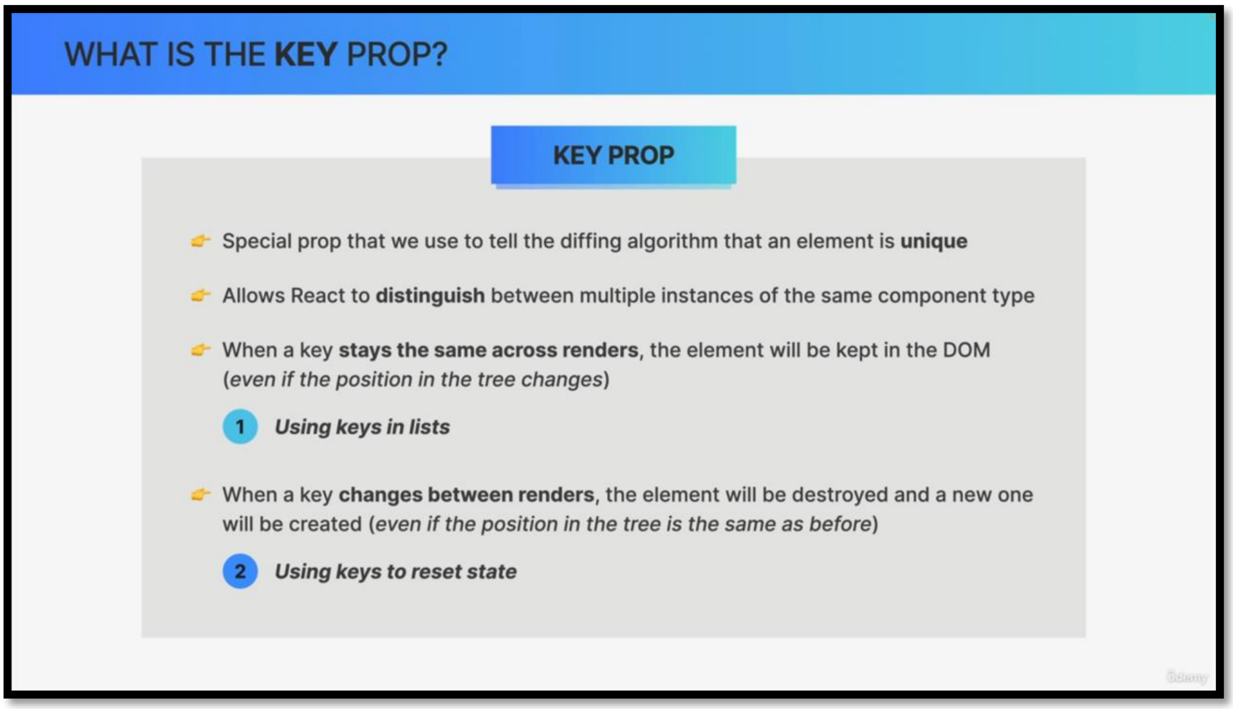
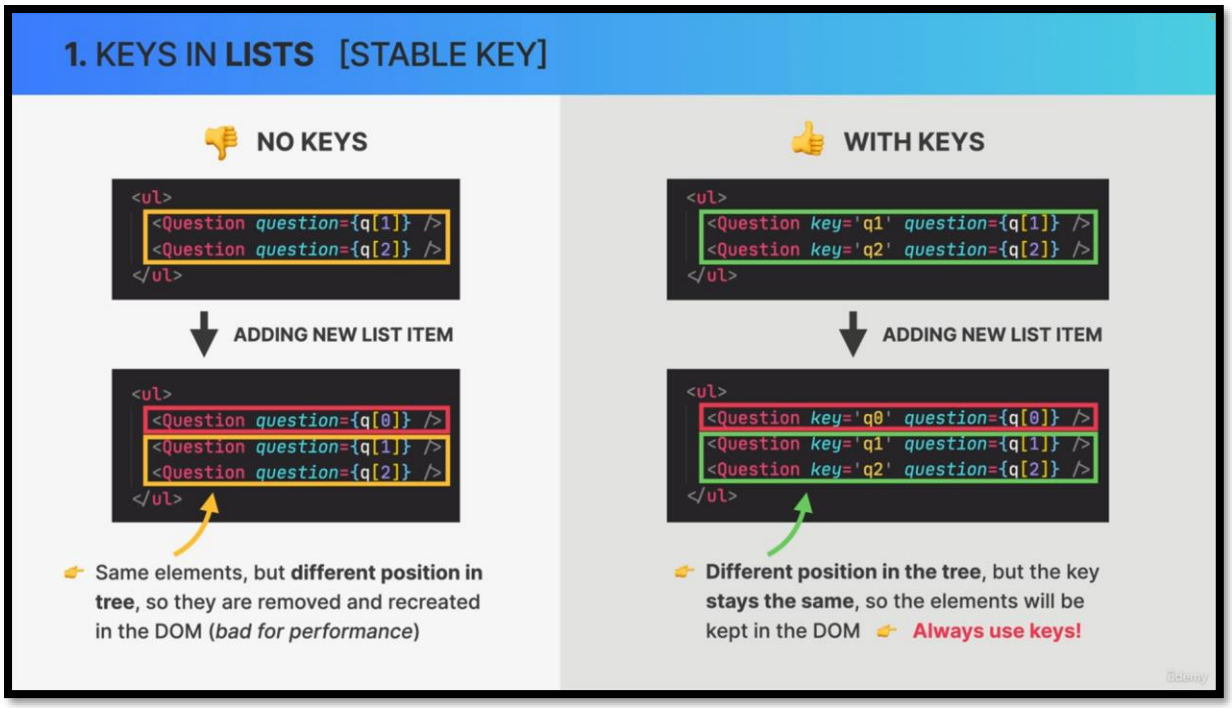


WHAT IS THE **KEY** PROP?

KEY PROP

- Special prop that we use to tell the diffing algorithm that an element is **unique**
- Allows React to **distinguish** between multiple instances of the same component type
- When a key **stays the same across renders**, the element will be kept in the DOM (*even if the position in the tree changes*)
  1. ***Using keys in lists***
- When a key **changes between renders**, the element will be destroyed and a new one will be created (*even if the position in the tree is the same as before*)
  2. ***Using keys to reset state***



1. KEYS IN **LISTS** [STABLE KEY]

NO KEYS

```
<ul>
  <Question question={q[1]} />
  <Question question={q[2]} />
</ul>
```

ADDING NEW LIST ITEM

```
<ul>
  <Question question={q[0]} />
  <Question question={q[1]} />
  <Question question={q[2]} />
</ul>
```

- Same elements, but **different position in tree**, so they are removed and recreated in the DOM (*bad for performance*)

WITH KEYS

```
<ul>
  <Question key='q1' question={q[1]} />
  <Question key='q2' question={q[2]} />
</ul>
```

ADDING NEW LIST ITEM

```
<ul>
  <Question key='q0' question={q[0]} />
  <Question key='q1' question={q[1]} />
  <Question key='q2' question={q[2]} />
</ul>
```

- **Different position in the tree**, but the key **stays the same**, so the elements will be kept in the DOM
- **Always use keys!**

we have a list with two question items which clearly have no key prop but let's see what happens when we add a new item to the top of the list.

The two list items that we already had are clearly still the same, but they will now appear at different positions in the React element tree. They're no longer the first and second children but now they are the second and the third children.

We basically have the same elements but at different positions in the tree.

According to the diffing rules these two DOM elements will be removed from the DOM and then immediately recreated at their new positions.

This is obviously bad for performance because removing and rebuilding the same dumb element is just wasted work. The thing is that React doesn't know that this is wasted work.

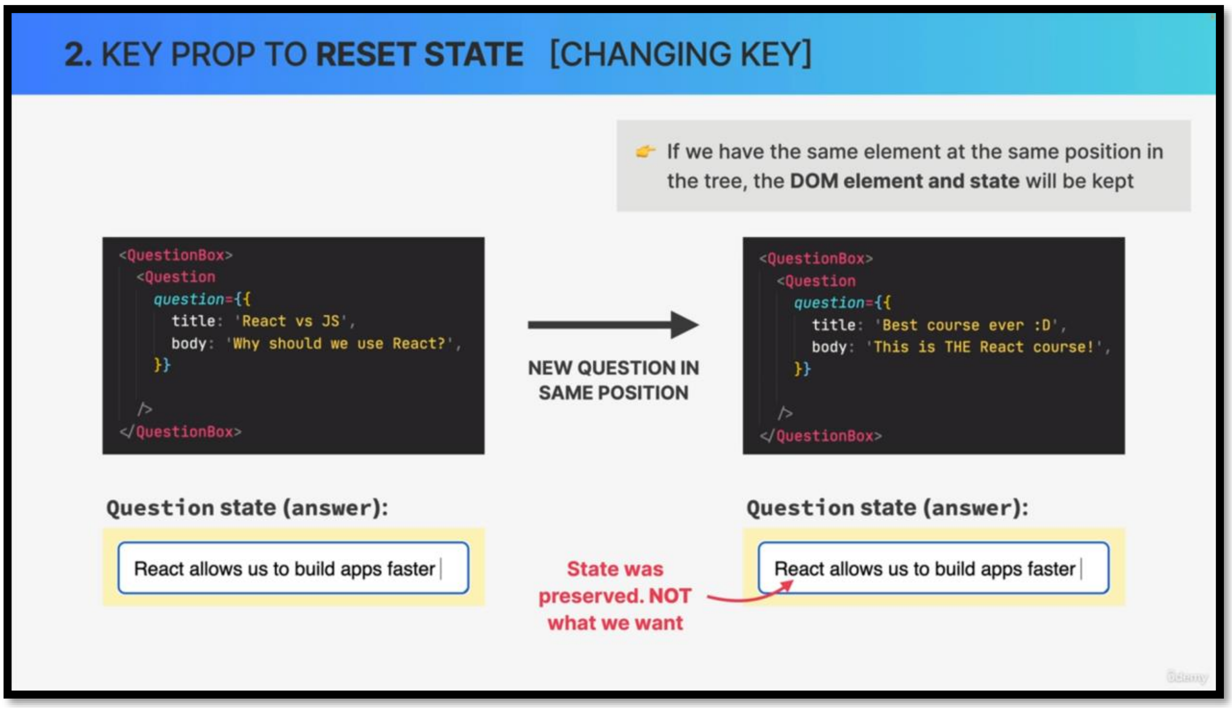
A key allows us developers to uniquely identify an element so we can give React that information that it doesn't have on its own.

When we add a new item to the top of the list, the two original elements are of course, still in different positions of the tree but they do have a stable key.

So, a key that stays the same across renders. So that's q1 and q2 in this case and according to the diffing rules, these two elements will now be kept in the DOM even though their position in the tree is different. So, they will not be destroyed.

Entry result will be a bit more of a performant UI. Now of course, you won't really notice this difference on small lists, but it will make a huge difference when you have a really big list with thousands of elements, which can actually happen in some applications.

So, in summary, always use the key prop when you have multiple child elements of the same type.



2. KEY PROP TO RESET STATE [CHANGING KEY]

👉 If we have the same element at the same position in the tree, the **DOM element and state** will be kept

```
<QuestionBox>
  <Question
    question={{
      title: 'React vs JS',
      body: 'Why should we use React?',
    }}
  />
</QuestionBox>
```

NEW QUESTION IN SAME POSITION

```
<QuestionBox>
  <Question
    question={{
      title: 'Best course ever :D',
      body: 'This is THE React course!',
    }}
  />
</QuestionBox>
```

Question state (answer):

React allows us to build apps faster

Question state (answer):

React allows us to build apps faster

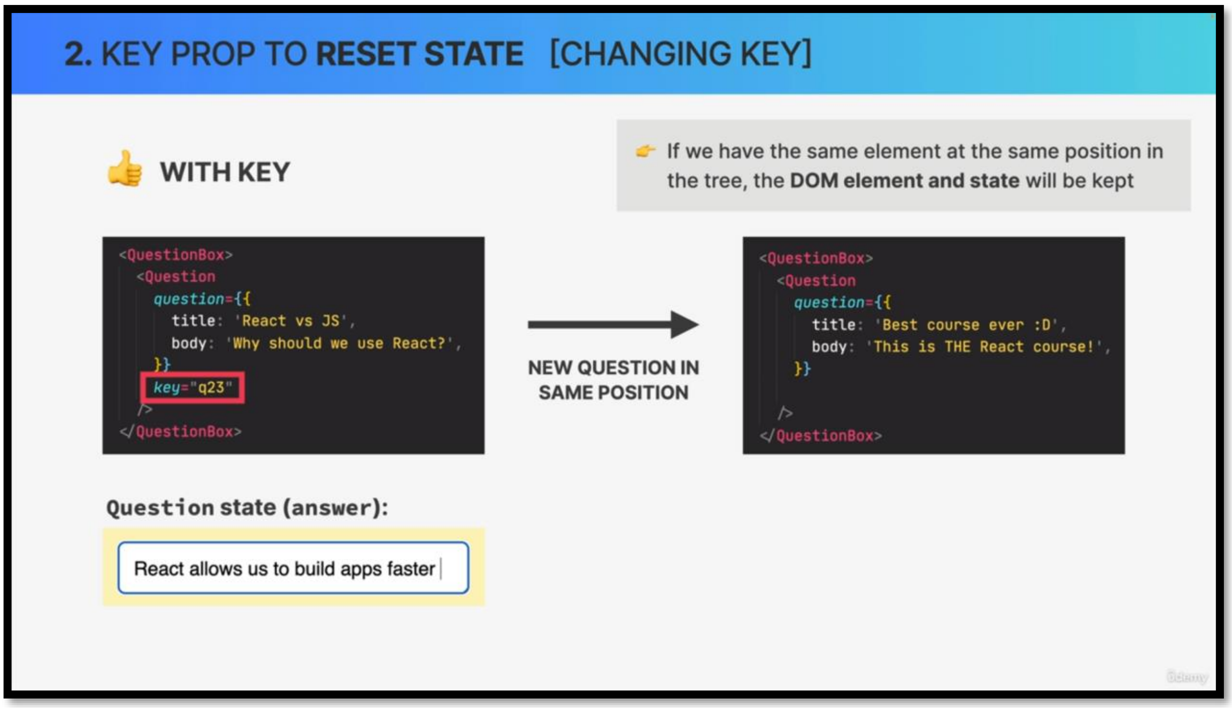
State was preserved. NOT what we want

Let's say we have this question, inside question box and we pass in this object as a prop. Now the question component instance has an answer state, which right now is set to React allows us to build apps faster.

Let's imagine that the question changes to another one. We still have the same element at the same position in the tree. All that changed was the question prop.

According to diffing rules if we have the same element at the same position in the tree, the DOM element and its state will be kept. Therefore, what's gonna happen is that the state of question will be preserved.

So, it will still show the answer that was in the component state before. But that answer is of course completely irrelevant to this new question it doesn't make any sense to keep this state around here. What we need is a way to reset this state.



2. KEY PROP TO **RESET STATE** [CHANGING KEY]

WITH KEY

If we have the same element at the same position in the tree, the **DOM element and state** will be kept

```
<QuestionBox>
  <Question
    question={{
      title: 'React vs JS',
      body: 'Why should we use React?',
    }}
    key="q23"
  />
</QuestionBox>
```

NEW QUESTION IN SAME POSITION

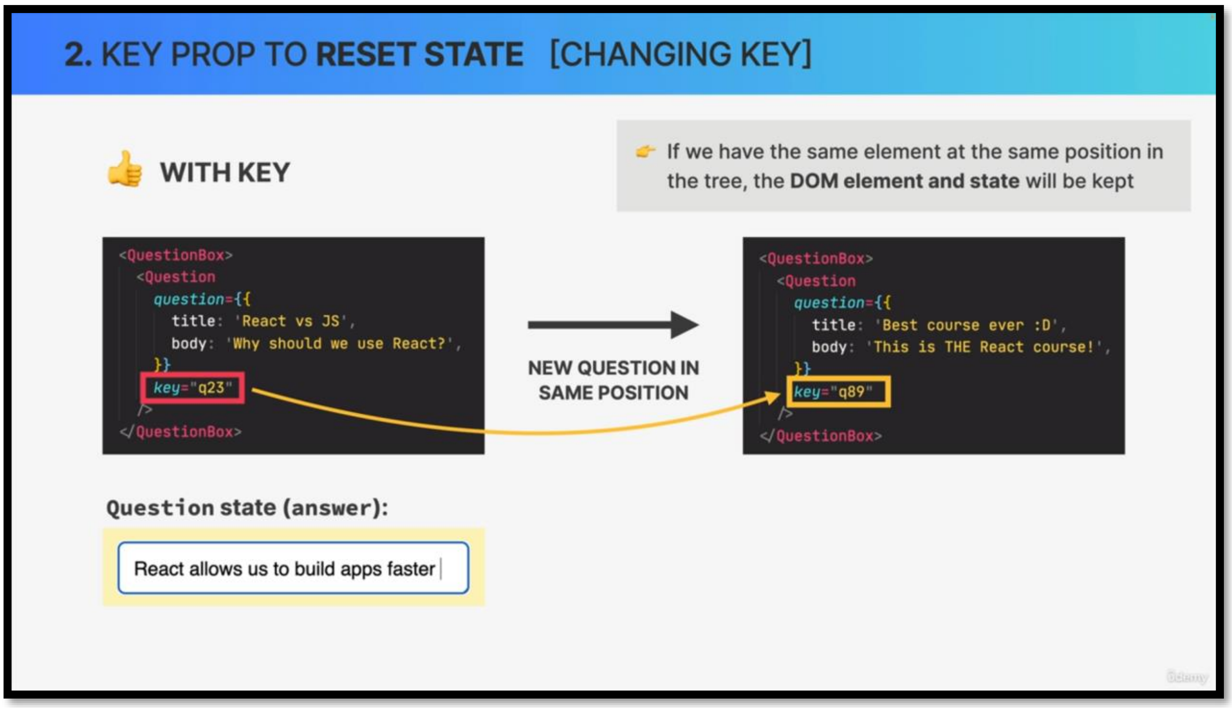
```
<QuestionBox>
  <Question
    question={{
      title: 'Best course ever :D',
      body: 'This is THE React course!',
    }}

  />
</QuestionBox>
```

Question state (answer):

React allows us to build apps faster

So now, we have a key of q23 in this first question, which allows React to uniquely identify this component instance.



2. KEY PROP TO RESET STATE [CHANGING KEY]

WITH KEY

If we have the same element at the same position in the tree, the **DOM element and state** will be kept

```
<QuestionBox>
  <Question
    question={{
      title: 'React vs JS',
      body: 'Why should we use React?',
    }}
    key="q23"
  />
</QuestionBox>
```

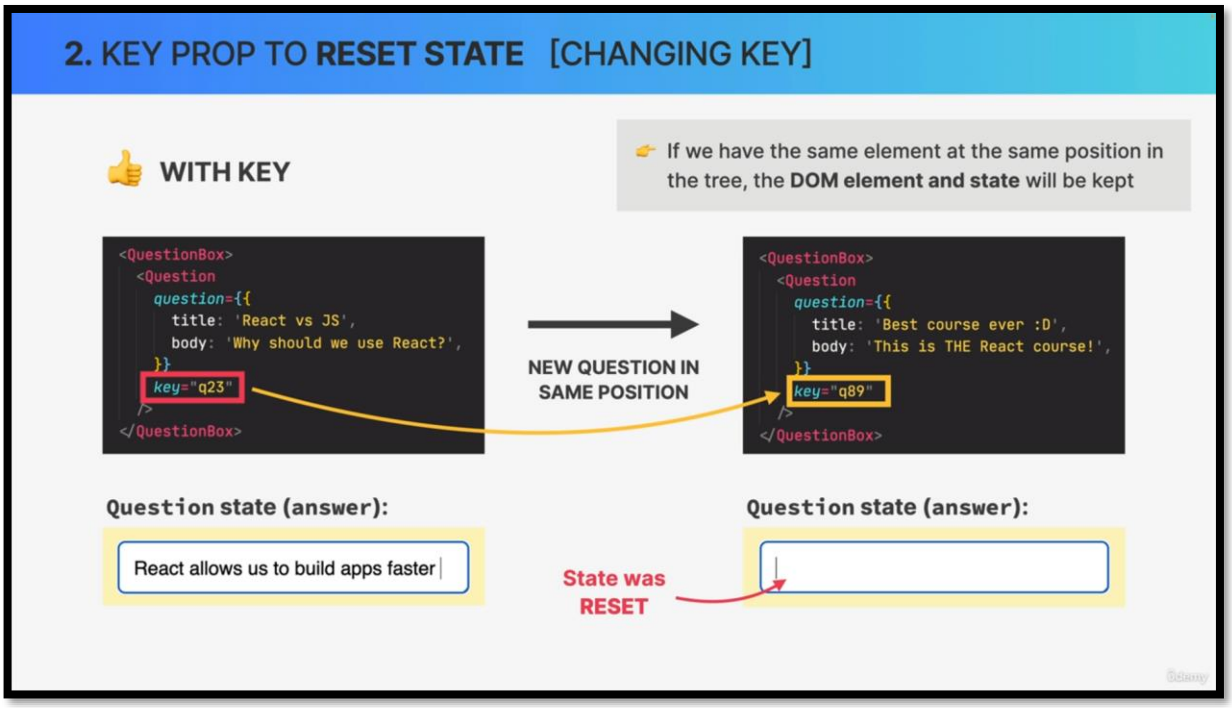
NEW QUESTION IN SAME POSITION

```
<QuestionBox>
  <Question
    question={{
      title: 'Best course ever :D',
      body: 'This is THE React course!',
    }}
    key="q89"
  />
</QuestionBox>
```

Question state (answer):

React allows us to build apps faster

When a new question appears, we can give it a different key and so by doing this, we tell React that this should be a different component instance and therefore, it should create a brand-new DOM element.



2. KEY PROP TO RESET STATE [CHANGING KEY]

WITH KEY

If we have the same element at the same position in the tree, the **DOM element and state** will be kept

```
<QuestionBox>
  <Question
    question={{
      title: 'React vs JS',
      body: 'Why should we use React?',
    }}
    key="q23"
  />
</QuestionBox>
```

NEW QUESTION IN SAME POSITION

```
<QuestionBox>
  <Question
    question={{
      title: 'Best course ever :D',
      body: 'This is THE React course!',
    }}
    key="q89"
  />
</QuestionBox>
```

Question state (answer):

React allows us to build apps faster

Question state (answer):

State was RESET

The result of doing this is that the state will be reset which is exactly what we need in the situation in order to make this small app work in a logical way.