costs for potential cost optimization in manufacturing.

```
MariaDB [spm]> SELECT manufacturer_id, manufacturer, AVG(manufacturing_cost) AS avg_cost
    -> FROM quality_manufacturing
    -> GROUP BY manufacturer_id, manufacturer
    -> ORDER BY avg_cost ASC;
```

manufacturer_id	manufacturer	avg_cost
33MN	Storage SSD: Toshiba	5.100000
23ST	Storage SSD: Seagate	5.210000
15CD	Battery: Sony Energy	5.360000
06KL	Camera: Canon	5.450000
11UV	Processor CPU: Intel	5.670000
03EF	Storage SSD: Western Digital	5.780000
28CD	Wi-Fi Chipsets: Marvell	5.890000
19KL	Keyboard: SteelSeries	5.980000
29EF	Keyboard: Corsair (again)	6.120000

Rate, Failure and Total Cost

```
MariaDB [spm]> CREATE TABLE component_costs AS
    -> SELECT
    ->    r.component_id,
    ->    r.pass_count,
    ->    r.fail_count,
    ->    r.total_test_numbers,
    ->    r.pass_rate,
    ->    r.fail_rate,
    ->    c.manufacturer as manufacturer_name,
    ->    c.manufacturer_cost,
    ->    c.quantity,
    ->    c.manufacturer_cost * c.quantity AS total_cost
    -> FROM (
    ->    SELECT
    ->      component_id,
    ->      SUM(CASE WHEN fail_present = 0 THEN 1 ELSE 0 END) AS pass_count,
    ->      SUM(CASE WHEN fail_present > 0 THEN 1 ELSE 0 END) AS fail_count,
    ->      COUNT(*) AS total_test_numbers,
    ->      SUM(CASE WHEN fail_present = 0 THEN 1 ELSE 0 END) / COUNT(*) * 100 AS pass_rate,
    ->      SUM(CASE WHEN fail_present > 0 THEN 1 ELSE 0 END) / COUNT(*) * 100 AS fail_rate
    ->    FROM (
    ->      SELECT
    ->        component_id,
    ->        test_number,
    ->        SUM(CASE WHEN Is_Pass_Fail = 'Fail' THEN 1 ELSE 0 END) AS fail_present
    ->      FROM
    ->        QC
    ->      GROUP BY
    ->        component_id,
    ->        test_number
    ->    ) AS subquery
    ->    GROUP BY
    ->      component_id
    -> ) r
    -> JOIN manufacturer_cost_and_quantity c ON r.component_id = c.component_id;
Query OK, 5 rows affected (0.043 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

```
MariaDB [spm]> select * from component_costs;
```

component_id	pass_count	fail_count	total_test_numbers	pass_rate	fail_rate	manufacturer_name	manufacturer_cost	quantity	total_cost
1836	82	18	100	82.0000	18.0000	Sennheiser	6.89	100	689.00
1275	98	2	100	98.0000	2.0000	Sharp	7.99	100	799.00
1049	95	5	100	95.0000	5.0000	BOE Technology	6.56	100	656.00
2386	78	22	100	78.0000	22.0000	Sanyo	7.45	100	745.00
1248	56	44	100	56.0000	44.0000	Cooler Master	9.12	100	912.00

```
5 rows in set (0.001 sec)
```

Final Component Analisys

```
MariaDB [spm]> CREATE TABLE final_component_analysis AS
    -> SELECT
    ->   component_id,
    ->   pass_count,
    ->   fail_count,
    ->   total_test_numbers,
    ->   pass_rate as pass_rate_in_percentage,
    ->   fail_rate as fail_rate_in_percentage,
    ->   manufacturer_name,
    ->   manufacturer_cost as manufacturer_cost_per_component,
    ->   quantity as total_ordered_quantity,
    ->   total_cost,
    ->   -- FlagLevel based on pass_rate
    ->   CASE
    ->     WHEN pass_rate > 90 THEN 'green'
    ->     WHEN pass_rate BETWEEN 80 AND 90 THEN 'yellow'
    ->     ELSE 'red'
    ->   END AS FlagLevel,
    ->   -- Calculate the AmountInDollarsForFailTest
    ->   total_cost * (fail_rate / 100) AS Amount_in_dollars_for_fail_test,
    ->   -- MarginalValue by the deal with the manufacturer
    ->   total_cost * 0.08 AS MarginalValue,
    ->   -- Calculate refund_amount_for_fail_test
    ->   (total_cost * (fail_rate / 100)) - (total_cost * 0.08) AS refund_amount_for_fail_test,
    ->   -- Calculate LossAmount
    ->   (total_cost * (pass_rate / 100)) - (total_cost * .92) AS LossAmount,
    ->   ((total_cost * (pass_rate / 100)) - (total_cost * .92)) * 100 / total_cost  as Loss_in_percentage
    -> FROM
    ->   component_costs;
Query OK, 5 rows affected (0.027 sec)
Records: 5  Duplicates: 0  Warnings: 0

MariaDB [spm]> select * from  final_component_analysis
    -> \cs
    -> \c
MariaDB [spm]> select * from  final_component_analysis;
```

component_id	pass_count	fail_count	total_test_numbers	pass_rate_in_percentage	fail_rate_in_percentage	manufacturer_name	manufacturer_cost_per_component	total_ordered_quantity	total_cost	FlagLevel	Amount_in_dollars_for_fail_test	MarginalValue	refund_amount_for_fail_test	LossAmount	Loss_in_percentage
1836	82	18	100	82.0000	18.0000	Sennheiser	6.89	100	689.00	yellow	124.0200000000	55.1200	68.9000000000	-68.9000000000	-10.00000000000000
1275	98	2	100	98.0000	2.0000	Sharp	7.99	100	799.00	green	15.9800000000	63.9200	-47.9400000000	47.9400000000	6.00000000000000
1049	95	5	100	95.0000	5.0000	BOE Technology	6.56	100	656.00	green	32.8000000000	52.4800	-19.6800000000	19.6800000000	3.00000000000000
2386	78	22	100	78.0000	22.0000	Sanyo	7.45	100	745.00	red	163.9000000000	59.6000	104.3000000000	-104.3000000000	-14.00000000000000
1248	56	44	100	56.0000	44.0000	Cooler Master	9.12	100	912.00	red	401.2800000000	72.9600	328.3200000000	-328.3200000000	-36.00000000000000