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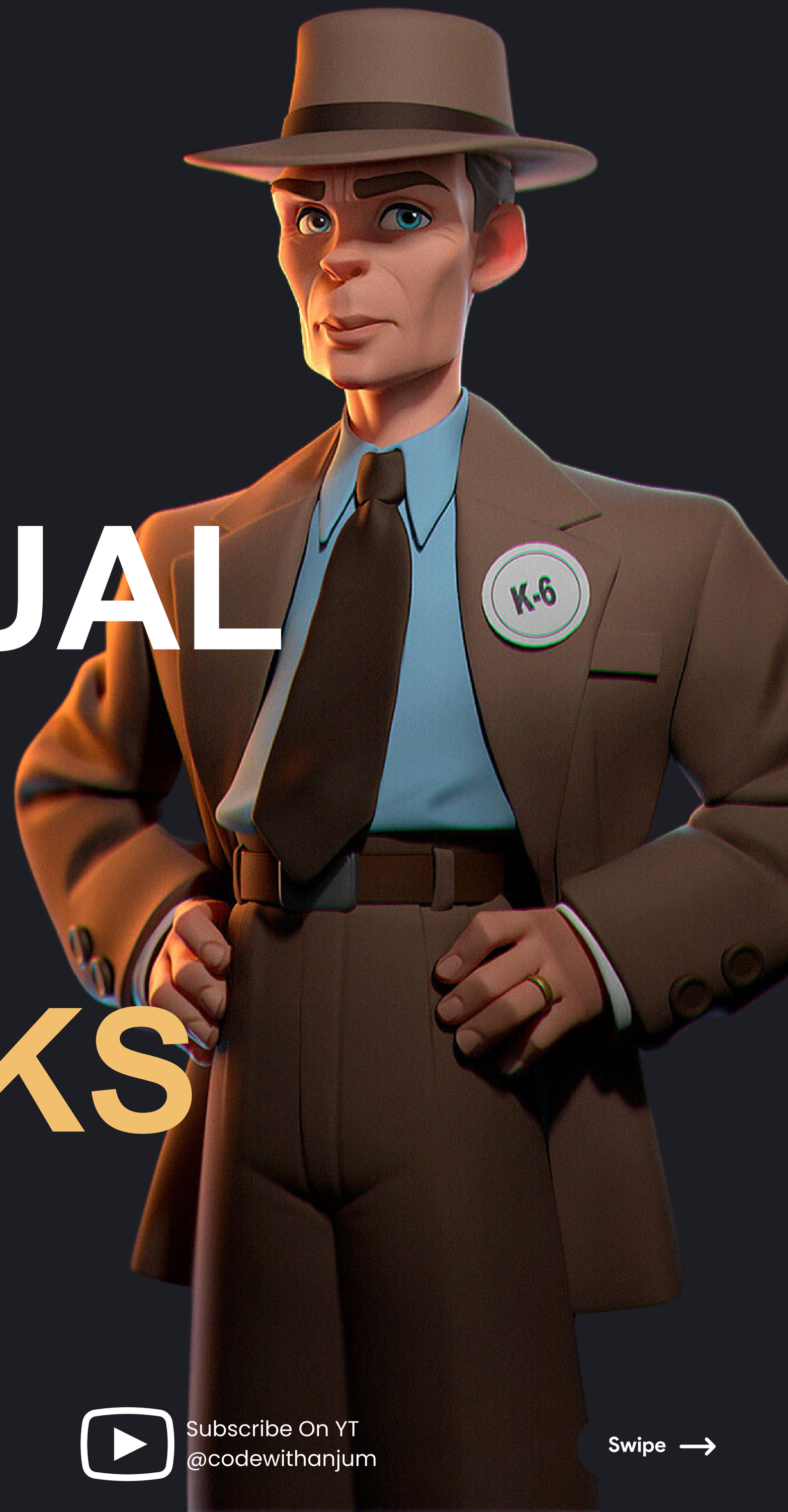
HOW VIRTUAL DOM WORKS



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The Virtual DOM

is a concept used in modern web development frameworks, such as React, to improve the performance of updating the actual DOM (Document Object Model) and to simplify the process of handling UI updates.

Here's how it works:

Real DOM and its problem:

The DOM is a tree-like representation of the web page's structure and content. Whenever there's a change in the application's state or data, the DOM needs to be updated to reflect those changes. However, directly updating the real DOM can be inefficient and slow, especially when there are frequent updates or complex UI structures. This can lead to poor user experience and performance issues.

Virtual DOM as a lightweight copy:
To tackle this problem, the Virtual DOM was introduced. The Virtual DOM is a lightweight copy of the real DOM, represented as a JavaScript object. It mirrors the structure of the real DOM but contains only the necessary information about the elements and their properties.

Rendering the Virtual DOM:
When a state or data change occurs in the application, instead of directly updating the real DOM, React (or other frameworks utilizing Virtual DOM) creates a new Virtual DOM representing the updated state.

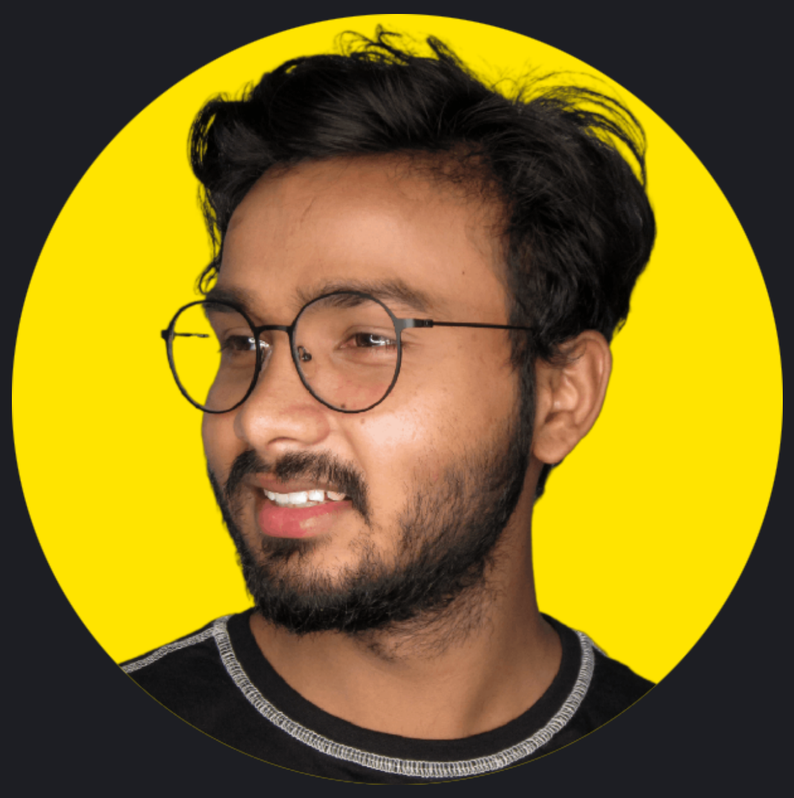
Diffing:
The next step is to perform a process called "diffing." This involves comparing the new Virtual DOM with the previous one (the one before the state update) to identify the minimal number of changes needed to update the real DOM.

Update the real DOM efficiently:
After the minimal changes are determined, React applies these changes to the real DOM in a batch update. This update process is much more efficient because it involves updating only the specific parts of the real DOM that have changed, instead of re-rendering the entire page.

Reconciliation:
Once the real DOM has been updated, the previous Virtual DOM is replaced with the new Virtual DOM to be used in the next state update cycle. This process is called "reconciliation."

By using the Virtual DOM, the framework can minimize the number of manipulations required to update the real DOM, leading to improved performance and a smoother user experience.

The Virtual DOM abstracts away the complexity of directly interacting with the real DOM, making it easier for developers to manage UI updates and build responsive web applications.



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