MySQL Built-in Functions

Data Transformation and formatting

Md. Emran Hasan
Anis Uddin Ahmad

DATABASE FOR SOFTWARE DEVELOPERS
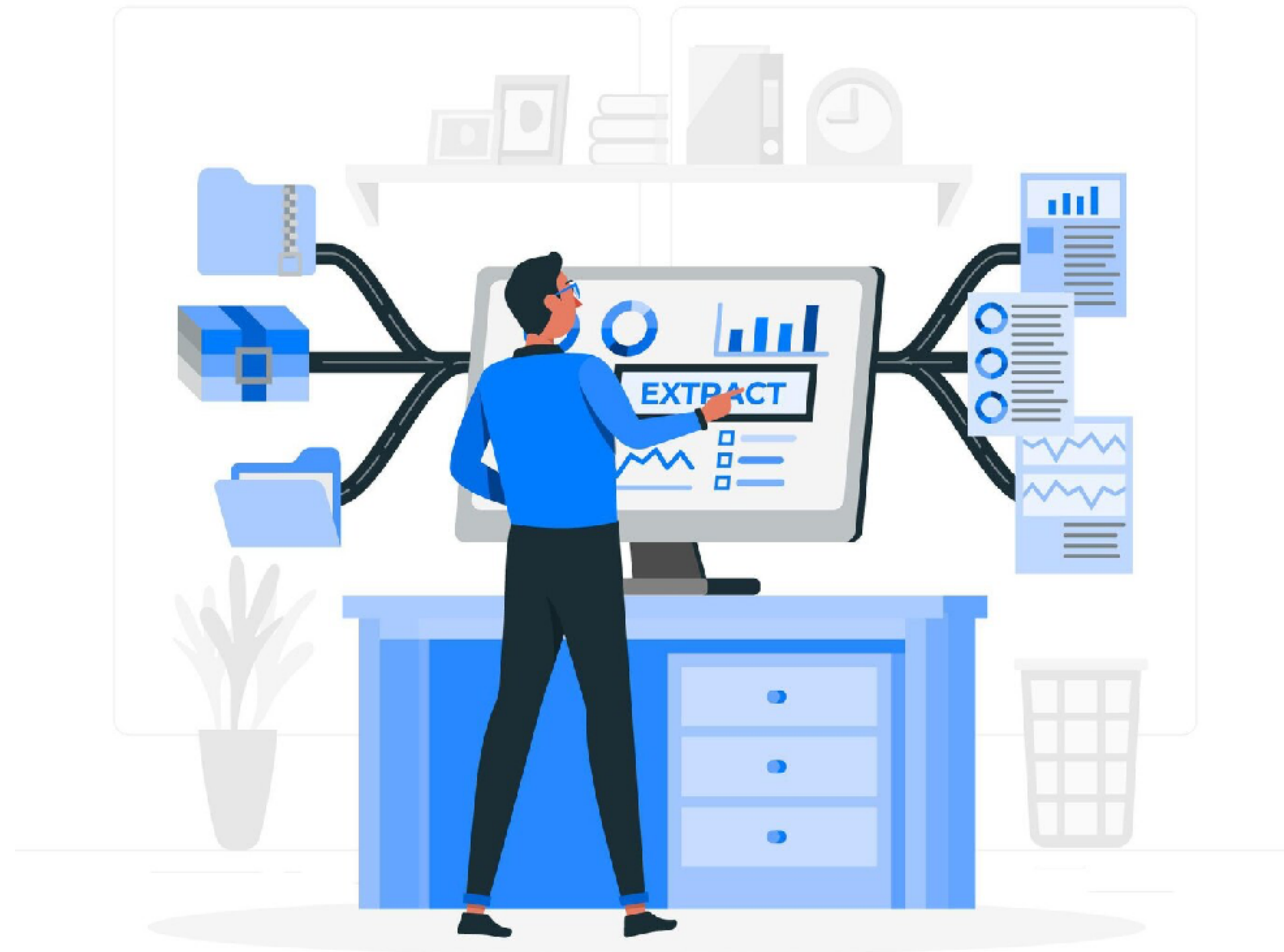
Example Scenarios

I want to...

☑ Concat multiple fields to show them together

☑ Delete carts that are created 3 days ago, but was not ordered

☑ Take users if the email domain is 'mycompany.com'

☑ Show the number of days an application took to get approval

☑ Show a large number with comma at specific position (#,##,###)

The solution is...

Built in Functions

Built in Functions

What can they do?

Built in Functions

What can they do?

☑ Data Formatting

☑ String Manipulation

☑ Aggregation

☑ Various conversion

☑ Numeric Calculations

☑ Wide range of comparisons

☑ Encryption/Decryption

☑ Date and Time Processing

Built in Functions

Types of Functions

String Manipulation
CONCAT(), SUBSTRING(), LENGTH(), REPLACE(), UPPER(), LOWER(), ...

Numeric Calculations
ROUND(), CEIL(), FLOOR(), ABS(), SQRT(), ...

Date and Time
NOW(), CURDATE(), CURTIME(), DATEDIFF(), DATE_ADD(), DATE_FORMAT(), ...

Control Flow
IF(), CASE, COALESCE(), IFNULL(), ...

Cryptography
MD5(), SHA1(), ENCRYPT(), AES_ENCRYPT(), AES_DECRYPT(), ...

▷ Aggregation

▷ Search and Comparison

▷ Type Conversion

▷ Regular Expressions

▷ JSON Functions

▷ Geospatial Functions

▷ System Functions

▷ Advanced Mathematical

▷ Managing Locks

String Manipulation

`CHAR_LENGTH, LENGTH`	The length of a string (in characters / bytes)
`CONCAT, CONCAT_WS`	Adds two or more expressions together. _WS will join them with a space
`FORMAT`	Formats a number to a format like "#,###,###.##"
`INSTR`	Returns the position of the first occurrence of a string in another string. 0 if not matched.
`LOWER, UPPER,`	Change case of text
`SUBSTR, SUBSTRING_INDEX`	Extracts a substring from a string
`TRIM, LTRIM, RTRIM`	Trim spaces from Left, Right or both side of string
`RIGHT, LEFT`	Extracts a number of characters from a string (starting from left or right)
`LPAD, RPAD`	Right/Left-pads a string with another string, to a certain length
`REPLACE`	Replaces all occurrences of a substring in a string

String Manipulation

```sql
— Get email domain of users
SELECT id, CONCAT(first_name, ' ', last_name) AS full_name

FROM users;


— Get email domain of users
SELECT id, name, SUBSTRING(email, INSTR(email, '@') + 1) AS email_domain

FROM users;



— Get email domain of users
SELECT id, title,

    LEFT(description, 100) AS excerpt,

    LOWER(REPLACE(product_name, ' ', '-')) AS url_slug

FROM products;
```

Numeric Calculations

`ROUND, FLOOR, CEILING`	Round a number with specified strategy
`MAX, MIN`	Get Min, Max of a given column/group
`SUM`	Get sum of a given column/group
`COUNT`	Count total records of a a given column/group
`RAND`	Returns a random number (between 0 and exclusive)
`POWER, SQRT`	Returns the value of a number raised to the power of another number (2 for SQRT).
`AVG`	Returns the average of a column/group
`DIV, MOD`	Returns the division/reminder of 2 numbers
`SIN, COS, TAN, COT`	Returns the sine, cosine, tangent, cotangent of numbers
`ASIN, ATAN, ATAN2, ACOS`	Returns the arc sine, cosine, tangent of numbers

Numeric Calculations

```sql
— Getting total price by items of an order
SELECT product_code, unit_price, qty, ROUND(unit_price * qty, 2) AS item_total
FROM orderd_items
WHERE order_id = 10105;

— Count number of records, optionally with filters
SELECT COUNT(*)
FROM users WHERE role = 'admin';


— Change 1 out of 3 users to a teacher
UPDATE users
    SET role = 'teacher'
WHERE MOD(id, 3) = 0;
```

Date and Time

`CURRENT_DATE, CURRENT_TIME`	Get current Date/Time
`DATE_ADD, DATE_SUB`	Add, remove datetime interval
`DATEDIFF, TIMEDIFF`	Getting difference of date (days) / time (HH:mm:ss)
`DATE_FORMAT, TIME_FORMAT`	Formatting Date/Time
`MAKEDATE, MAKETIME`	Make date/time by providing necessary input
`NOW`	Returns the current date and time
`STR_TO_DATE`	Returns a date based on a string and a format
`TO_DAYS, TIME_TO_SEC, SEC_TO_TIME, ...`	Various unit conversion functions
`EXTRACT, HOUR, MONTH, MINUTE, MICROSECOND, ...`	Various extraction functions to get s part of a date

Date and Time

```
— Getting orders where shipment was delayed above 3 days
SELECT id, order_date, shipped_date, DATEDIFF(shipped_date, order_date) AS delay
FROM orders
WHERE delay > 3;
```

```
— Get payments with future check date

SELECT check_number, amount

FROM payments

WHERE payment_date > CURDATE();
```

Control Flow

`IF()`	If / Else construct
`CASE`	Case Operator (with WHEN-THEN-ELSE)
`IFNULL()`	If / Else construct based on NULL or not
`NULLIF()`	Return NULL if expr1 = expr2

Control Flow

```
— Display customer type based on credit limit
SELECT id, name,
    CASE

        WHEN credit_limit > 1000 THEN 'Premium'

        WHEN credit_limit > 500 THEN 'Standard'

        ELSE 'New'

    END AS customer_type

FROM customers;

— Get discount eligibility based on current stock
SELECT product_id, IF(stock_qty > 50, 'Eligible', 'Not Eligible') AS discount

FROM products;
```

Cryptography / Hashing

`MD5()`	Round a number with specified strategy
`SHA(), SHA1(), SHA2()`	Calculate an SHA-1 (160-bit), SHA-1, and SHA-2 checksum
`AES_ENCRYPT(), AES_DECRYPT()`	Encrypt/Decrypt string with a same key
`CRC32()`	Compute a cyclic redundancy check value (Math Function)

Cryptography / Hashing

```sql
— Save user password with MD5 encryption
INSERT INTO users (username, password)
VALUES ('goodboy', MD5('the-secret-password'));


— Sign document update version with SHA1 encryption
UPDATE documents
SET content_hash = SHA1(CONCAT(content, username, salt));


— Encrypt and Decrypt with AES encryption
UPDATE customers
SET credit_card_info = AES_ENCRYPT('the-card-number', 'encryptionkey');

SELECT customer_id, AES_DECRYPT(credit_card_info, 'encryptionkey') AS card_info
FROM customers;
```

Questions?