

Today

- Information Extraction techniques
- Text Mining vs NLP
- QA Concepts-V1
- Greedy Patterns in NLP
- Encoder Decoder Differences
- Spelling Error Examples
- Data Science vs Data Engineer
- Transition and Emission Probabilities
- Encoder vs Decoder

Yesterday

- Headword Definition and Examples
- Regex Explanation
- PCFG Limitations Explained
- Email Regex Explanation
- Information Extraction Overview
- Question Answering Overview
- Understanding Attention Mechanisms
- Speech Synthesis Overview
- New chat

always answer in short

Got it! What's your question? 😊

in 30 balls, a batsman hits the boundaries 6 times, what will be the probability that he did not hit the boundaries, just give me the answer

The probability is $\frac{24}{30} = 0.8$ or 80%.

12c2

$$\binom{12}{2} = \frac{12!}{2!(12-2)!} = \frac{12 \times 11}{2 \times 1} = 66$$

what does an API allow one system to do in short

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which header is commonly used in REST API to specify the format of the response data in short

The `Content-Type` header is commonly used to specify the response data format in a REST API.

⬇️ ⏪ ⏴ ⏵ ⏷ ⏸ ⏹

https method to update the data in short

The `PUT` and `PATCH` methods are used to update data in an HTTP request.

in the context of RESTful APIs, how does the use of statelessness affect the scalability of a system in short

Statelessness improves scalability by ensuring each request is independent, allowing easy load balancing and horizontal scaling without server-side session storage.

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**Potential drawbacks of using indexes in a relational database:**

- Increased Storage** – Indexes consume extra disk space.
- Slower Writes** – Insert, update, and delete operations take longer due to index maintenance.
- Overhead in Index Management** – Frequent changes can lead to index fragmentation.
- Not Always Used** – Poorly designed indexes may not be utilized by the query optimizer.

disadvantage of creating too many indexes on a table in a database in short

Too many indexes can:

- Slow down write operations** (INSERT, UPDATE, DELETE).
- Increase storage usage.**
- Cause query optimizer inefficiencies.**
- Lead to index fragmentation.**

multiple join across large table, which will not improve performance

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Also:

- Joining without indexes** slows down queries.
- Using too many joins** increases computational cost.
- Joining on non-indexed columns** leads to full table scans.
- Cartesian joins (CROSS JOIN without filters)** explode data size.

creating proper indexes on join columns, using subqueries instead of join to simplify the query, partitioning large tables based on query patterns, analyzing and optimizing the execution plan using database tools, which one

Creating proper indexes on join columns will improve performance the most, as it speeds up lookups and reduces full table scans.

which one does not improve performance

Using subqueries instead of joins does not always improve performance. In many cases, joins are

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which one specify pls

"Using subqueries instead of joins to simplify the query" does not always improve performance. In many cases, joins are more efficient because relational databases optimize them better than nested subqueries.

binary search tree deleting root node

When deleting the root node in a Binary Search Tree (BST), there are three cases:

1. Root has no children → Simply remove the root.
2. Root has one child → Replace the root with its only child.
3. Root has two children → Replace the root with either:
 - Inorder Successor (smallest node in the right subtree)
 - Inorder Predecessor (largest node in the left subtree)

After replacement, recursively delete the successor/predecessor from its original position.



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To make a class immutable, follow these principles:

1. Declare the class as `final` (Prevents subclassing).
2. Make all fields `private` and `final` (Prevents modification).
3. Provide only getter methods (No setters).
4. Avoid exposing mutable objects (Return deep copies).
5. Initialize fields in the constructor (No modification after creation).

floyd warshall time complexity in short

The Floyd-Warshall algorithm has a time complexity of $O(V^3)$, where V is the number of vertices in the graph.

creational design pattern in which one is short

Singleton Pattern is a creational design pattern that ensures only one instance of a class exists and provides a global access point to it



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is abstract factory is a design pattern

Yes, Abstract Factory is a creational design pattern that provides an interface for creating families of related objects without specifying their concrete classes.

structural is a design pattern?

No, Structural is a category of design patterns, not a specific pattern. It includes patterns like Adapter, Bridge, Composite, Decorator, Facade, Flyweight, and Proxy, which focus on structuring classes and objects efficiently.

behavioral is design pattern?

No, Behavioral is a category of design patterns, not a specific pattern. It includes patterns like Strategy, Observer, Command, Chain of Responsibility, Mediator, and State, which focus on communication and interaction between objects.



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Applications of Singleton Pattern:

1. Database Connection – Ensures a single database connection instance.
2. Logging System – Maintains a single log manager across an application.
3. Configuration Management – Stores global configuration settings.
4. Thread Pool Management – Controls a single instance of a thread pool.

5. **Caching** – Manages a single cache instance to avoid redundant data storage.
6. **Resource Management** – Handles shared resources like file handlers or network sockets.
7. **Service Locator** – Provides a single access point for various services.

pattern allows an object to alter its behavior when its internal state changes which pattern

The **State Pattern** allows an object to alter its behavior when its internal state changes.

one to many dependencies among objects which pattern

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qos network, which term is used to describe the delay what packets experience in networking

The term used to describe the delay that packets experience in networking is **Latency**.

connect multiples in a network which device

A **Switch** is used to connect multiple devices in a network efficiently.

subnet mask of class c

The default subnet mask of Class C is **255.255.255.0**.

$13^{\wedge}210, 17^{\wedge}140$ which one is greater

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2 container 8 and 5, how many steps of measure 4 liters

To measure 4 liters using 8-liter and 5-liter containers, follow these steps:

1. Fill the 5-liter container completely.
2. Pour from the 5-liter container into the 8-liter container.
3. Fill the 5-liter container again.
4. Pour from the 5-liter container into the 8-liter container until it holds 8 liters (this transfers 3 more liters, leaving 2 liters in the 5-liter container).
5. Empty the 8-liter container completely.
6. Pour the remaining 2 liters from the 5-liter container into the 8-liter container.
7. Fill the 5-liter container again.
8. Pour from the 5-liter container into the 8-liter container. Now, the 8-liter container has 4 liters.

Thus, it takes **8 steps** to measure exactly **4 liters**.

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South Korea was the first country to launch 5G commercially on April 3, 2019

first open source os

The first open-source operating system was **Berkeley Software Distribution (BSD)**, released in the late 1970s. However, **Linux (1991)** became the most widely known open-source OS.

linux, unix, windows, ms-dos which one

Unix was the first among them, developed in the 1960s. However, Linux was the first fully open-source OS (1991).

which one is used for software maintenance - integration, unit, system, regression

Regression Testing is used for software maintenance to ensure that new changes do not break existing functionality

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which encryption & key - one public one private

Asymmetric encryption (also known as **public-key encryption**) uses two keys:

1. **Public Key** – Used for encryption.
2. **Private Key** – Used for decryption.

Examples: RSA, ECC, Diffie-Hellman.

separation of concerns in software architecture

Separation of Concerns (SoC) in software architecture means dividing a system into distinct sections, each handling a specific functionality, to improve **maintainability, scalability, and reusability**.

Examples:

1. **MVC (Model-View-Controller)** – Separates data, UI, and logic.
2. **Microservices** – Divides applications into independent services.
3. **Layered Architecture** – Splits software into presentation, business, and data layers.



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The `!important` rule in CSS overrides all other styles, including **inline styles and higher specificity** selectors.

Why is it important?

1. **Ensures priority** – Forces a style to apply.
2. **Overrides specificity** – Even if another rule has higher specificity.
3. **Useful for debugging** – Helps in testing style conflicts.

⚠ Use sparingly as it can make CSS harder to manage and debug.

font-face in why?

The `@font-face` rule in CSS is used to **embed custom fonts** in a webpage, allowing the use of fonts that are not installed on the user's device.

Why use @font-face ?

1. **Custom Typography** – Use any font, not just web-safe fonts.
2. **Better Branding** – Maintain design consistency



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Example:

```
css                                         ⌂ Copy ⌂ Edit

@font-face {                               
    font-family: 'MyCustomFont';
    src: url('myfont.woff2') format('woff2');
}

body {                                 
    font-family: 'MyCustomFont', sans-serif;
}
```

which best average case time complexity sorting algo

The best **average-case time complexity** sorting algorithm is **Merge Sort** and **Heap Sort**, both having $O(n \log n)$ time complexity.

However, **Quick Sort** also has $O(n \log n)$ on average and is often faster in practice due to better cache performance.



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- **Insertion Sort** → $O(n^2)$ (Average case)
- **Selection Sort** → $O(n^2)$ (Average case)

Both are inefficient for large datasets compared to **Merge Sort** ($O(n \log n)$) or **Quick Sort** ($O(n \log n)$ on average).

doctype html purpose

The `<!DOCTYPE html>` declaration is used to tell the browser that the document is written in **HTML5**.

Purpose:

1. **Ensures proper rendering** in modern browsers.
2. **Switches browsers to "Standards Mode"**, not "Quirks Mode".
3. **Improves compatibility and consistent behavior** across browsers.

It must be placed at the **very beginning** of the HTML document.

< 1/2 >



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A Document Type (DOCTYPE) is a declaration that defines the **HTML version** and **rules** the browser should follow when rendering a webpage.

Example:

html

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<!DOCTYPE html>

This specifies **HTML5** and ensures the document is displayed in **standards mode**.

does doctype define document type?

No, `DOCTYPE` does not define the document type; it only declares the HTML version the browser should follow. It helps the browser render the page correctly but does not define structure or content.

doctype html = define document type, link html document, include metadata, specify character encoding?



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- Link an HTML document (use `<link>` for that).
- Include metadata (use `<meta>` tags).
- Specify character encoding (use `<meta charset="UTF-8">`).

default value or rem unit in px

The default value of `1rem` is **16px** in most browsers.

So, `1rem = 16px` (by default), but it depends on the root (`<html>`) font-size.

parent font size? value of root font size?

- The **parent font size** is the font size set on the parent element. If no specific size is set, it inherits from the **root element**.
- The **root font size** (on the `<html>` element) is usually **16px** by default in most browsers.

If the root font size is changed (e.g., `html { font-size: 18px; }`), then `1rem` would equal that value



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diff between rem and em

`rem` and `em` are both relative units in CSS, but they behave differently:

- `rem` (root em) is relative to the **root element's font size** (usually `<html>`).
 - Example: If `html { font-size: 16px; }`, then `1rem = 16px`.
- `em` is relative to the **parent element's font size**.
 - Example: If a parent element has `font-size: 20px;`, then `1em` inside that element will equal `20px`.

Key Difference:

- `rem` is fixed to the root font size.
- `em` is dynamic and depends on the parent's font size.

.box ~ p meaning in css

In CSS, `.box ~ p` is a **general sibling selector**.

It selects all `<p>` elements that are **siblings** (i.e., at the same level in the DOM) of a `.box` element, and

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css

Copy Edit

```
.box ~ p {  
    color: red;  
}
```

This will make all `<p>` elements that are siblings of `.box` (and appear after it) have **red text**.

css specificity and how it affects the application of styles in short

CSS specificity determines which CSS rule is applied when multiple rules target the same element. It is calculated based on the **selectors used** and follows this order:

1. Inline styles (highest specificity)
 2. IDs (#id)
 3. Classes, attributes, and pseudo-classes (.class, [type="text"], :hover)
 4. Elements and pseudo-elements (div, p, ::before)

The more specific a selector is, the higher its priority in applying styles. If two rules have the same specificity, the **last declared rule** will be applied.

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To measure 4 liters using an 8-liter and a 5-liter container in the minimum steps, follow these steps:

1. Fill the 5-liter container.
 2. Pour the 5 liters from the 5-liter container into the 8-liter container.
 3. Fill the 5-liter container again.
 4. Pour from the 5-liter container into the 8-liter container until it holds 8 liters. This will leave exactly 2 liters in the 5-liter container.
 5. Empty the 8-liter container.
 6. Pour the remaining 2 liters from the 5-liter container into the 8-liter container.
 7. Fill the 5-liter container again.
 8. Pour from the 5-liter container into the 8-liter container until the 8-liter container holds 4 liters (this transfers 3 liters, leaving exactly 4 liters in the 8-liter container).

It takes 8 steps to measure 4 liters

192.168.2.100 , subnet mask 255.255.255.192 /26 find network address

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- Convert the subnet mask to binary:
255.255.255.192 → 11111111.11111111.11111111.11000000
 - Convert the IP address to binary:
192.168.2.100 → 11000000.10101000.00000010.01100100
 - Perform a **bitwise AND** between the IP address and the subnet mask.

markdown

ID address = 11000000_1010

Subnet mask: 11111111.11111111.

Thus, the network address is 192.168.2.164

Translation method: WordSense, introduced in "Japanese and Korean voice search".
Verb frequency: 50,422 A padding token used
in the model

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explain in short points

The image explains the BERT base model (uncased) and its components.

1. **Tokenizer Method:** BERT uses **WordPiece** for tokenization, which was introduced in "Japanese and Korean voice search".
 2. **Vocabulary Size:** BERT's vocabulary size is 30,522 tokens.
 3. **Special Tokens:**
 - **unk_token** [**UNK**]: Used when the tokenizer doesn't have a specific encoding for a token.
 - **sep_token** [**SEP**]: Used as a separator for tasks involving two texts (e.g., re-ranking).
 - **pad_token** [**PAD**]: Used to pad unused positions in the model's input.
 - **cls_token** [**CLS**]: Used for classification tasks.
 - **mask_token** [**MASK**]: Used to mask tokens during the training process.
 4. **Tokenized Text:** The sample tokenized text shows how different components of a sentence are broken down using BERT's tokenization system.

L6-V1

 [View plans](#)
Unlimited access, team features...

  



ChatGPT can make mistakes. Check important info.

?