State vs useState - Complete Interview Guide 🎯

📌 PART 1: STATE என்றால் என்ன? (What is STATE?)

🎯 Definition (Tamil Explanation)

State என்பது React component-ல உள்ள **data storage** மாதிரி.

எளிய தமிழில்:

- Component-க்கு **memory** மாதிரி
- Data-வை **remember** பண்ணும்
- Data மாறும் போது **screen automatically update** ஆகும்

Interview-ல சொல்ல வேண்டியது:

> "State is a built-in React object that holds data or information about the component. When the state changes, the component re-renders to reflect those changes in the UI."

🔥 State-ஓட முக்கிய Features (In-Depth)

1. State is Mutable (மாற்ற முடியும்)

```
javascript

// State மாறலாம்
Initial state: count = 0
After update: count = 1
After update: count = 2
```

Interview Point:

> "Unlike props which are immutable, state is mutable - meaning it can be changed within the component itself."

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2. State Triggers Re-render (மறுபடியும் render ஆகும்)

```
javascript

State changes → React detects change → Component re-renders → UI updates
```

Interview Point:

> "State updates trigger a re-render cycle. React compares the previous state with the new state using shallow comparison, and if different, it schedules a re-render."

Deep Dive:

```javascript
function Counter() {
  const [count, setCount] = useState(0);
  console.log('Component rendered'); // This runs every time state changes

  return <button onClick={() => setCount(count + 1)}>{count}</button>;
}
```

என்ன நடக்குது:

1. User button-ஐ click செய்றாங்க
2. `setCount` call ஆகுது
3. React schedule பண்ணுது re-render-ஐ
4. Component function மறுபடியும் run ஆகுது
5. New value screen-ல display ஆகுது

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3. State is Component-Specific (ஒவ்வொரு component-க்கும் தனி state)

```javascript
function Counter() {
  const [count, setCount] = useState(0);
  return <h1>{count}</h1>;
}

// Usage
<Counter />  // count = 0 (own state)
<Counter />  // count = 0 (own state - independent)
<Counter />  // count = 0 (own state - independent)
```

Interview Point:

> "Each component instance maintains its own separate state. State is local and encapsulated to that component instance."

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4. State is Asynchronous (உடனடியாக மாறாது)

```javascript
function Counter() {
  const [count, setCount] = useState(0);

  const increment = () => {
    setCount(count + 1);
    console.log(count); // Still shows 0! Not 1!
  };
}
```

ஏன்?

- React **batches** multiple state updates for performance
- State update-க்கு **time** எடுக்கும்
- Immediate-ஆ access பண்ண முடியாது

Interview Point:

> "State updates are asynchronous. React batches multiple setState calls for performance optimization. You cannot access the updated state immediately after calling setState."

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5. State Persists Between Renders (renders-க்கு இடையில் value மறையாது)

```javascript
// First render: count = 0
// User clicks button
// Second render: count = 1 (retained!)
// Third render: count = 1 (still retained!)
```

Regular variable-ஓட difference:

```javascript
// Regular variable
let count = 0;  // Render 1: count = 0
count = 1;      // Render 2: count = 0 (reset!)

// State
const [count, setCount] = useState(0);  // Render 1: count = 0
setCount(1);                            // Render 2: count = 1 (retained!)
```

Interview Point:

> "State persists across re-renders. React maintains state in its internal data structure (fiber tree) and provides the same state value on subsequent renders."

🎯 எப்போது State Use பண்ணணும்?

Use State when: ✅ Data UI-ல காட்டனும்
✅ Data user interaction-ஆல மாறும்
✅ Data component lifecycle-ல persist ஆகனும்
✅ Data மாறும் போது UI update ஆகனும்

Examples:

- Form inputs (name, email, password)
- Counters (likes, views, cart items)
- Toggles (show/hide, light/dark mode)
- API response data
- User authentication status
- Modal open/close states

📊 State Types (எத்தனை வகை State?)

1. Local State (Component State)

```javascript
function MyComponent() {
  const [localData, setLocalData] = useState('');
  // Only this component can access
}
```

2. Lifted State (Shared between components)

```javascript
function Parent() {
  const [sharedData, setSharedData] = useState('');
  return (
    <>
      <Child1 data={sharedData} />
      <Child2 data={sharedData} />
    </>
  );
}
```

3. Global State (Entire app - using Context/Redux)

```javascript
// Available to all components
```

📌 PART 2: useState என்றால் என்ன? (What is useState?)

🎯 Definition (Deep Explanation)

useState என்பது ஒரு **React Hook**.

Hook என்றால் என்ன?

- React 16.8-ல வந்த feature
- Functional components-ல state use பண்ண allow பண்ணுது
- முன்னாடி class components மட்டும் state use பண்ண முடியும்

Interview-ல சொல்ல வேண்டியது:

> "useState is a React Hook that lets you add state to functional components. It was introduced in React 16.8. Before hooks, only class components could have state."

🔥 useState - Deep Dive

1. Syntax Breakdown

```javascript
const [state, setState] = useState(initialValue);
//    [1]     [2]         [3]       [4]
```

1. `state` - Current state value (read-only variable)

- இதை direct-ஆ மாற்ற கூடாது
- Read மட்டும் பண்ணலாம்

2. `setState` - Updater function

- State-ஐ மாத்த இதை use பண்ணனும்
- Direct mutation கூடாது

3. `useState` - The Hook itself

- React-லேர்ந்து import பண்ணனும்

- Function component-ல மட்டும் use பண்ணலாம்

4. **initialValue** - Starting value

- முதல் render-ல மட்டும் use ஆகும்
- Any data type (number, string, object, array, boolean)

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2. Array Destructuring (ஏன் இப்படி எழுதனும்?)

```javascript
// useState returns an array with 2 elements
const stateArray = useState(0);
// stateArray = [0, function]

// We use destructuring
const [count, setCount] = useState(0);
// count = stateArray[0]  // Current value
// setCount = stateArray[1]  // Updater function
```

Interview Point:

> "useState returns an array with two elements: the current state value and a setter function. We use array destructuring to assign meaningful names to these values."

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3. Naming Convention (மிக முக்கியம்!)

Standard Pattern:

```javascript
const [value, setValue] = useState(initial);
```

Rules:

1. First name = **descriptive noun** (what the data is)
2. Second name = **set + FirstName** (camelCase)

✅ **Good Examples:**

```javascript
```

```javascript
const [count, setCount] = useState(0);
const [name, setName] = useState('');
const [isVisible, setIsVisible] = useState(false);
const [isLoggedIn, setIsLoggedIn] = useState(false);
const [hasError, setHasError] = useState(false);
const [users, setUsers] = useState([]);
const [user, setUser] = useState({});
const [todos, setTodos] = useState([]);
const [theme, setTheme] = useState('light');
const [loading, setLoading] = useState(false);
```

❌ Bad Examples:

```javascript
const [count, updateCount] = useState(0);     // Don't use 'update'
const [name, changeName] = useState('');      // Don't use 'change'
const [x, y] = useState(0);                   // Not descriptive
const [data, setdata] = useState('');         // Wrong casing
const [isOpen, setopen] = useState(false);    // Wrong casing
```

Interview Point:

> "The naming convention is [stateName, setStateName]. The setter function should always be prefixed with 'set' followed by the state name in camelCase. This makes code more readable and maintainable."

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4. How useState Works Internally (உள்ளுக்குள்ள என்ன நடக்குது?)

```javascript
function Counter() {
  console.log('1. Component function called');
  const [count, setCount] = useState(0);
  console.log('2. useState executed, count =', count);

  const increment = () => {
    console.log('3. Button clicked, calling setCount');
    setCount(count + 1);
    console.log('4. setCount called, but count is still', count);
  };

  console.log('5. Returning JSX');
  return <button onClick={increment}>{count}</button>;
}
```

முதல் Render (First Render):

```
1. Component function called
2. useState executed, count = 0
5. Returning JSX
→ Button shows "0"
```

Button Click பண்ணும் போது:

```
3. Button clicked, calling setCount
4. setCount called, but count is still 0  (Async!)
1. Component function called (Re-render!)
2. useState executed, count = 1  (Updated value!)
5. Returning JSX
→ Button shows "1"
```

Interview Point:

> "On the first render, useState initializes the state with the provided initial value. On subsequent renders, useState returns the current state value from React's internal memory (fiber tree). When setState is called, React schedules a re-render, and on the next render, useState returns the updated value."

---

5. React's Memory System (எப்படி remember பண்ணுது?)

```javascript
function MyComponent() {
  const [name, setName] = useState('John');      // Hook 1
  const [age, setAge] = useState(25);            // Hook 2
  const [isActive, setIsActive] = useState(true); // Hook 3
}
```

React's Internal Array (Fiber Node):

```javascript
// React maintains:
fiber.memoizedState = [
  { state: 'John', setState: function },     // Hook 1
  { state: 25, setState: function },         // Hook 2
  { state: true, setState: function }        // Hook 3
]
```

Hook Call Order முக்கியம்:

```javascript
// ❌ WRONG - Order can change
function MyComponent({ condition }) {
  if (condition) {
    const [state1, setState1] = useState(0);  // Sometimes Hook 1
  }
  const [state2, setState2] = useState('');   // Sometimes Hook 1, sometimes Hook 2
}

// ✅ CORRECT - Order always same
function MyComponent({ condition }) {
  const [state1, setState1] = useState(0);    // Always Hook 1
  const [state2, setState2] = useState('');   // Always Hook 2

  if (condition) {
    // Use state here, don't declare here
  }
}
```

Interview Point:

> "React relies on the order of Hook calls to associate state with components. It uses a linked list structure in the fiber tree. This is why Hooks must be called at the top level and in the same order every render."

---

6. Update Methods (இரண்டு வழிகள்)

Method 1: Direct Update

```javascript
const [count, setCount] = useState(0);

setCount(5);          // Set to 5
setCount(count + 1);  // Current + 1
setCount(count * 2);  // Current * 2
```

எப்போது use பண்ணலாம்:

- Simple updates
- New value doesn't depend on old value
- Single update at a time

Method 2: Functional Update (Callback Form)

```javascript
const [count, setCount] = useState(0);

setCount(prev => prev + 1);      // Previous + 1
setCount(prev => prev * 2);      // Previous * 2
setCount(prev => prev - 5);      // Previous - 5
```

எப்போது use பண்ணனும்:

- New value depends on previous value
- Multiple updates in succession
- Inside async operations (setTimeout, API calls)
- To avoid stale closure issues

Problem Example:

```javascript
function Counter() {
  const [count, setCount] = useState(0);

  const incrementThreeTimes = () => {
    setCount(count + 1);  // count = 0, so 0 + 1 = 1
    setCount(count + 1);  // count still 0, so 0 + 1 = 1
    setCount(count + 1);  // count still 0, so 0 + 1 = 1
    // Final result: 1 (not 3!)
  };
}
```

Solution:

```javascript
```

```javascript
function Counter() {
  const [count, setCount] = useState(0);

  const incrementThreeTimes = () => {
    setCount(prev => prev + 1);  // 0 + 1 = 1
    setCount(prev => prev + 1);  // 1 + 1 = 2
    setCount(prev => prev + 1);  // 2 + 1 = 3
    // Final result: 3 ✅
  };
}
```

Interview Point:

> "Use functional updates when the new state depends on the previous state. The updater function receives the most recent state value, even if multiple updates are batched. This prevents stale state issues."

---

7. Lazy Initialization (முதல் render-ல மட்டும் expensive calculation)

Without Lazy Init:

```javascript
function ExpensiveComponent() {
  // This runs on EVERY render!
  const [data, setData] = useState(calculateExpensiveValue());

  return <div>{data}</div>;
}
```

With Lazy Init:

```javascript
function ExpensiveComponent() {
  // This runs ONLY ONCE on mount!
  const [data, setData] = useState(() => calculateExpensiveValue());

  return <div>{data}</div>;
}
```

Use Cases:

```javascript
```

```javascript
// Reading from localStorage
const [user, setUser] = useState(() => {
  const saved = localStorage.getItem('user');
  return saved ? JSON.parse(saved) : null;
});

// Complex calculations
const [data, setData] = useState(() => {
  return heavyProcessing();
});

// Creating initial large arrays/objects
const [items, setItems] = useState(() => {
  return Array(1000).fill().map((_, i) => ({ id: i }));
});
```

Interview Point:

> "Lazy initialization is an optimization technique where you pass a function to useState instead of a value. The function only runs once during the initial render, which is useful for expensive computations or reading from external storage."

📌 PART 3: STATE vs useState (வித்தியாசம் என்ன?)

🎯 Core Difference

STATE:

- Concept (கருத்து)
- The data itself
- Can exist in class or functional components

useState:

- Implementation (செயல்படுத்தும் வழி)
- A Hook to create state
- Only in functional components

📊 Detailed Comparison

javascript

```
// CLASS COMPONENT - STATE
class Counter extends React.Component {
  // STATE concept implemented using this.state
  state = { count: 0 };  // STATE (concept)

  increment = () => {
    this.setState({ count: this.state.count + 1 });
  };
}

// FUNCTIONAL COMPONENT - useState
function Counter() {
  // STATE concept implemented using useState Hook
  const [count, setCount] = useState(0);  // useState (implementation)

  const increment = () => {
    setCount(count + 1);
  };
}
```

🔥 Interview-க்கான Perfect Answer

Q: What's the difference between State and useState?

Perfect Answer:

> "State is a concept - it refers to the data that a React component maintains and can change over time. useState is a Hook - it's the tool we use to implement state in functional components.
> In class components, we use this.state and this.setState() to manage state. In functional components, we use the useState Hook. Both are implementing the same concept of 'state', but with different syntax. Think of it like this: 'State' is like saying 'storage', and 'useState' is like saying 'this specific box I'm using for storage'. The concept is the same, but the implementation differs."

📋 Feature Comparison Table

Feature	Class State (this.state)	useState Hook
Component Type	Class components	Functional components
Declaration	`this.state = { count: 0 }`	`const [count, setCount] = useState(0)`
Access	`this.state.count`	`count`
Update	`this.setState({ count: 1 })`	`setCount(1)`
Data Structure	Must be object	Any type
Merging	Auto-merges	Replaces completely
Multiple States	One object, multiple properties	Multiple separate useState calls

Feature	Class State (this.state)	useState Hook
Initialization	In constructor	During function call
Binding	Need to bind methods	No binding needed
Code Length	More verbose	Cleaner, concise

🎯 Side-by-Side Example

javascript

```
// ============================================
// CLASS COMPONENT - STATE CONCEPT
// ============================================
class UserProfile extends React.Component {
  constructor(props) {
    super(props);
    // State initialization
    this.state = {
      name: '',
      age: 0,
      email: ''
    };
  }

  updateName = (e) => {
    // State update (auto-merges)
    this.setState({ name: e.target.value });
    // age and email remain unchanged
  };

  render() {
    return (
      <div>
        <input
          value={this.state.name}
          onChange={this.updateName}
        />
        <p>Name: {this.state.name}</p>
        <p>Age: {this.state.age}</p>
      </div>
    );
  }
}

// ============================================
// FUNCTIONAL COMPONENT - useState HOOK
// ============================================
function UserProfile() {
  // State initialization (3 separate states)
  const [name, setName] = useState('');
  const [age, setAge] = useState(0);
  const [email, setEmail] = useState('');

  const updateName = (e) => {
    // State update
    setName(e.target.value);
```

```
  };

  return (
    <div>
      <input
        value={name}
        onChange={updateName}
      />
      <p>Name: {name}</p>
      <p>Age: {age}</p>
    </div>
  );
}
```

📌 PART 4: Advanced Interview Topics

🔥 1. State Updates are Batched

```
javascript

function Counter() {
  const [count, setCount] = useState(0);
  console.log('Rendered with count:', count);

  const handleClick = () => {
    setCount(count + 1);  // Schedule update
    setCount(count + 1);  // Schedule update
    setCount(count + 1);  // Schedule update
    // React batches these → Only ONE re-render!
  };

  return <button onClick={handleClick}>{count}</button>;
}
```

Interview Point:

> "React batches multiple state updates within the same event handler into a single re-render for performance. This is called 'batching'. In React 18, automatic batching extends to promises, setTimeout, and native event handlers."

🔥 2. State Immutability (மிக முக்கியம்!)

❌ Wrong Way - Mutation:

```
javascript
```

```javascript
const [user, setUser] = useState({ name: 'John', age: 25 });

// Direct mutation - React won't detect change!
user.age = 26;
setUser(user);  // Same reference, no re-render!
```

✅ Correct Way - Immutability:

```javascript
const [user, setUser] = useState({ name: 'John', age: 25 });

// Create new object
setUser({ ...user, age: 26 });  // New reference, triggers re-render!
```

Why Immutability?

- React uses **shallow comparison** (reference check)
- `oldState === newState` → No re-render
- `oldState !== newState` → Re-render
- Helps with performance optimization (React.memo, useMemo)

Interview Point:

> "State should be treated as immutable. React compares state by reference (Object.is). If you mutate state directly, the reference stays the same, so React won't detect the change. Always create new objects or arrays when updating state."

🔥 3. Multiple useState vs Single Object

```javascript
```

```javascript
// Approach 1: Multiple useState
function Form() {
  const [name, setName] = useState('');
  const [email, setEmail] = useState('');
  const [age, setAge] = useState(0);

  // Each update is independent
  setName('John');  // Only name changes
}

// Approach 2: Single Object
function Form() {
  const [formData, setFormData] = useState({
    name: '',
    email: '',
    age: 0
  });

  // Must spread previous state
  setFormData({ ...formData, name: 'John' });
}
```

When to use which:

- **Multiple useState:** Unrelated data, simple updates
- **Single Object:** Related data, form data, complex state

Interview Point:

> "There's no strict rule, but generally use multiple useState calls for unrelated pieces of state, and a single useState with an object for related state. Multiple states are simpler to update independently, while single objects are good for grouping related data like form fields."

🔥 4. Derived State (Calculate, Don't Store)

javascript

```
// ❌ Bad - Storing derived state
function ShoppingCart({ items }) {
  const [total, setTotal] = useState(0);

  // Bug-prone: Must manually sync
  const addItem = (item) => {
    setItems([...items, item]);
    setTotal(total + item.price);  // Easy to forget!
  };
}

// ✅ Good - Calculate derived state
function ShoppingCart({ items }) {
  // Automatically stays in sync
  const total = items.reduce((sum, item) => sum + item.price, 0);

  const addItem = (item) => {
    setItems([...items, item]);
    // Total automatically recalculates on next render
  };
}
```

Interview Point:

> "Don't store values in state that can be calculated from existing state or props. This is called 'derived state'. Calculating values keeps them in sync automatically and prevents bugs from forgetting to update multiple pieces of state."

📝 Quick Reference

State

- ✅ Concept of component data
- ✅ Can change over time
- ✅ Triggers re-renders
- ✅ Persists between renders
- ✅ Local to component

useState

- ✅ Hook to implement state
- ✅ Only in functional components
- ✅ Returns [value, setter]
- ✅ Naming: [thing, setThing]

- ✅ Supports all data types
- ✅ Updates are async

Key Rules

- ✅ Call hooks at top level
- ✅ Never mutate state directly
- ✅ Use functional updates for previous value
- ✅ Batch updates are automatic
- ✅ Keep state minimal

**இந்த guide-ல interview-க்கு வேண்டிய எல்லா points-ம் in-depth-ஆ cover பண்ணிருக்கேன்!