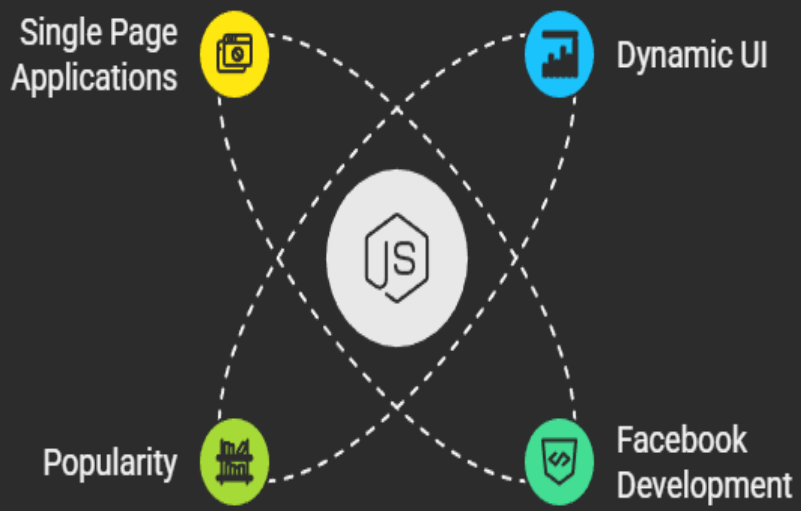
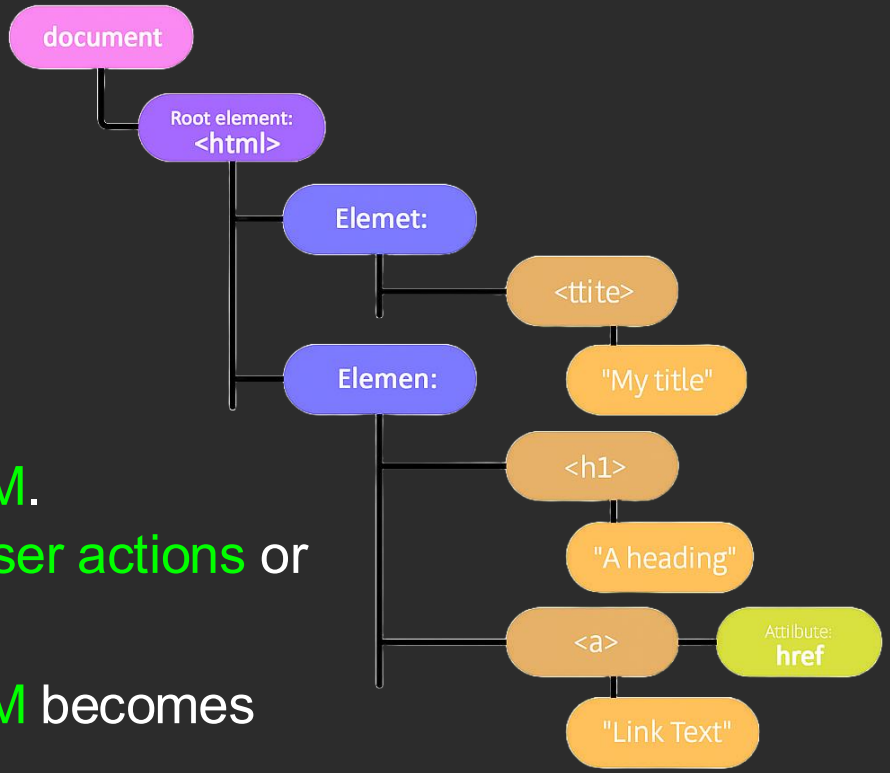
1. What is React



1. JavaScript library to build Dynamic and interactive user interfaces
2. Developed at Facebook in 2011.
3. Currently most widely used JS library for front-end development.
4. Used to create single page application (page does not re-load).

2. Working of DOM



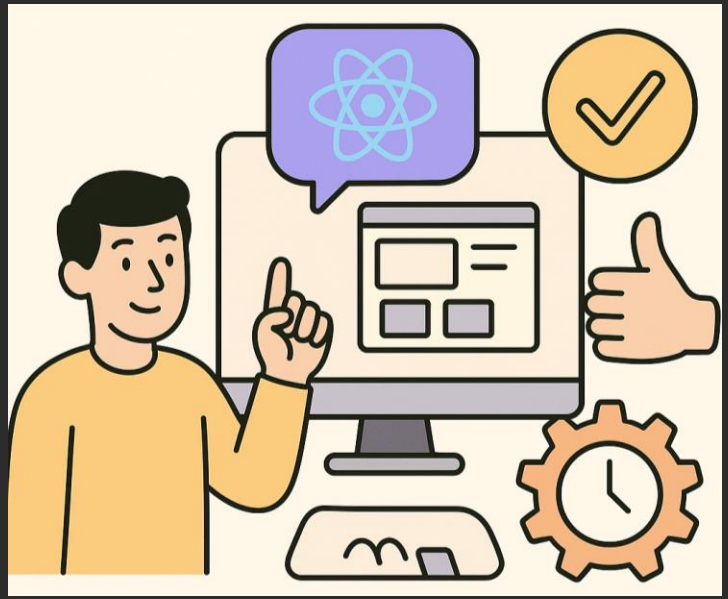
1. Browser takes HTML and create DOM.
2. JS helps us modify DOM based on user actions or events.
3. In big applications, Working with DOM becomes complicated.

3. Problems with JavaScript

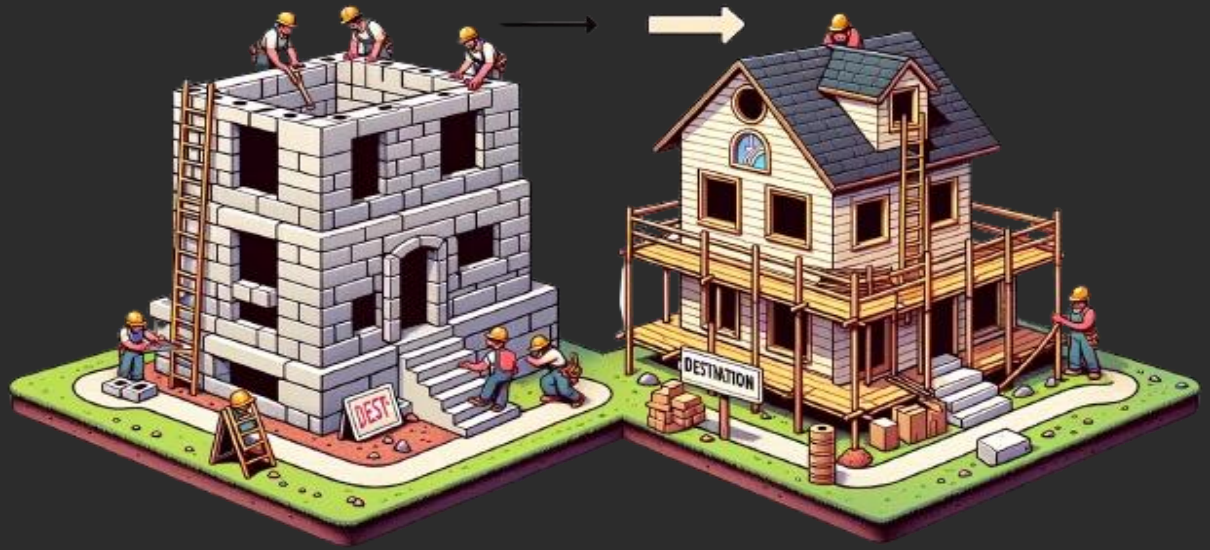
1. Complex UI Logic: Managing DOM, state, and updates manually is difficult.
2. Error-Prone & Hard to Debug: Minor mistakes can break entire features.
3. Poor Maintainability: Code becomes messy & unmanageable as grows.
4. Low Reusability: No standard way to reuse UI or logic efficiently.
5. Manual DOM Manipulation: Time-consuming and performance-intensive.

4. Working of React

1. No need to manually query or update DOM elements.
2. React simplifies development by using small, reusable components.
3. React efficiently handles the creation and updating of DOM elements for you.
4. It saves significant development time - most things are pre-built and easier to manage.



5. JS Vs React

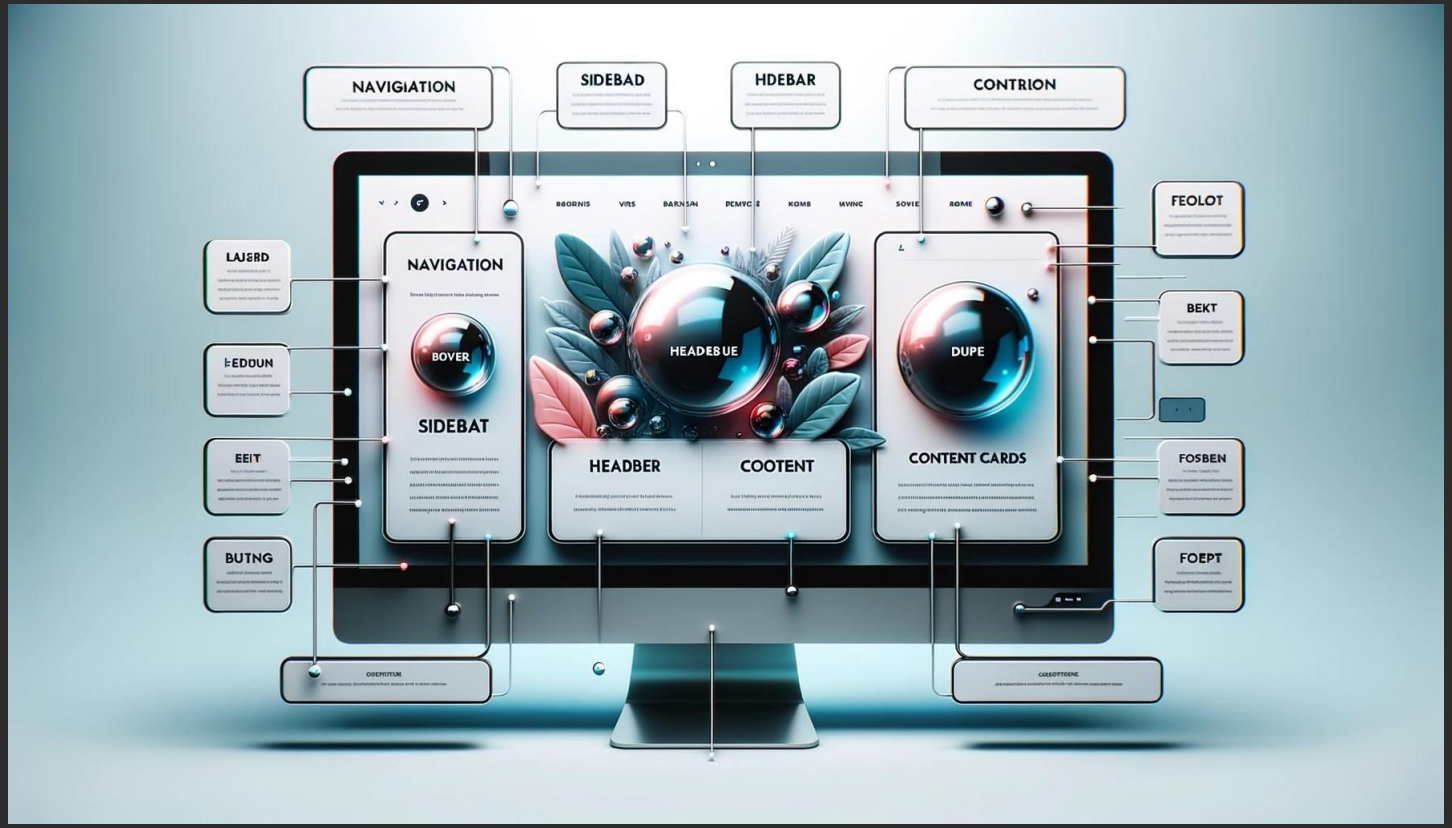


1. JS is imperative: You define steps to reach your desired state.
2. React is Declarative: You define the target UI state and then react figures out how to reach that state.

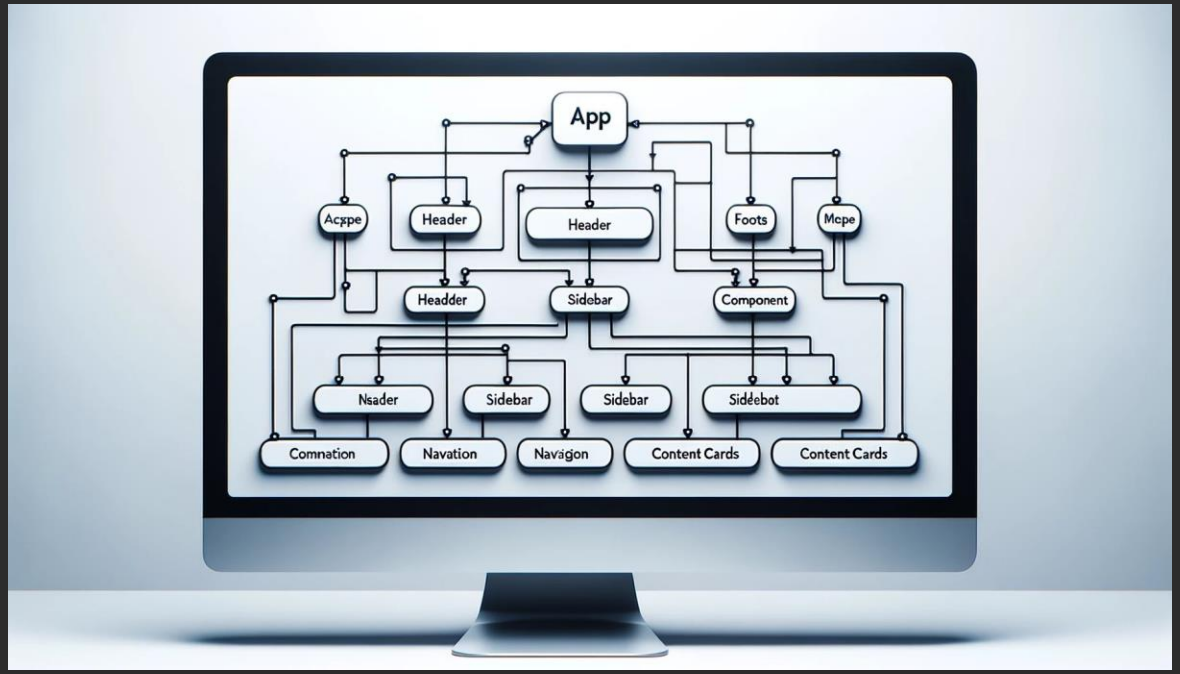
6. Introduction to Components

Components help us write reusable, modular and better organized code.

6. Introduction to Components



6. Introduction to Components



React application is a tree of components with App Component as the root bringing everything together.

Create a React App

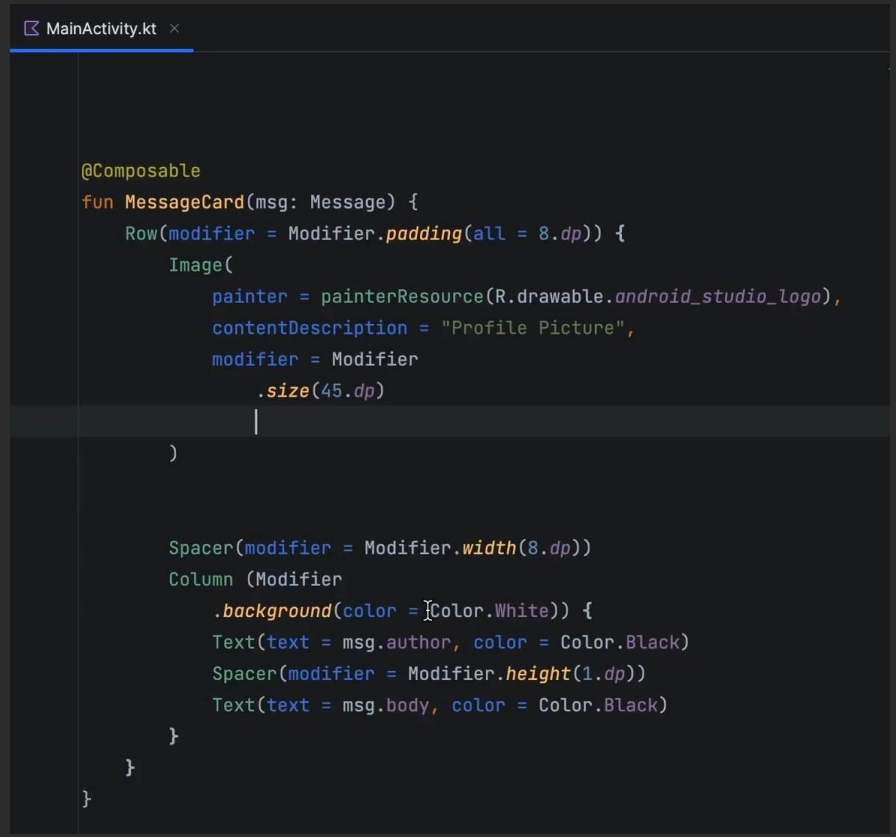
7. Setup IDE
8. Create a React App
9. Project Structure

7. What is IDE

1. IDE stands for Integrated Development Environment.
2. Software suite that consolidates basic tools required for software development.
3. Central hub for coding, finding problems, and testing.
4. Designed to improve developer efficiency.

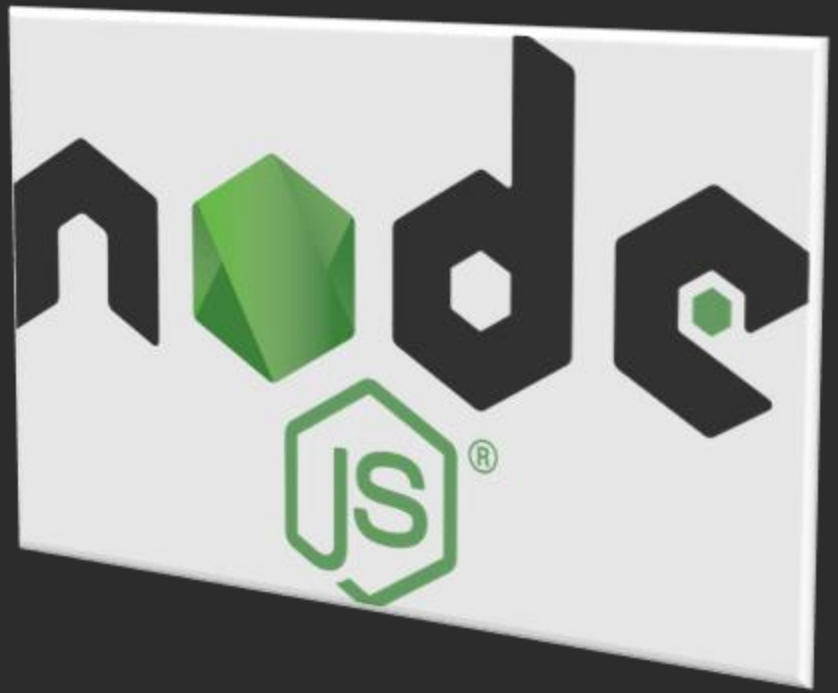
7. Need of IDE

1. Streamlines development.
2. Increases productivity.
3. Simplifies complex tasks.
4. Offers a unified workspace.
5. IDE Features
    1. Code Autocomplete
    2. Syntax Highlighting
    3. Version Control
    4. Error Checking



7. Install latest Node

Search
Download
NodeJS



7. Installation & Setup

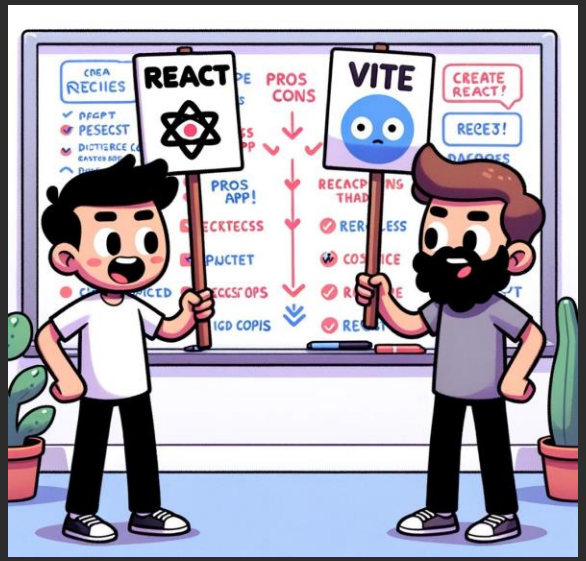
1. Search VS Code
2. Keep Your Software up to date

7. VsCode Extensions and Settings

1. Live Server / Live Preview
2. Prettier (Format on Save)
3. Line Wrap
4. Tab Size from 4 to 2

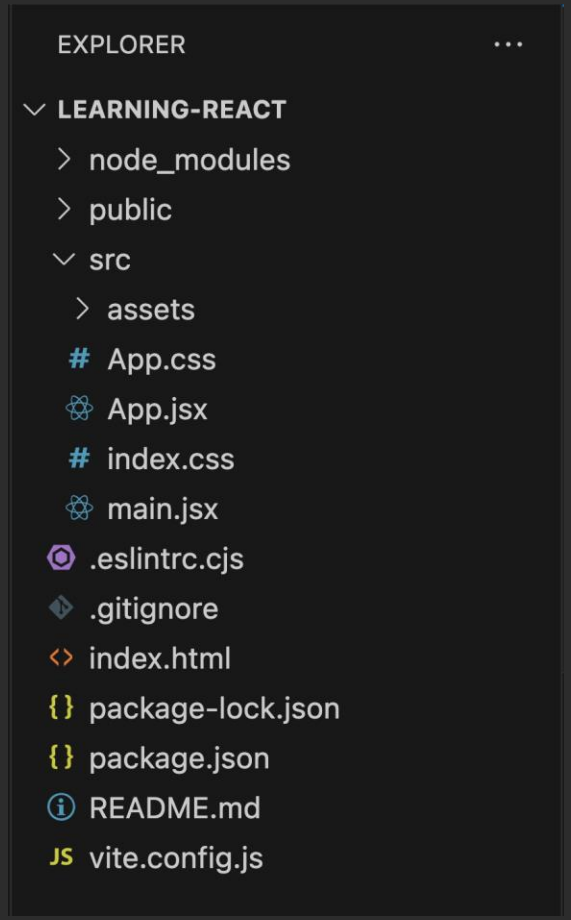
8. Create a React App

1. Official tool is CRA(Create React APP)
2. Vite is a modern tool to create React Project.
3. Vite produces Quick and Small bundle size.
4. Vite: Use *npm run dev* to launch dev server.
5. Use *npm start* for CRA.



9. Project Structure

1. node_modules/ has all the installed node packages
2. public/ Directory: Contains static files that don't change.
3. src/ Directory: Main folder for the React code.
    1. components/: Reusable parts of the UI, like buttons or headers.
    2. assets/: Images, fonts, and other static files.
    3. styles/: CSS or stylesheets.
4. package.json contains information about this project like name, version, dependencies on other react packages.
5. vite.config.js contains vite config.



10. File Extensions

.JS

- Stands for JavaScript
- Contains regular JavaScript code
- Used for general logic and components

.JSX

- Stands for JavaScript XML
- Combines JavaScript with HTML-like tags
- Makes it easier to design UI components

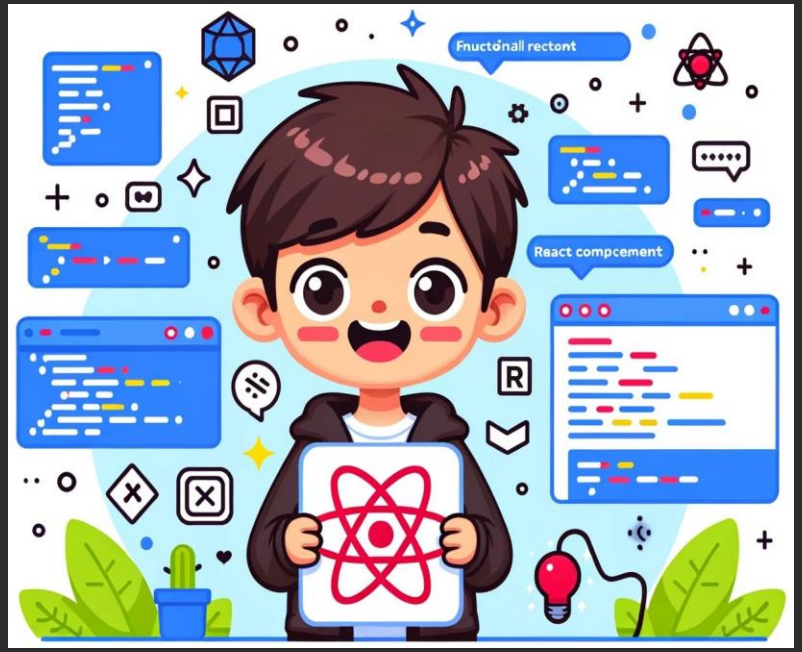
11. Class vs Function Components

Class Components

- Stateful: Can manage state.
- Lifecycle: Access to lifecycle methods.
- Verbose: More boilerplate code.
- Not Preferred anymore.

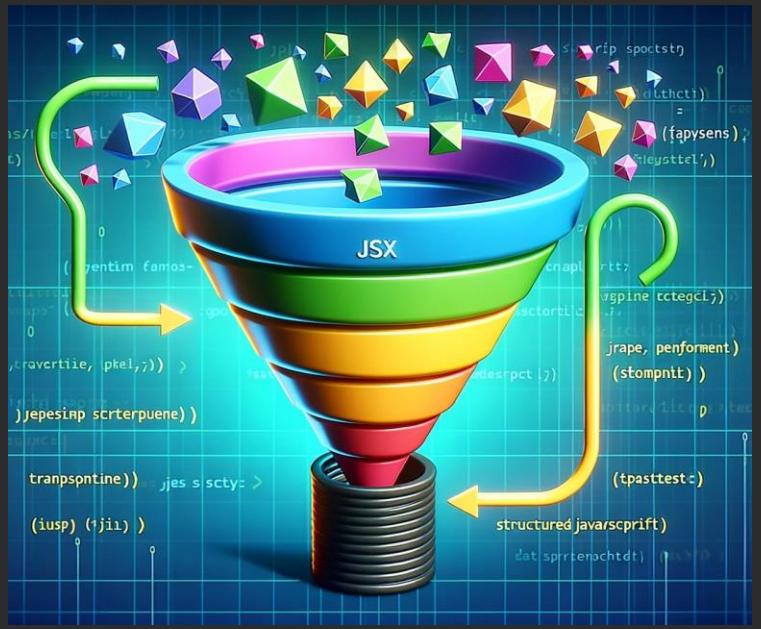
Functional Components

- Initially stateless.
- Can use Hooks for state and effects.
- Simpler and more concise.
- More Popular.



12. What is JSX?

1. Definition: JSX determines how the UI will look wherever the component is used.
2. Not HTML: Though it resembles HTML, you're actually writing JSX, which stands for JavaScript XML.
3. Conversion: JSX gets converted to regular JavaScript.
4. Babeljs.io/repl is a tool that allows you to see how JSX is transformed into JavaScript.



13. Exporting components

Component.js

```
export default
function
Button() {
 ...
}
```

one default export

Components.js

```
export function
Slider() {
 ...
}
```

```
export function
Checkbox() {
 ...
}
```

multiple named exports

MixedComponents.js

```
export function
Avatar() {
 ...
}
```

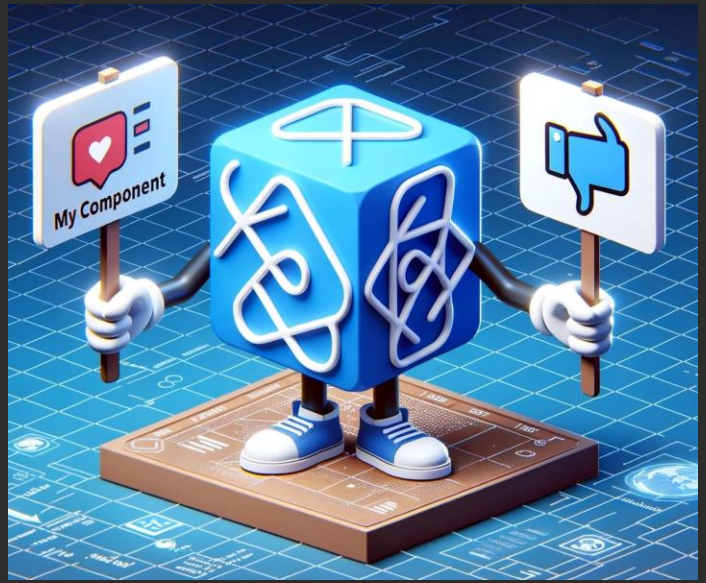
```
export default
function
FriendsList() {
 ...
}
```

named export(s)
and one default export

1. Enables the use of a component in other parts.
2. Default Export: Allows exporting a single component as the default from a module.
3. Named Export: Allows exporting multiple items from a module.
4. Importing: To use an exported component, you need to import it in the destination file using import syntax.

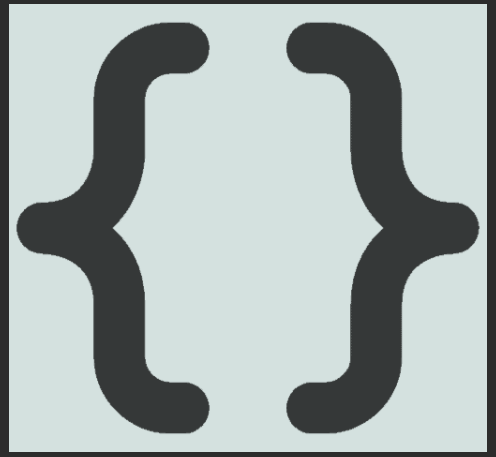
14. Other important Points

1. Naming: Must be capitalized; lowercase for default HTML.
2. HTML: Unlike vanilla JS where you can't directly write HTML, in React, you can embed HTML-like syntax using JSX.
3. CSS: In React, CSS can be directly imported into component files, allowing for modular and component-specific styling.



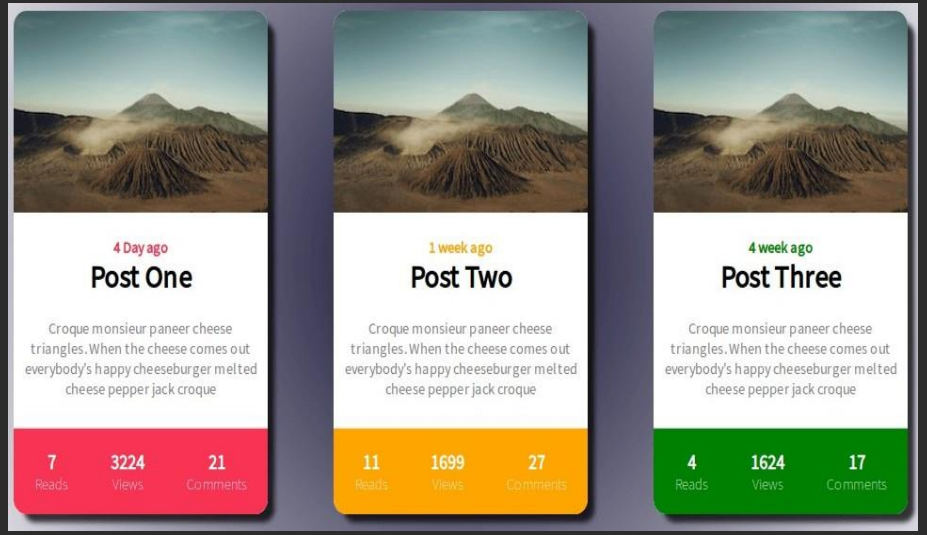
15. Dynamic Components

1. Dynamic Content: JSX allows the creation of dynamic and interactive UI components.
2. JavaScript Expressions: Using {}, we can embed any JS expression directly within JSX. This includes variables, function calls, and more.



16. Reusable Components

1. Modularity: Components are modular, allowing for easy reuse across different parts of an application.
2. Consistency: Reusing components ensures UI consistency and reduces the chance of discrepancies.
3. Efficiency: Reduces development time and effort by avoiding duplication of code.
4. Maintainability: Changes made to a reused component reflect everywhere it's used, simplifying updates and bug fixes.



17. Including Bootstrap

1. Responsive: Mobile-first design for all device sizes.
2. Components: Pre-styled elements like buttons and navbars.
3. Customizable: Modify default styles as needed.
4. Cross-Browser: Consistent look across browsers.
5. Open-Source: Free with community support.

1. Install:

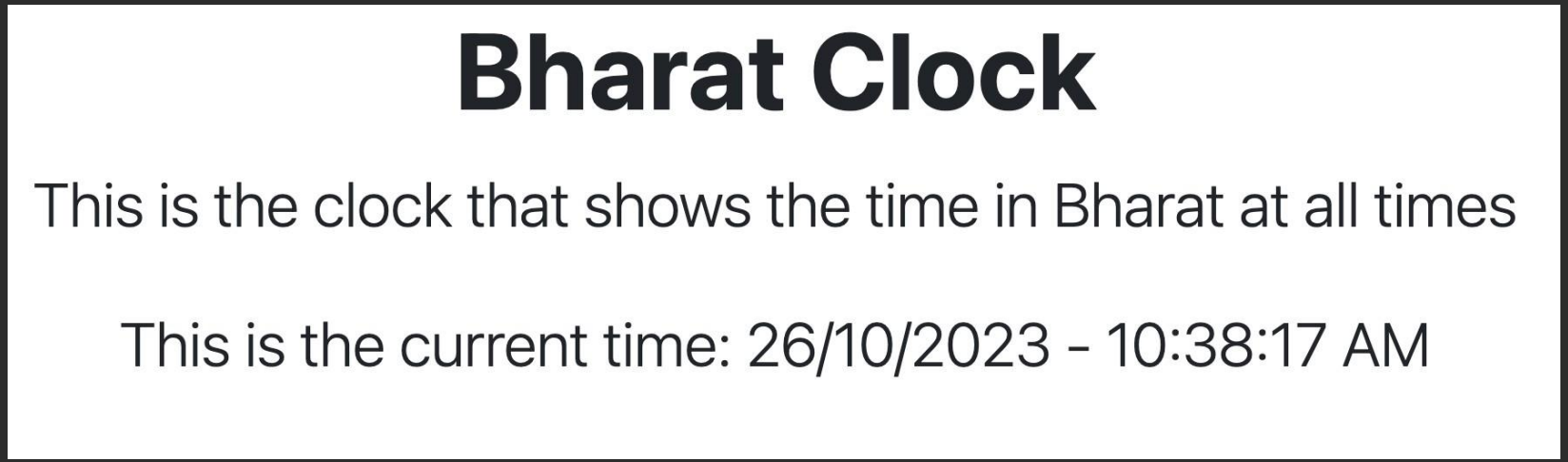
```
npm i bootstrap@5.3.2
```

2. import

```
import "bootstrap/dist/css/bootstrap.min.css";
```

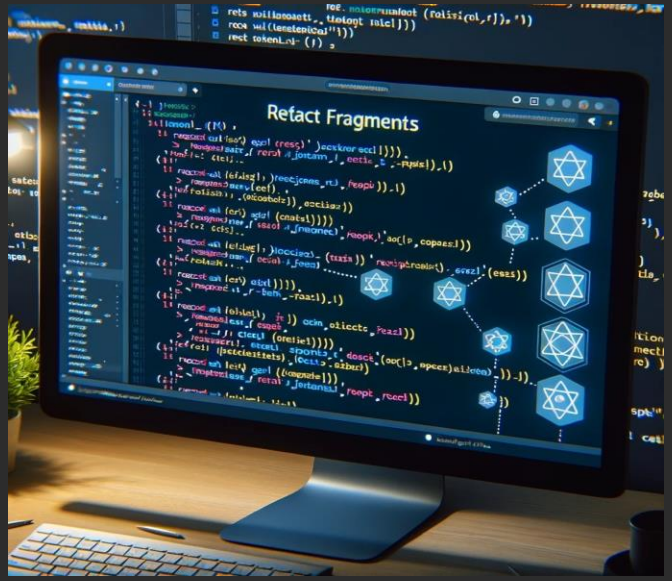
Project: TODO App UI

Project: Clock



18. Fragments

1. What?
   Allows grouping of multiple elements without extra DOM nodes.
2. Why?
   - Return multiple elements without a wrapping parent.
   - Cleaner DOM and consistent styling.
3. How? Two syntaxes:
   1. <React.Fragment>...</React.Fragment>
   2. Short: <>...</>



19. Map Method

1. Purpose: Dynamically display array data using JSX

2. JSX Mapping: Use .map() to convert each item into a JSX element.

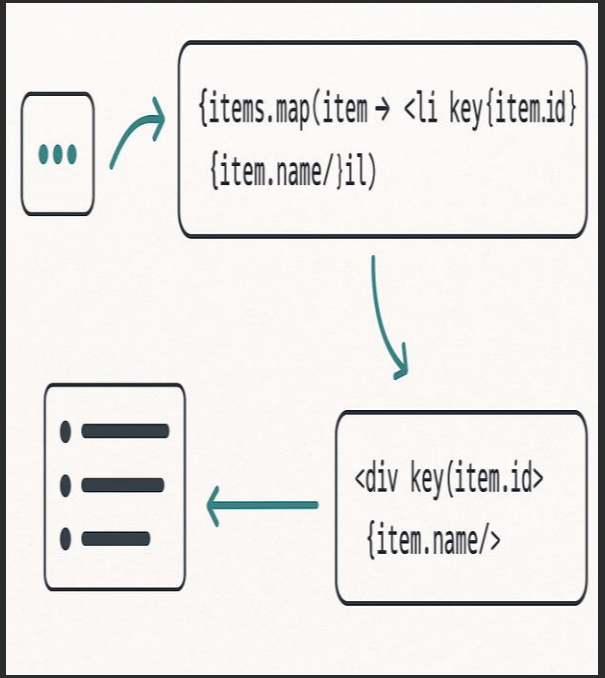
{items.map(item => <li key={item.id}>{item.name})}

3. Inline Rendering: Render directly within JSX — no separate function needed.

4. Key Prop: Assign a unique key to each element for optimized re-renders.

Example: {item.name}

5. Why Key Matters: Helps React track items efficiently and improve performance.



20. Conditional Rendering

Conditional Rendering
- Displaying content based on certain conditions.
- Allows for dynamic user interfaces.

Methods
- If-else statements: Choose between two blocks of content.
- Ternary operators: Quick way to choose between two options.
- Logical operators: Useful for rendering content when a condition is true.

Benefits
- Enhances user experience.
- Reduces unnecessary rendering.
- Makes apps more interactive and responsive.

```
{ condition && <div>Write something</div> }

{ !condition ? <div>Error do it again</div> :
               <div>Congratulations</div> }
```

21. Passing Data via Props

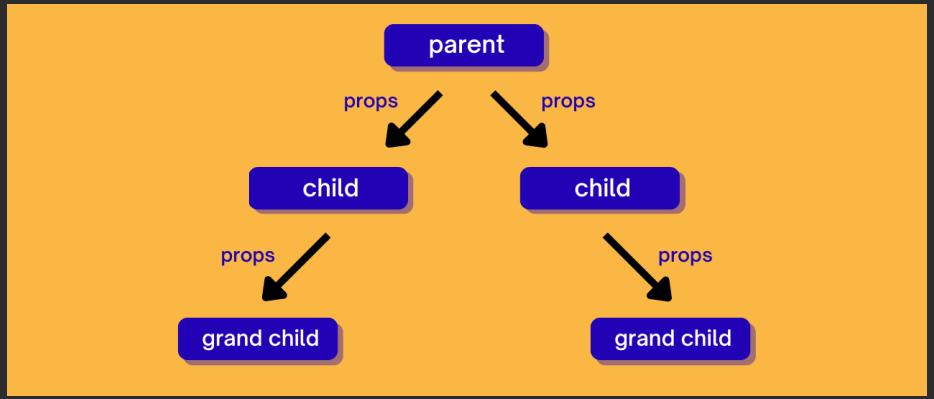
Props in React
- Short for properties
- Mechanism for passing data.
- Read-only by default

Usage
- Pass data from parent to child component.
- Makes components reusable.
- Defined as attributes in JSX.

Key Points
- Data flows one-way (downwards).
- Props are immutable.
- Used for communication between components.

Examples

```
<Header title="My App" />
```



22. CSS Modules

1. Localized class names to avoid global conflicts.
2. Styles are scoped to individual components.
3. Helps in creating component-specific styles.
4. Automatically generates unique class names.
5. Promotes modular and maintainable CSS.
6. Can use alongside global CSS when needed.

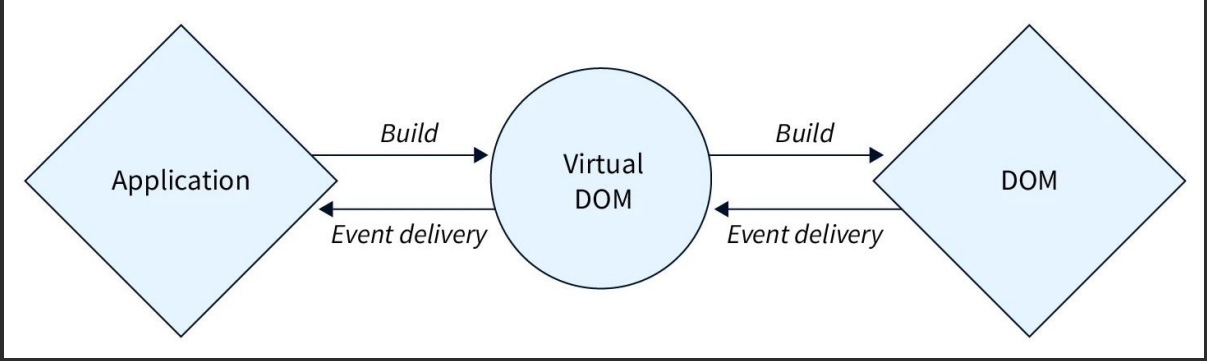
23. Passing Children

```jsx
function Container(props) {
  return (
    <div className="container-style">
      {props.children}
    </div>
  );
}
```

```jsx
<Container>
  <h1>Welcome to My App</h1>
  <p>This content is passed as children to the
  Container component.</p>
</Container>
```

1. children is a special prop for passing elements into components.
2. Used for flexible and reusable component designs.
3. Common in layout or container components.
4. Accessed with props.children.
5. Can be any content: strings, numbers, JSX, or components.
6. Enhances component composability and reusability.

24. Handling Events

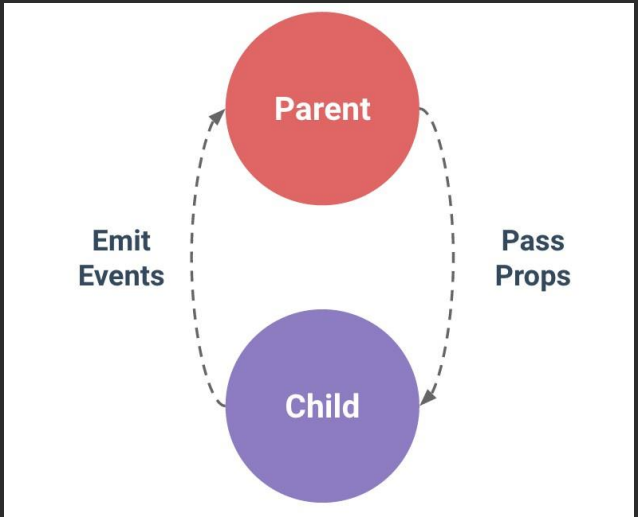


1. React events use camelCase, e.g., onClick.
2. Uses synthetic events, not direct browser events.
3. Event handlers can be functions or arrow functions.
4. Use onChange for controlled form inputs.
5. Avoid inline arrow functions in JSX for performance.

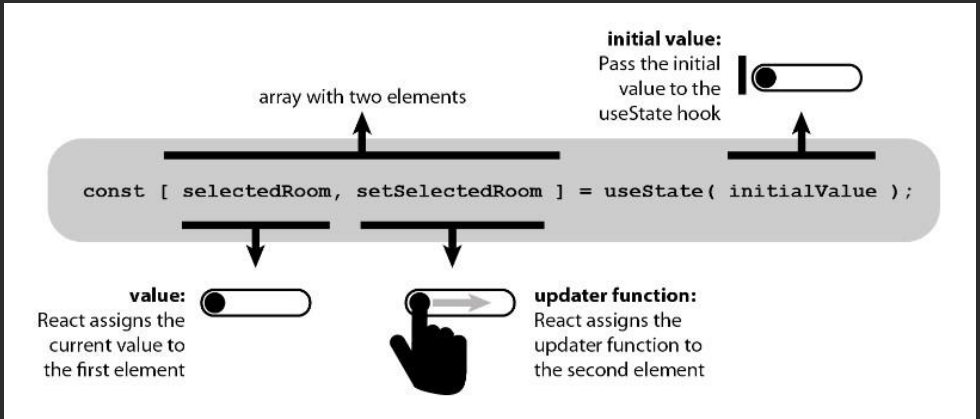
25. Passing Functions via Props

1. Pass dynamic behaviour between components.
2. Enables upward communication from child to parent.
3. Commonly used for event handling.
4. Parent defines a function, child invokes it.
5. Enhances component interactivity.
6. Example:

```
<Button onClick={handleClick} />
```



26. Managing State



1. State represents data that changes over time.
2. State is local and private to the component.
3. State changes cause the component to re-render.
4. For functional components, use the useState hook.
5. React Functions that start with word use are called hooks
6. Hooks should only be used inside components
7. Parent components can pass state down to children via props.
8. Lifting state up: share state between components by moving it to their closest common ancestor.

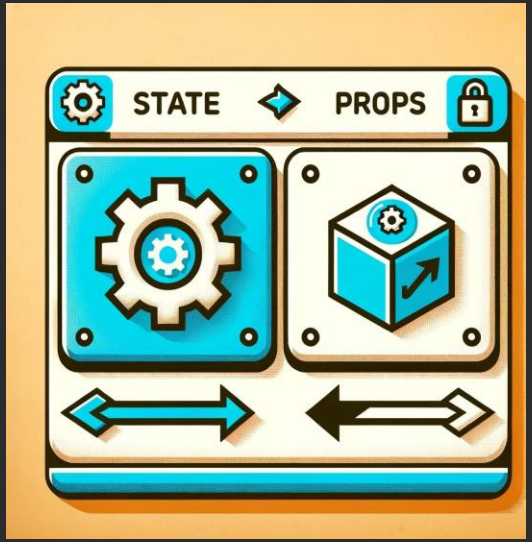
27. State vs Props

State:

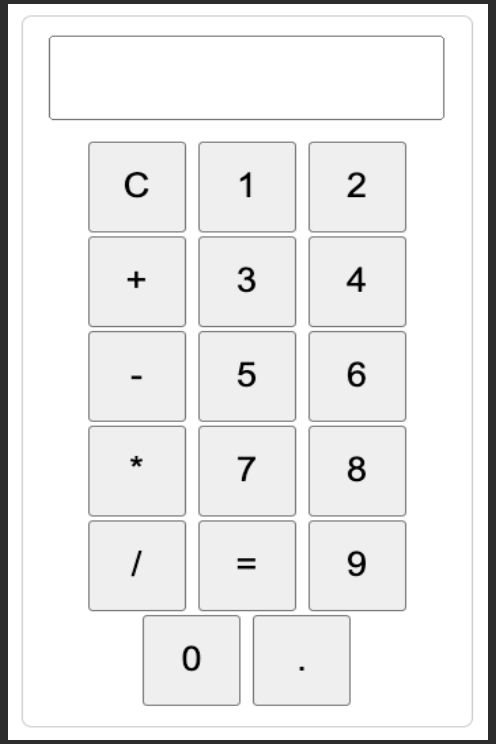
- Local and mutable data within a component.
- Initialized within the component.
- Can change over time.
- Causes re-render when updated.
- Managed using useState in functional components.

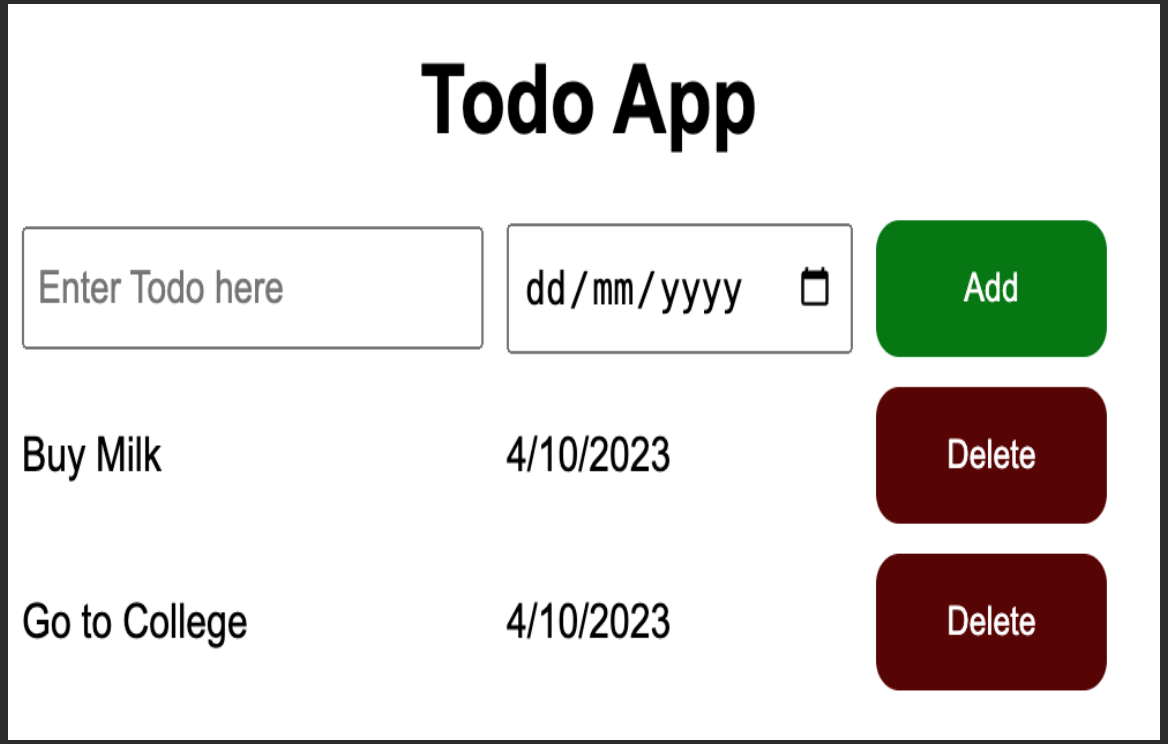
Props:

- Passed into a component from its parent.
- Read-only (immutable) within the receiving component.
- Allow parent-to-child component communication.
- Changes in props can also cause a re-render.



Project Calculator & TODO App

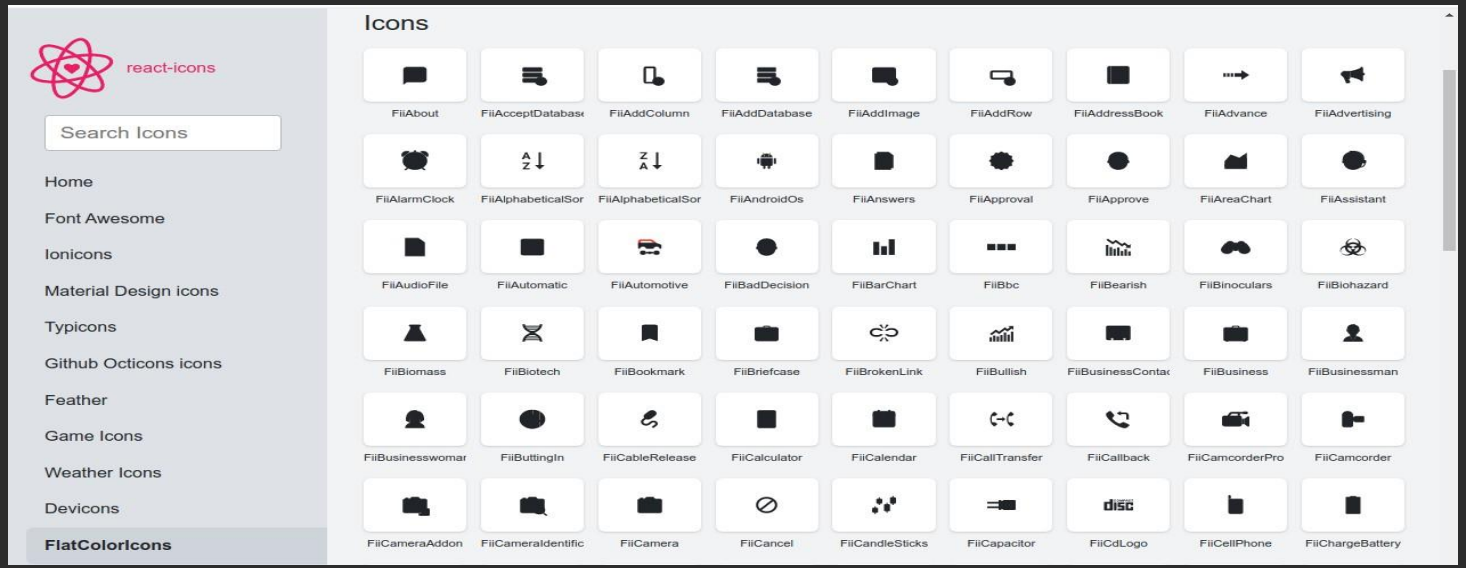




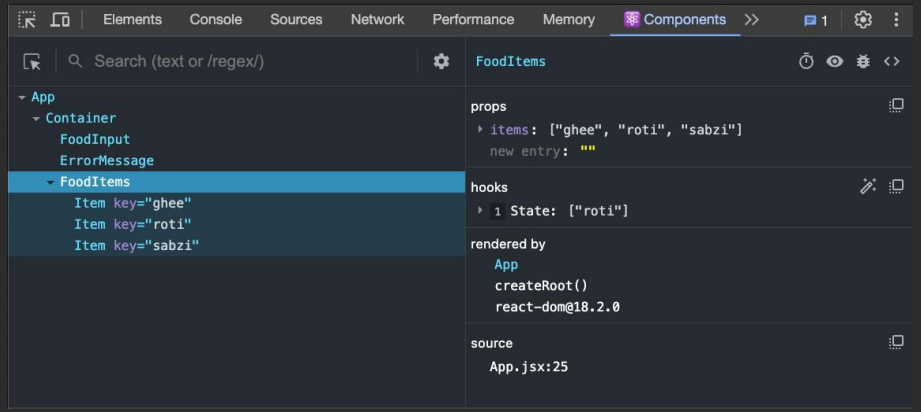
28. React-icon Library

1. You can use a lot of icons without managing them.
2. Install Package: `npm install react-icons -save`
3. Use icon:

```
import {IconName} from "react-icons/fc";
```



29. Inspecting with React Dev Tools



1. Inspection: Allows inspection of React component hierarchies.
2. State & Props: View and edit the current state and props of components.
3. Performance: Analyze component re-renders and performance bottlenecks.
4. Navigation: Conveniently navigate through the entire component tree.
5. Filtering: Filter components by name or source to locate them quickly.
6. Real-time Feedback: See live changes as you modify state or props.

30. How React Works

Root Component:

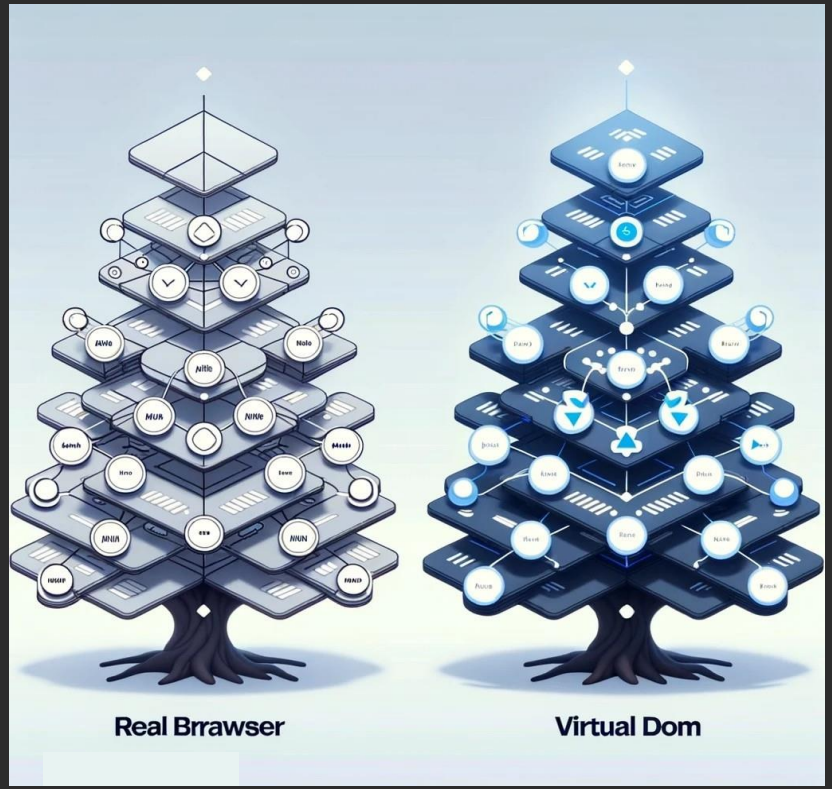
- The App is the main or root component of a React application.
- It's the starting point of your React component tree.

Virtual DOM:

- React creates an in-memory structure called the virtual DOM.
- Different from the actual browser DOM.
- It's a lightweight representation where each node stands for a component and its attributes.

Reconciliation Process:

- When component data changes, React updates the virtual DOM's state to mirror these changes.
- React then compares the current and previous versions of the virtual DOM.
- It identifies the specific nodes that need updating.
- Only these nodes are updated in the real browser DOM, making it efficient.



30. How React Works

React and ReactDOM:

- The actual updating of the browser's DOM isn't done by React itself.
- It's handled by a companion library called react-dom.

Root Element:

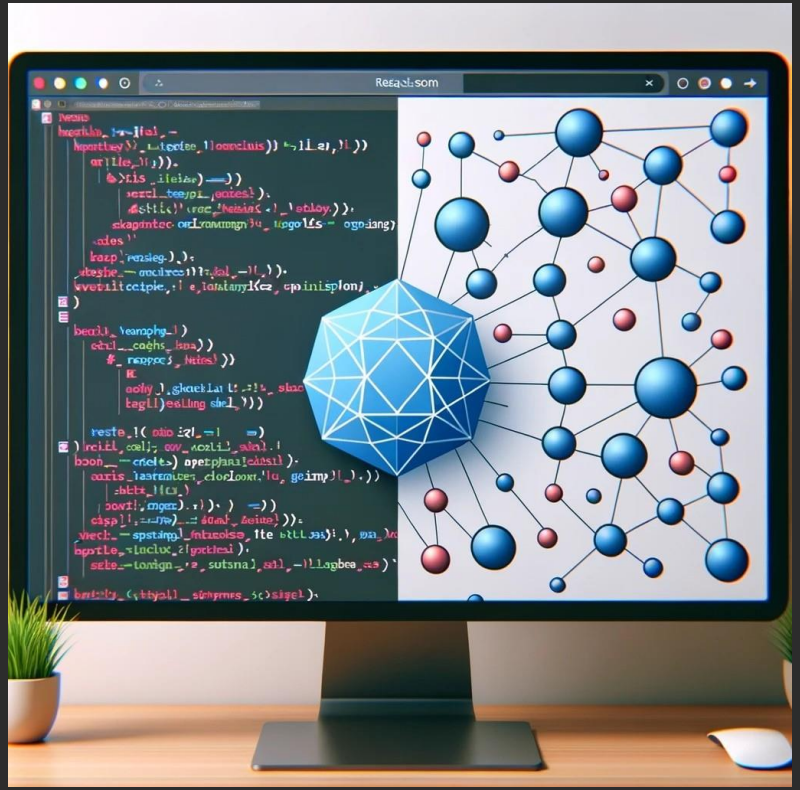
- The root div acts as a container for the React app.
- The script tag is where the React app starts executing.
- If you check main.tsx, the component tree is rendered inside this root element.

Strict Mode Component:

- It's a special component in React.
- Doesn't have a visual representation.
- Its purpose is to spot potential issues in your React app.

Platform Independence:

- React's design allows it to be platform-agnostic.
- While react-dom helps build web UIs using React, ReactNative can be used to craft mobile app UIs.



31. React Vs Angular vs Vue

React, Angular, and Vue:

- React is a library, while Angular and Vue.js are frameworks.
- React focuses on UI; Angular and Vue.js offer comprehensive tools for full app development.

Library vs. Framework:

- A library offers specific functionality.
- A framework provides a set of tools and guidelines.
- In simpler terms: React is a tool; Angular and Vue.js are toolsets.

React's Specialty:

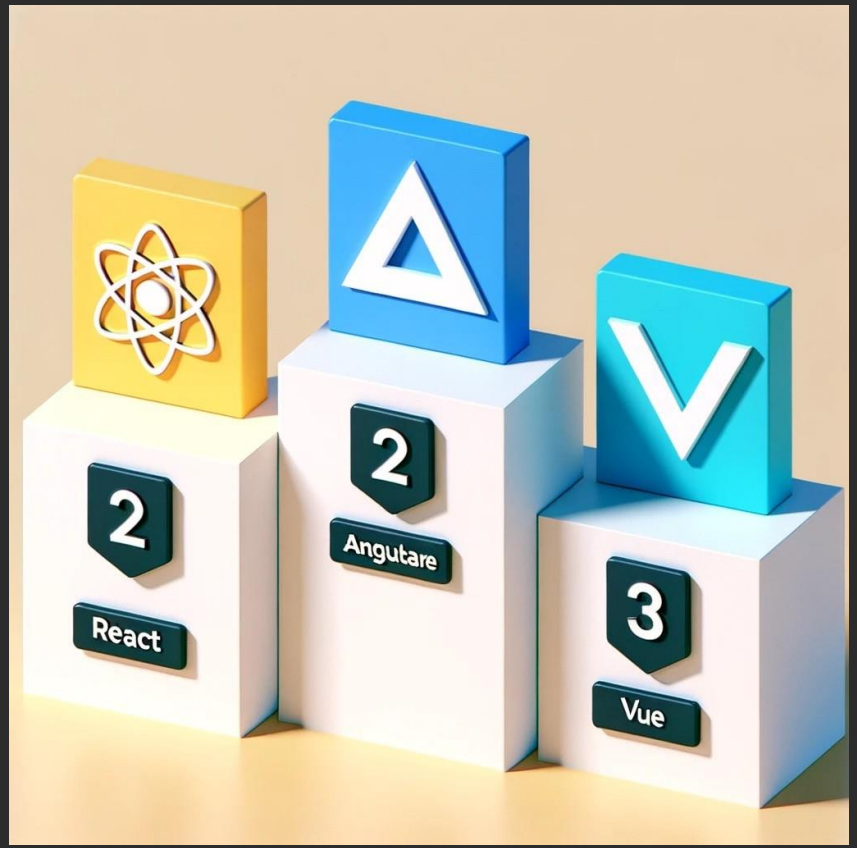
- React's main role is crafting dynamic, interactive UIs.
- It doesn't handle routing, HTTP calls, state management, and more.

React's Flexibility:

- React doesn't dictate tool choices for other app aspects.
- Developers pick what fits their project best.

About Angular and Vue.js:

- Angular, developed by Google, provides a robust framework with a steep learning curve.
- Vue.js is known for its simplicity and ease of integration, making it beginner-friendly.

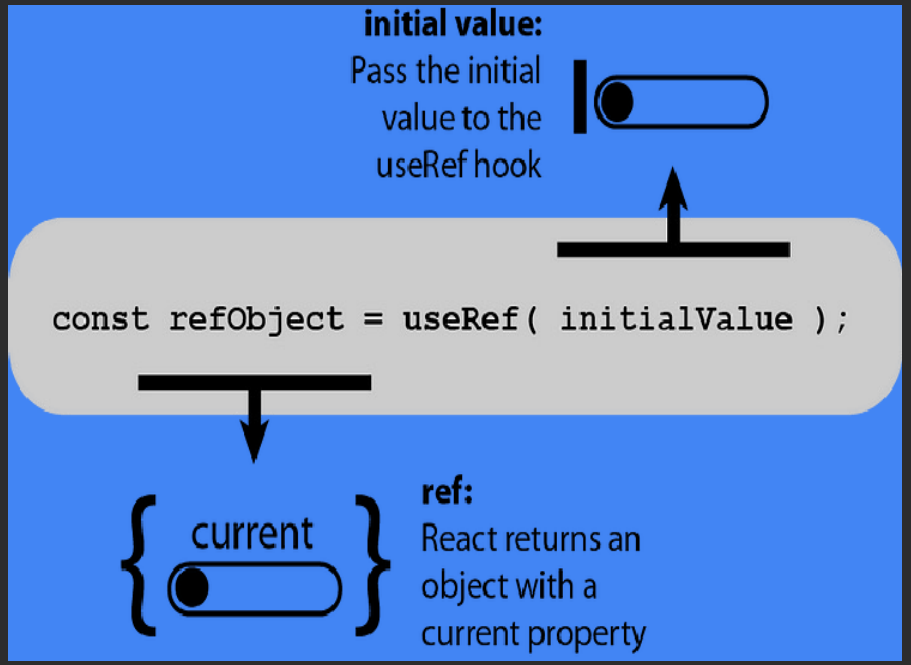


32. Using Forms

1. State Management: Each input's state is stored in the component's state.
2. Handling Changes: Use onChange to detect input changes.
3. Submission: Utilize onSubmit for form submissions and prevent default with event.preventDefault().
4. Validation: Implement custom validation or use third-party libraries.

33. Use Ref

1. useRef allows access to DOM elements and retains mutable values without re-renders.
2. Used with the ref attribute for direct DOM interactions.
3. Can hold previous state or prop values.
4. Not limited to DOM references; can hold any value.
5. Refs can be passed as props also

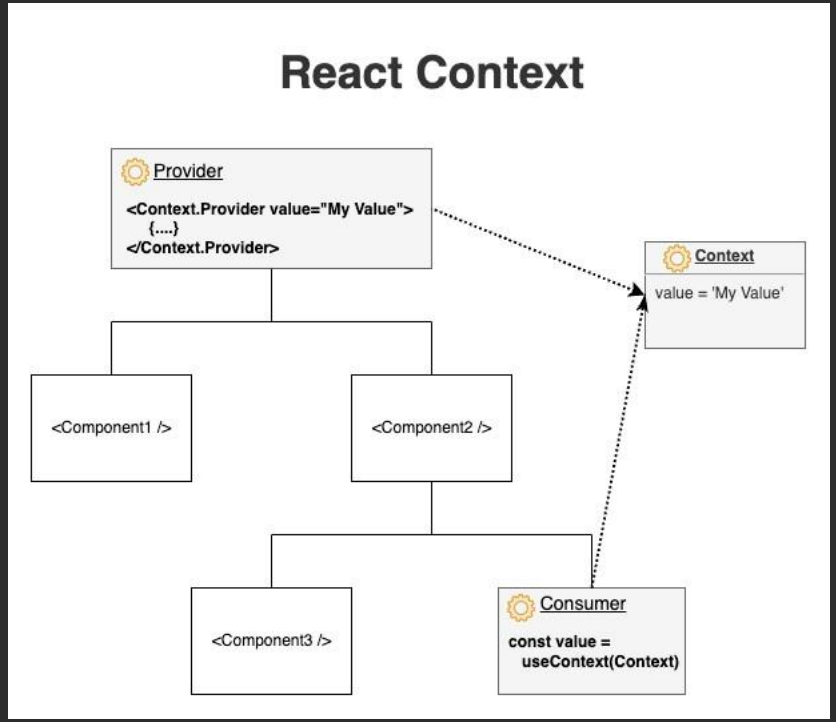


34. Update state from Previous State

- **Spread Operator**: Use to maintain immutability when updating arrays or objects.
- **Functional Updates**: Use (existingPosts) => [postData, ...existingPosts] to avoid stale values during asynchronous updates.

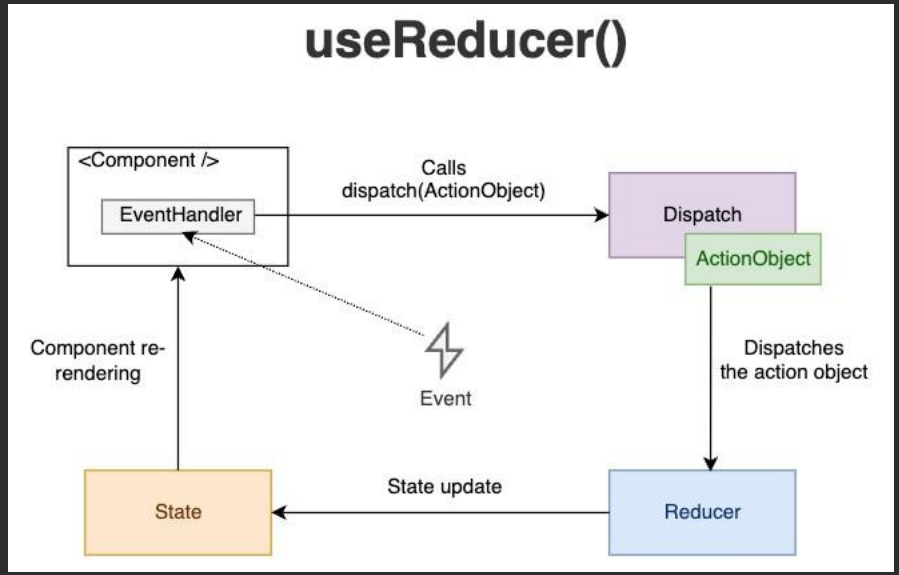
35. Context API

1. Prop Drilling: Context API addresses prop drilling; component composition is an alternative.
2. Folder Setup: Use a store folder for context files.
3. Initialization: Use React.createContext with initial state and export it.
4. Provider: Implement with contextName.Provider in components.
5. Access Value: Use the useContext hook.
6. Dynamic Data: Combine context value with state.
7. Export Functions: Context can also export functions for actions
8. Logic Separation: This helps keep the UI and business logic separate from each other.

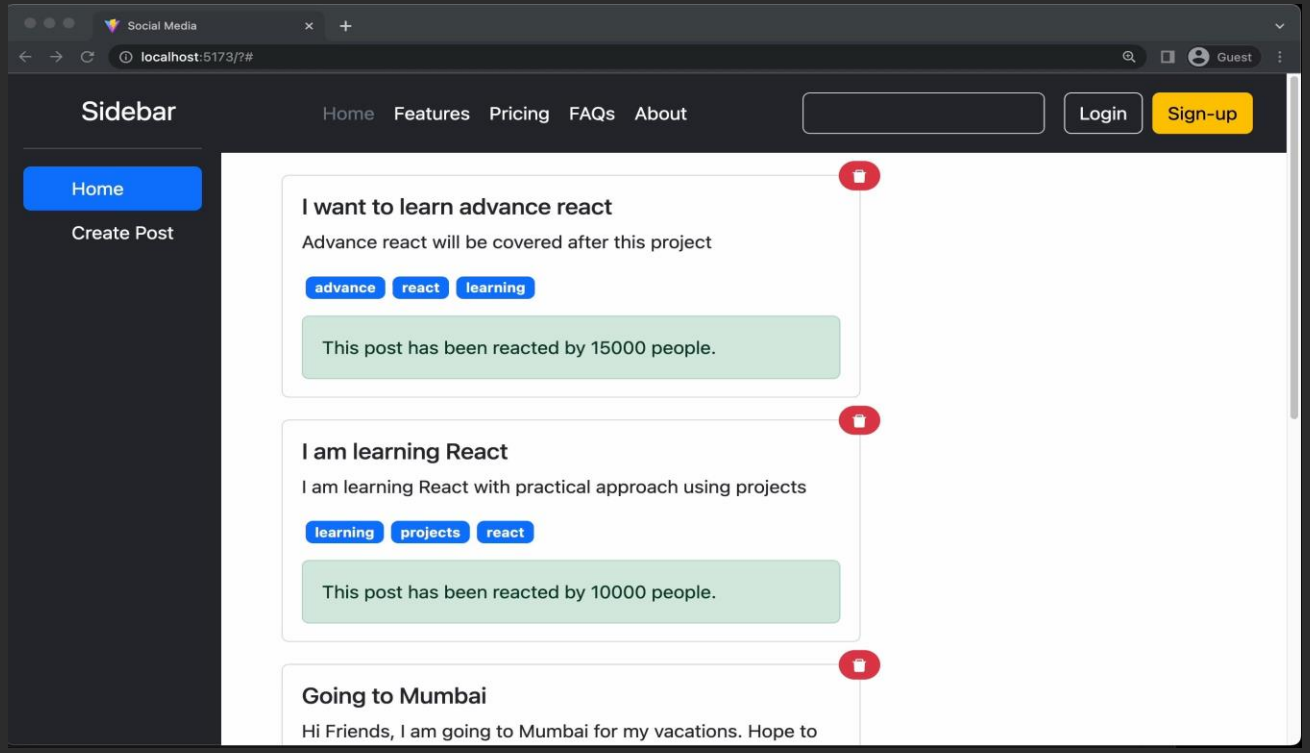


36. Use Reducer

1. useReducer is a hook in React that offers more control over state operations compared to useState, especially for complex state logic.
2. Components: It involves two main components:
   - Reducer: A pure function that takes the current state and an action and returns a new state.
   - Action: An object describing what happened, typically having a type property.
3. Initialization: It's invoked as const [state, dispatch] = useReducer(reducer, initialState).
4. Dispatch: Actions are dispatched using the dispatch function, which invokes the reducer with the current state and the given action.
5. Use Cases: Particularly useful for managing state in large components or when the next state depends on the previous one.
6. Predictable State Management: Due to its strict structure, it leads to more predictable and maintainable state management.



Project: Social Media



37. Introducing Dummy API

DummyJSON

Get dummy/fake JSON data to use as placeholder in development or in prototype testing.

View on GitHub | Read Docs

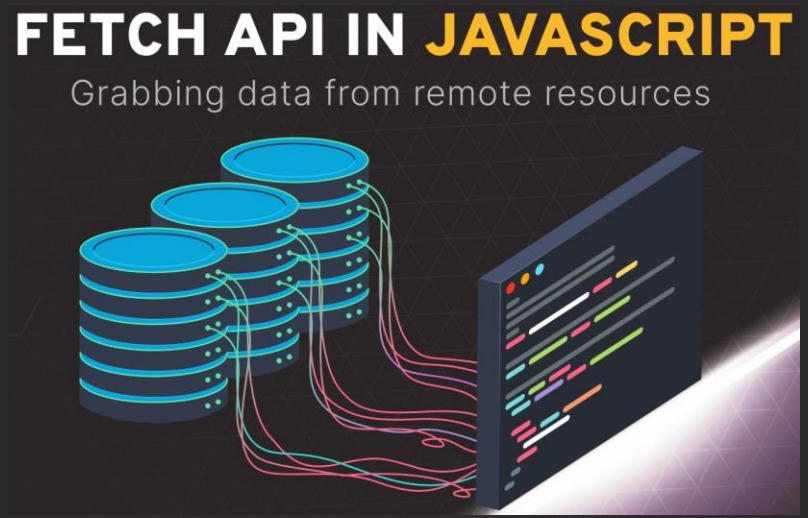

```
{
  "id": 11,
  "title": "perfume Oil",
  "description": "Mega Discount, Impression of A...",
  "price": 13,
  "discountPercentage": 8.4,
  "rating": 4.26,
  "stock": 65,
  "brand": "Impression of Acqua Di Gio",
  "category": "fragrances",
  "thumbnail": "https://i.dummyjson.com/data/products/11/thumbnail.jpg",
  "images": [
    "https://i.dummyjson.com/data/products/11/1.jpg",
    "https://i.dummyjson.com/data/products/11/2.jpg",
    "https://i.dummyjson.com/data/products/11/3.jpg",
    "https://i.dummyjson.com/data/products/11/thumbnail.jpg"
  ]
}
```


perfume Oil — fragrances

13$ — ★ 4.26

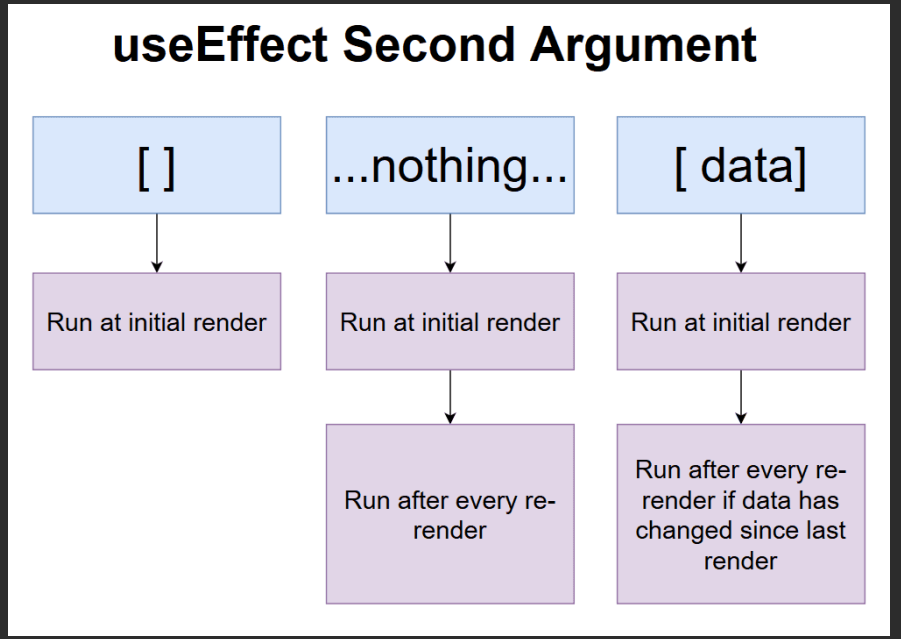
38. Data fetching using Fetch

1. fetch: Modern JavaScript API for network requests.
2. Promise-Based: Returns a Promise with a Response object.
3. Usage: Default is GET. For POST use method: 'POST'
4. Response: Use .then() and response.json() for JSON data.
5. Errors: Doesn't reject on HTTP errors. Check response.ok.
6. Headers: Managed using the Headers API.



39. The useEffect Hook

1. In function-based components, useEffect handles side effects like data fetching or event listeners.
2. useEffect runs automatically after every render by default.
3. By providing a dependency array, useEffect will only run when specified variables change. An empty array means the effect runs once.
4. Multiple useEffect hooks can be used in a single component for organizing different side effects separately.



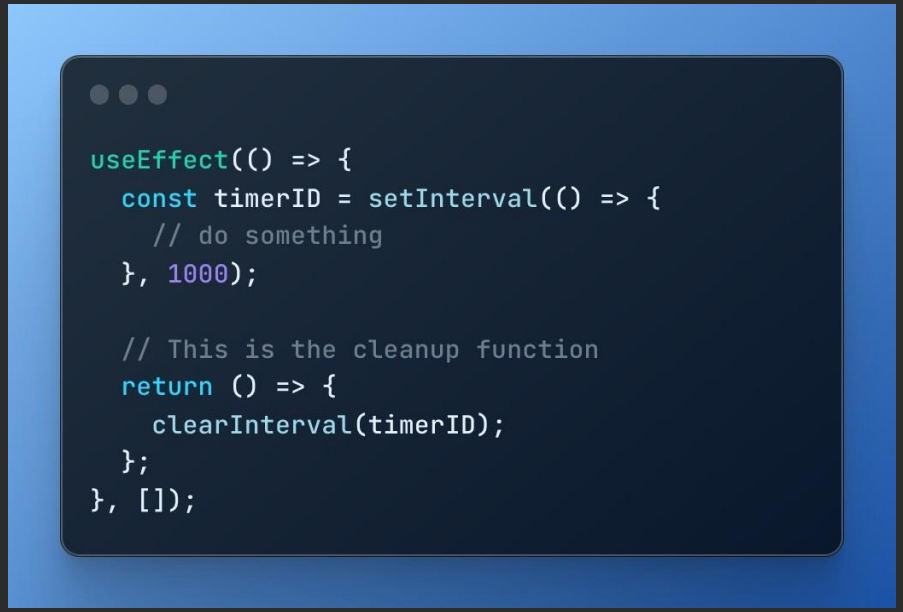
39. More About useEffect Hook

The useEffect hook becomes important when your component needs to **react to changes**, **interact with external systems**, or **perform side effects** like:

- Fetching data from an API
- Setting up a subscription (e.g. WebSocket)
- Listening to window events (scroll, resize)
- Updating the document title or localStorage
- Handling timers (setInterval, setTimeout)

40. Handling Loading State

41. The useEffect Hook Cleanup



```
useEffect(() => {
  const timerID = setInterval(() => {
    // do something
  }, 1000);

  // This is the cleanup function
  return () => {
    clearInterval(timerID);
  };
}, []);
```

Returning a function from `useEffect` allows for cleanup, ideal for removing event listeners.

42. Advanced useEffect

Junior

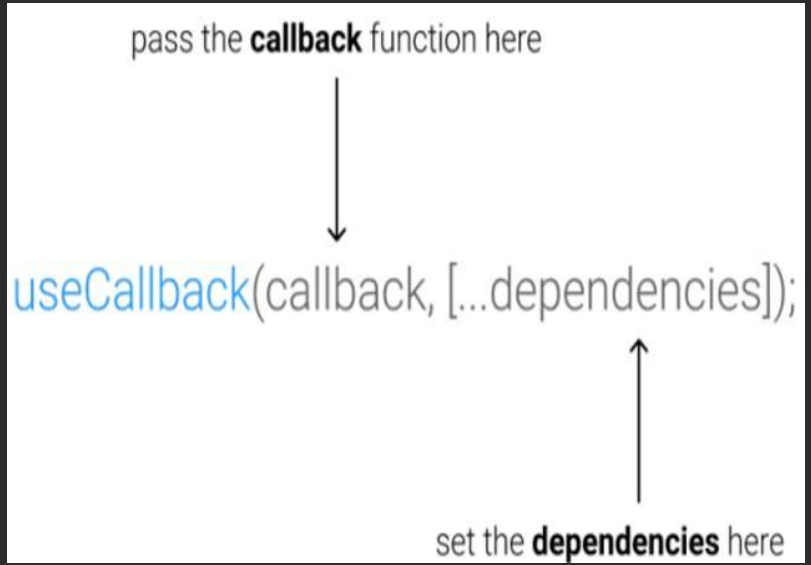
```
useEffect(() => {
  fetch(`/api/users/${id}`)
    .then((res) => res.json(
    .then((data) => {
      setUser(data);
    });
}, [id]);
```

Pro

```
useEffect(() => {
  const controller = new AbortController();
  const signal = controller.signal;

  fetch(`/api/users/${id}`, { signal })
    .then((res) => res.json())
    .then((data) => {
      setUser(data);
    });

  return () => {
    controller.abort();
  };
}, [id]);
```

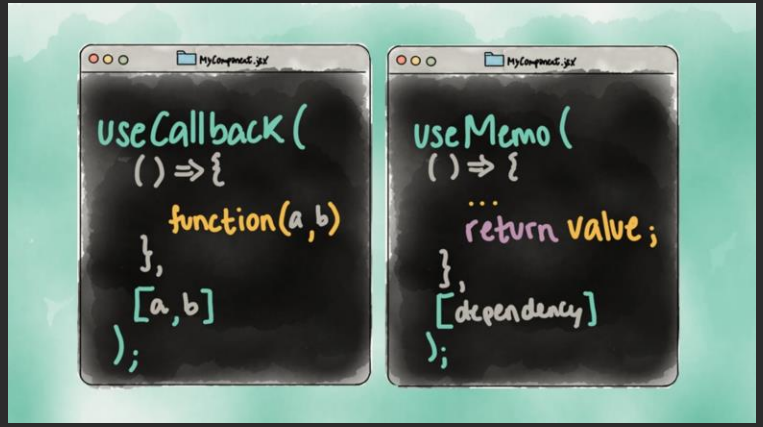
43. The useCallback Hook

1. Memoization: Preserves function across renders to prevent unnecessary re-renders.
2. Optimization: Enhances performance in components with frequent updates.
3. Dependency Array: Recreates the function only when specific dependencies change.
4. Event Handlers: Used to keep consistent function references for child components.
5. With useEffect: Prevents infinite loops by maintaining function references.



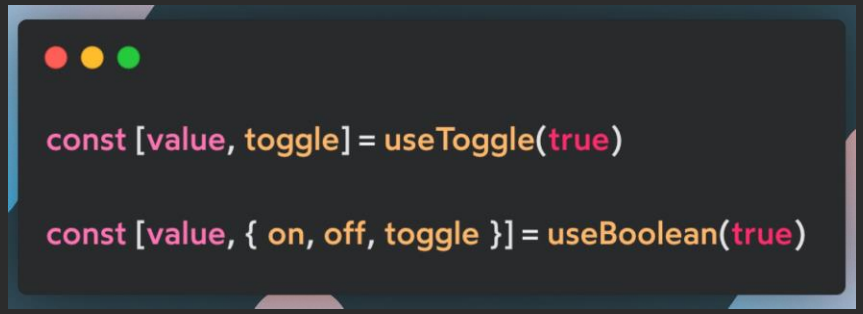
44. The useMemo Hook

1. Memoization: useMemo caches the result of expensive calculations to enhance performance.
2. Re-computation: Only re-computes the memoized value when specific dependencies change.
3. Optimization: Helps prevent unnecessary recalculations, improving component rendering efficiency.
4. Dependency Array: Uses an array of dependencies to determine when to recompute the cached value.
5. Comparison with useCallback: While useCallback memoizes functions, useMemo memoizes values or results of functions.
6. Best Use: Ideal for intensive computations or operations that shouldn't run on every render.



45. Custom Hooks

1. Reusable Logic: Custom hooks allow you to extract and reuse component logic across multiple components.
2. Naming Convention: Typically start with "use" (e.g., useWindowSize, useFetch).
3. Combining Hooks: Custom hooks can combine multiple built-in hooks like useState, useEffect, and others.
4. Sharing State: Enables sharing of stateful logic without changing component hierarchy.
5. Isolation: Helps in isolating complex logic, making components cleaner and easier to maintain.
6. Custom Return Values: Can return any value (arrays, objects, or any other data type) based on requirements.

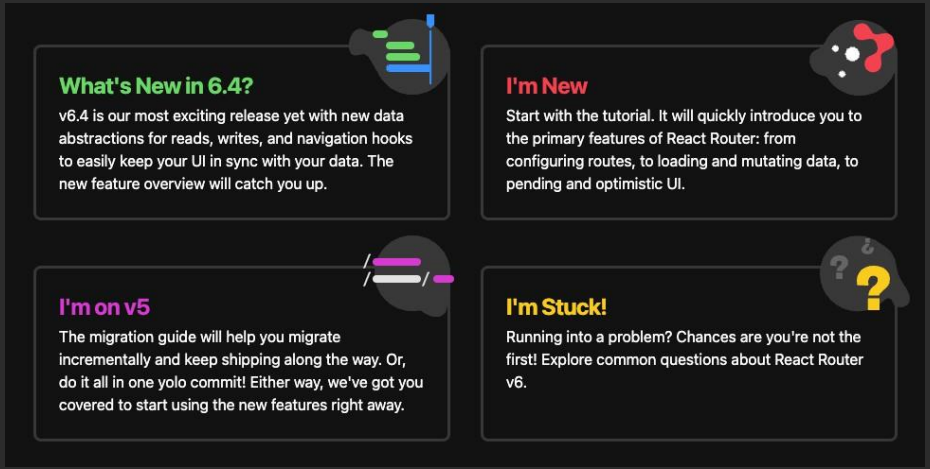


46. Submitting data with Fetch

```
fetch('http://example.com/users.json', { // http path (Endpoint)
headers: { "Content-Type": "application/json; charset=utf-8" }, //Headers
method: 'POST', // Method, which is the type of request we want to make
body: JSON.stringify({ //Data we want to send to our database
    username: 'Jorge',
    email: 'jorge@example.com',
})
})
.then(response => response.json()) //Defines the response type
.then(data => console.log(data)); //Gets the response type
```

47. React Router

1. Installation: Use npm install react-router-dom.
2. We are going to use the latest version which is 6+
3. RouterProvider: Wraps the app for routing capabilities.
4. createBrowserRouter: helps creating the mapping for router provider.
5. Declarative Routing: Easily define application routes.
6. Routes are React components.



48. Layout Routes

```
export default function Router() {
  return useRoutes([
    {
      path: '/dashboard',
      element: <DashboardLayout />,
      children: [
        { element: <Navigate to="/dashboard/app" replace /> },
        { path: 'app', element: <DashboardApp /> },
        { path: 'user', element: <User /> },
        { path: 'products', element: <Products /> },
        { path: 'blog', element: <Blog /> }
      ]
    },
    {
      path: '/',
```

1. Layout Routes help us to use shared elements
2. Outlet component is used to render the children at the correct places

49. Route Links

```
import { useNavigate } from "react-router-dom"; // v6

const Component = () => {
    // Triggers re-renders on every path change
    const navigate = useNavigate();
    ...
}
```

1. Link Component with to property can be used to avoid reloading
2. useNavigate hook can be used to do navigation programmatically.

50. Data fetching using loader

1. Loader method can be used to load data before a particular route is executed.
2. The loader method must return the data that is loaded or promise.
3. Data is available in component and all the child components.
4. useLoaderData hook can be used to get the fetched data.
5. Loading state can also be used.

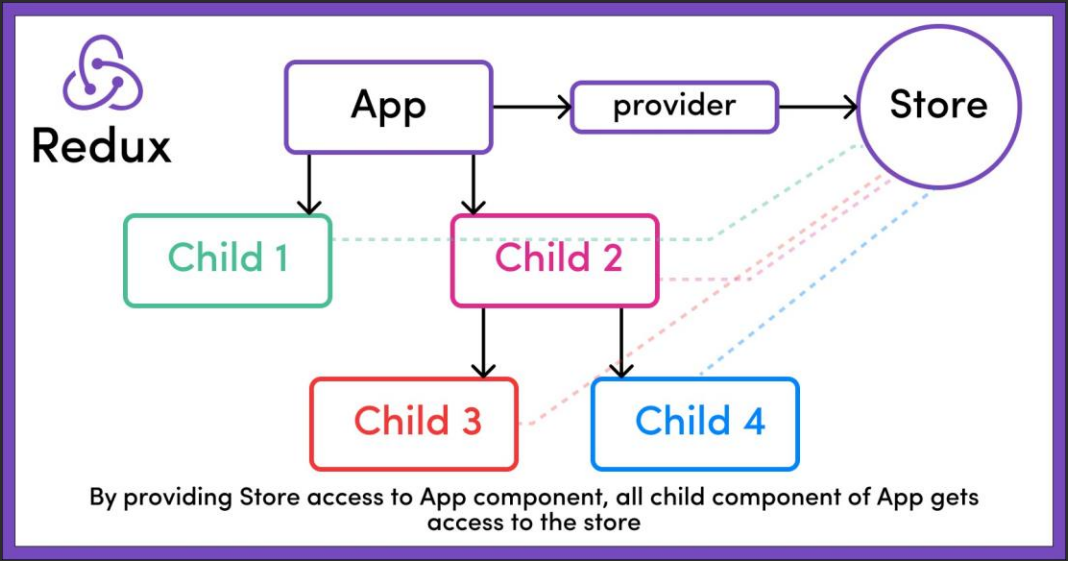
PageB.jsx

```jsx
import { useLoaderData } from 'react-router-dom'

export function loader() {
  return fetch("/api/data")
    .then(response => response.json());
}

export default function PageB() {
  const data = useLoaderData();
  // use the data accordingly
}
```

51. Submitting data using action

1. Action method can be used to perform an action on submission of Forms.
2. Custom Form component need to be used along with name attribute for all inputs.
3. Action function will get an data object. To generate correct request object method="post" attribute should be used.
4. Data.request.formData() method can be used to get form data Object.
5. Object.fromEntries(formData) can be used to get actual input data.
6. redirect() response can be returned for navigation after submission.

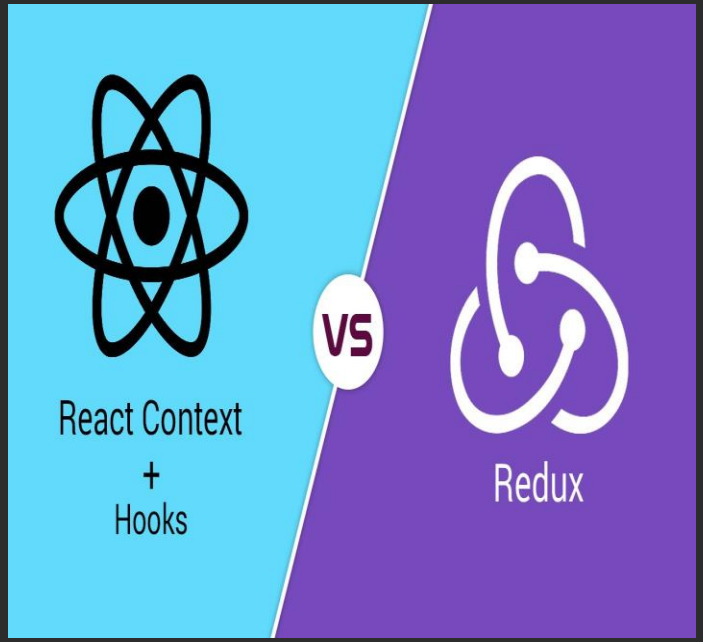
52. What is Redux



1. State management for cross component or app-wide state.
2. Redux is a predictable state management library for JavaScript apps.
3. Local State vs Cross-component state vs App-Wide state
4. useState or useReducer vs useState with prop drilling vs useState or useContext or Redux.

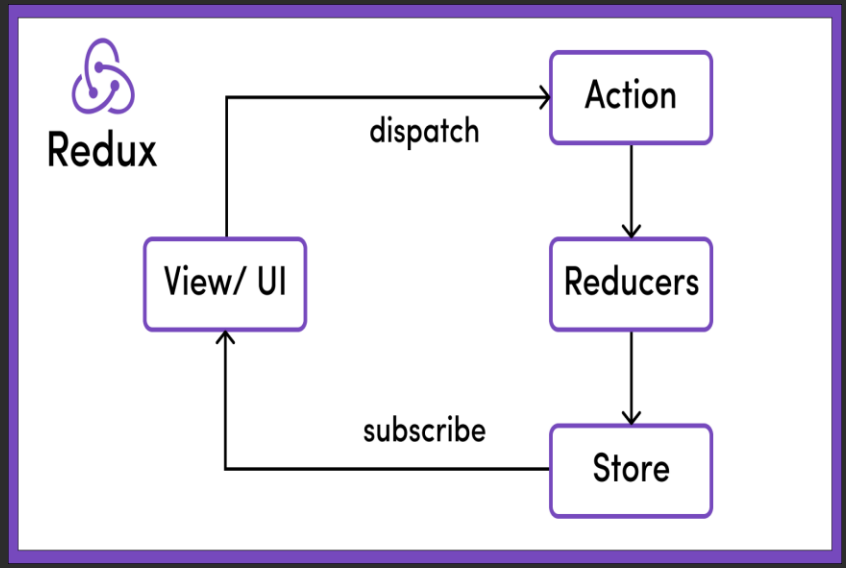
53. React-Context vs Redux

1. You can use both.
2. Setup and Coding is tough especially if you have multiple context providers.
3. Performance is slow. Context should only be used for things that rarely change. On the other hand Redux has great performance.
4. If these things don't matter to you then you can choose not to use redux and stay with React-Context.



54. How Redux Works

1. Single Source: Uses a single central store to maintain the entire application's state.
2. Actions: Components never directly change the store. Changes to state are made through dispatched actions, which describe events.
3. Reducers: Actions are processed by reducers, pure functions that return the new state.
4. Immutable: State is immutable; every change results in a new state object.
5. This is different from useReducer hook.



55. Working with Redux

1. npm init –y
2. npm install redux
3. import in node Const redux = require('redux');
4. We need to setup all 4 basic things:
    1. Reducer
    2. Store
    3. Subscriber
    4. Actions
5. Node redux-demo.js command to run node server

56 React with Redux

1. Npm install redux
2. Npm install react-redux
3. Create store folder with Index.js file
4. Creating the store using
   Import {createStore} from redux.
5. Providing the store with react
   1. Provider from react-redux
   2. <Provider store={store}><App /></Provider>
6. Using the store
   1. useSelector hook gets a slice of the store.
      Const counter = useSelector(state => state.counter);
   2. Subscription is already setup and only will re-execute when only your slice is changed. Subscription is automatically cleared also.
7. Dispatch Actions using the useDispatch hook.

57. Why Redux Toolkit

1. Action types are difficult to maintain.
2. Store becoming too big.
3. Mistakenly editing store.
4. Reducer becoming too big.

58 Working with Redux Toolkit

1. Npm install @reduxjs/toolkit
2. Remove redux from package.json
3. Import {createSlice} from “@reduxjs/toolkit”
4. Slices of the store can be created using the following syntax:

```
Const slice = createSlice({
  name: '',
  initialState: {},
  reducers: {
    smallReducerMethods: (state, action) => {
    },
  }
})
```

5. ConfigureStore combines multiple reducers and can be used as:

```
configureStore({
  reducer: {name: slice.reducer}
})
```

6. Export actions = slice.actions;
7. Actions can be dispatched like: actions.reducerMethod(payload);

About Me

💬 Let's Connect

I'd love to hear from you, collaborate, or simply connect over tech and ideas. Feel free to explore more or reach out through the links below.

🌐 Portfolio 🐱 GitHub 🔗 Linkedin 🦿 Instagram

👨💻 Keep Learning. Keep Building.

Thanks again for reading — wishing you continued success and growth in your development journey!

— Rishabh Singh