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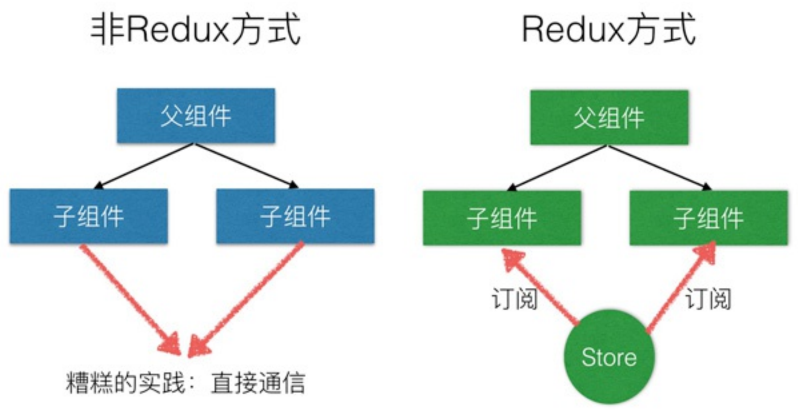
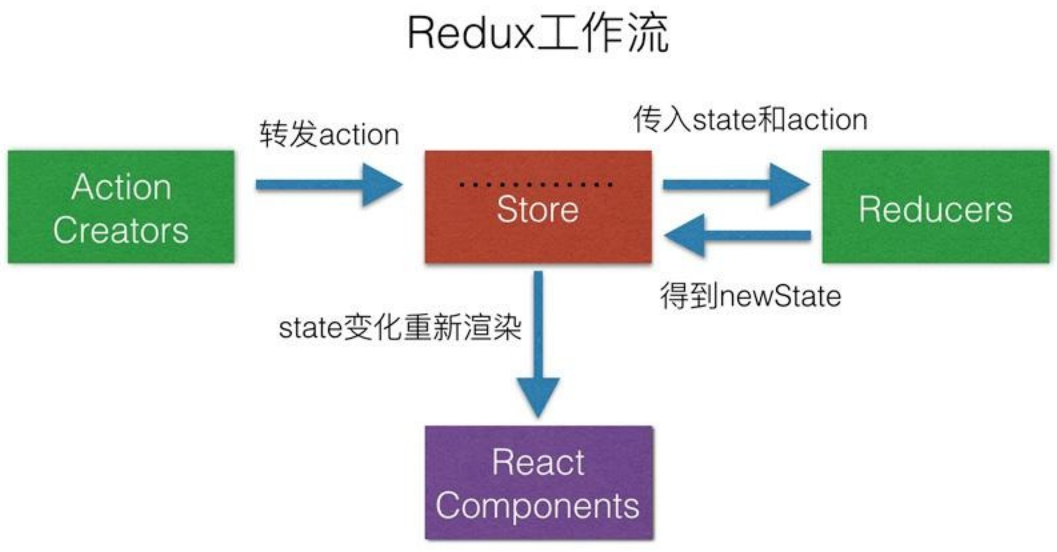
1. Redux应用场景

- 随着 JavaScript 单页应用开发日趋复杂,管理不断变化的 state 非常困难
- Redux的出现就是为了解决state里的数据问题
- 在React中，数据在组件中是单向流动的
- 数据从一个方向父组件流向子组件(通过props)，由于这个特征，两个非父子关系的组件（或者称作兄弟组件）之间的通信就比较麻烦



2. Redux设计思想

- Redux是将整个应用状态存储到到一个地方，称为store
- 里面保存一棵状态树state tree
- 组件可以派发dispatch行为action给store,而不是直接通知其它组件
- 其它组件可以通过订阅store中的状态(state)来刷新自己的视图



3. Redux三大原则

- 整个应用的 state 被储存在一棵 object tree 中，并且这个 object tree 只存在于唯一一个 store 中
- State 是只读的，惟一改变 state 的方法就是触发 action，action 是一个用于描述已发生事件的普通对象 使用纯函数来执行修改，为了描述action如何改变state tree ，你需要编写 reducers
- 单一数据源的设计让React的组件之间的通信更加方便，同时也便于状态的统一管理

4. 原生计数器

redux (https://github.com/reduxjs/redux)

4.1 index.html

```
<div id="counter">
  <p id="counter-value">0p>
  <button id="increment-btn">+button>
  <button id="decrement-btn">-button>
div>
```

4.2 index.js

```
import {createStore} from 'redux';
let counterValue = document.getElementById('counter-value');
let incrementBtn = document.getElementById('increment-btn');
let decrementBtn = document.getElementById('decrement-btn');

const INCREMENT='INCREMENT';
const DECREMENT = 'DECREMENT';
let initState = 0;
function reducer(state=initState,action){
    switch(action.type){
        case INCREMENT:
            return state + 1;
        case DECREMENT:
            return state - 1;
        default:
            return state;
    }
}
let store=createStore(reducer);
function render() {
    counterValue.innerHTML=store.getState();
}
store.subscribe(render);
render();
incrementBtn.addEventListener('click',function () {
    store.dispatch({type:INCREMENT});
});
decrementBtn.addEventListener('click',function () {
    store.dispatch({type:DECREMENT});
});
```

4.3 redux

4.3.1 index.js

src\redux\index.js

```
import createStore from './createStore'
export {
    createStore
}
```

4.3.2 createStore.js

src\redux\createStore.js

```
export default function createStore(reducer, preloadedState) {
  let currentState = preloadedState;
  let currentListeners = [];

  function getState() {
    return currentState;
  }

  function subscribe(listener) {
    currentListeners.push(listener);
    return function unsubscribe() {
      const index = currentListeners.indexOf(listener);
      currentListeners.splice(index, 1);
    };
  }

  function dispatch(action) {
    if (Object.getPrototypeOf(action) !== Object.prototype) {
      throw new Error(`动作必须是一个纯对象，如果想进行异步操作请使用中间件`);
    }
    if (typeof action.type === "undefined") {
      throw new Error(`动作不能一个值为undefined的type属性`);
    }

    currentState = reducer(currentState, action);
    for (let i = 0; i < currentListeners.length; i++) {
      const listener = currentListeners[i];
      listener();
    }

    return action;
  }
  dispatch({ type:'@@redux/INIT' });
  return {
    dispatch,
    subscribe,
    getState
  };
}
```

5. React计数器

- 使用React实现一个计数器

```
import React, { Component } from 'react';
import { createStore } from '../redux';
function reducer(state=0,action){
    switch(action.type){
        case 'INCREMENT':
            return state + 1;
        case 'DECREMENT':
            return state - 1;
        default:
            return state;
    }
}
const store = createStore(reducer,0);
export default class Counter extends Component {
    constructor(props) {
        super(props);
        this.state = { value: 0 };
    }
    componentDidMount() {
        this.unsubscribe = store.subscribe(() => this.setState({ value: store.getState() }));
    }
    componentWillUnmount() {
        this.unsubscribe();
    }
    render() {
        return (
            <div>
                <p>{this.state.value}p>
                <button onClick={() => store.dispatch({ type: 'INCREMENT' })}>+button>
                <button onClick={() => store.dispatch({ type: 'DECREMENT' })}>-button>
                <button onClick={
                    () => {
                        setTimeout(() => {
                            store.dispatch({ type: 'INCREMENT' })
                        }, 1000);
                    }
                }>1秒后加1button>
            div>
        )
    }
}
```

6. bindActionCreators.js

6.1 Counter.js

```
import React, { Component } from 'react';
import { createStore,bindActionCreators} from '../redux';
function reducer(state=0,action){
    switch(action.type){
        case 'INCREMENT':
            return state + 1;
        case 'DECREMENT':
            return state - 1;
        default:
            return state;
    }
}
const store = createStore(reducer,0);
function increment(){
   return {type:'INCREMENT'};
}
function decrement(){
   return {type:'DECREMENT'};
}
const actions = {increment,decrement};

const boundActions = bindActionCreators(actions,store.dispatch);

export default class Counter extends Component {
    constructor(props) {
        super(props);
        this.state = { value: 0 };
    }
    componentDidMount() {
        this.unsubscribe = store.subscribe(() => this.setState({ value: store.getState() }));
    }
    componentWillUnmount() {
        this.unsubscribe();
    }
    render() {
        return (
            <div>
                <p>{this.state.value}p>
                <button onClick={boundIncrement}>+button>
                <button onClick={boundIncrement}>-button>
            div>
        )
    }
}
```

6.2 bindActionCreators.js

bindActionCreators.js

```
function bindActionCreator(actionCreator, dispatch) {
    return function() {
      return dispatch(actionCreator.apply(this, arguments))
    }
}
export default function bindActionCreators(actionCreators, dispatch) {
    if (typeof actionCreators === 'function') {
        return bindActionCreator(actionCreators, dispatch)
    }
    const boundActionCreators = {}
    for (const key in actionCreators) {
        const actionCreator = actionCreators[key]
        if (typeof actionCreator === 'function') {
            boundActionCreators[key] = bindActionCreator(actionCreator, dispatch)
        }
    }
    return boundActionCreators
}
```

7. combineReducers

7.1 src/index.js

```
import React from 'react';
import ReactDOM from 'react-dom';
import Counter1 from './components/Counter1';
import Counter2 from './components/Counter2';
ReactDOM.render(<><Counter1/><hr/><Counter2/></>,document.getElementById('root'));
```

7.2 redux/index.js

src\redux\index.js

```
import createStore from './createStore'
import bindActionCreators from './bindActionCreators'
import combineReducers from './combineReducers'
export {
    createStore,
    bindActionCreators,
    combineReducers
}
```

7.3 combineReducers.js

src\redux\combineReducers.js

```
export default function combineReducers(reducers) {
    const reducerKeys = Object.keys(reducers)
    return function combination(state = {}, action) {
        const nextState = {}
        for (let i = 0; i < reducerKeys.length; i++) {
            const key = reducerKeys[i];
            const reducer = reducers[key];
            const previousStateForKey = state[key];
            const nextStateForKey = reducer(previousStateForKey, action);
            nextState[key] = nextStateForKey;
        }
        return nextState;
    }
}
```

7.4 store\index.js

src\store\index.js

```
import { createStore } from '../redux';
import reducer from './reducers';
const store = createStore(reducer,{counter1:0,counter2:0});
export default store ;
```

7.5 action-types.js

src\store\action-types.js

```
export const INCREMENT1 = 'INCREMENT1';
export const DECREMENT1 = 'DECREMENT1';

export const INCREMENT2 = 'INCREMENT2';
export const DECREMENT2 = 'DECREMENT2';
```

7.6 actions

7.6.1 counter1.js

src\store\actions\counter1.js

```
import * as types from '../action-types';
export default {
    increment1(){
        return {type:types.INCREMENT1};
    },
    decrement1(){
        return {type:types.DECREMENT1};
    }
}
```

7.6.2 counter2.js

src\store\actions\counter2.js

```
import * as types from '../action-types';
export default {
    increment2(){
        return {type:types.INCREMENT2};
    },
    decrement2(){
        return {type:types.DECREMENT2};
    }
}
```

7.7 reducers

7.7.1 index.js

src\store\reducers\index.js

```
import {combineReducers} from '../../redux';
import counter1 from './counter1';
import counter2 from './counter2';
export default combineReducers({
    counter1,
    counter2
});
```

7.7.2 counter1.js

src/store/reducers/counter1.js

```
import * as types from '../action-types';
export default function (state=0,action){
    switch(action.type){
        case types.INCREMENT1:
            return state + 1;
        case types.DECREMENT1:
            return state - 1;
        default:
            return state;
    }
}
```

7.7.3 counter2.js

src/store/reducers/counter2.js

```
import * as types from '../action-types';
export default function (state=0,action){
    switch(action.type){
        case types.INCREMENT2:
            return state + 1;
        case types.DECREMENT2:
            return state - 1;
        default:
            return state;
    }
}
```

7.8 Component

7.8.1 Counter1.js

src\components\Counter1.js

```
import React, { Component } from 'react';
import actions from '../store/actions/counter1';
import store from '../store';
import {bindActionCreators} from '../redux';
const boundActions = bindActionCreators(actions,store.dispatch);
export default class Counter extends Component {
    constructor(props) {
        super(props);
        this.state = {value:0}
    }
    componentDidMount() {
        this.unsubscribe = store.subscribe(() => this.setState({ value: store.getState().counter1 }));
    }
    componentWillUnmount() {
        this.unsubscribe();
    }
    render() {
        return (
            <div>
                <p>{this.state.value}p>
                <button onClick={boundActions.increment1}>+button>
                <button onClick={boundActions.decrement1}>-button>
            div>
        )
    }
}
```

7.8.2 Counter2.js

src\components\Counter2.js

```
import React, { Component } from 'react';
import actions from '../store/actions/counter2';
import store from '../store';
import {bindActionCreators} from '../redux';
const boundActions = bindActionCreators(actions,store.dispatch);
export default class Counter extends Component {
    constructor(props) {
        super(props);
        this.state = {value:0}
    }
    componentDidMount() {
        this.unsubscribe = store.subscribe(() => this.setState({ value: store.getState().counter2 }));
    }
    componentWillUnmount() {
        this.unsubscribe();
    }
    render() {
        return (
            <div>
                <p>{this.state.value}p>
                <button onClick={boundActions.increment2}>+button>
                <button onClick={boundActions.decrement2}>-button>
            div>
        )
    }
}
```

8. react-redux

8.1 src/index.js

src/index.js

```
import React from 'react';
import ReactDOM from 'react-dom';
import Counter1 from './components/Counter1';
import Counter2 from './components/Counter2';
import store from './store';
import {Provider} from './react-redux';
ReactDOM.render(<Provider store={store}><Counter1/><hr/><Counter2/>Provider>,document.getElementById('root'));
```

8.2 Counter.js

src/components/Counter.js

```
import React, { Component } from 'react';
import actions from '../store/actions/counter1';
import {connect} from '../react-redux'
class Counter extends Component {
    constructor(props) {
        super(props);
    }
    render() {
        return (
            <div>
                <p>{this.props.value}p>
                <button onClick={this.props.increment}>+button>
                <button onClick={this.props.decrement}>-button>
            div>
        )
    }
}

let mapStateToProps = state=>({value:state.counter});
export default connect(
    mapStateToProps,
    actions
)(Counter)
```

8.3 react-redux\index.js

src\react-redux\index.js react-redux (https://github.com/reduxjs/react-redux/blob/master/src/index.js)

```
import Provider from './Provider';
import connect from './connect';
export {
    Provider,
    connect
}
```

8.4 react-redux\Provider.js

src\react-redux\Provider.js Provider.js (https://github.com/reduxjs/react-redux/blob/master/src/components/Provider.js)

```
import React, { Component } from 'react'
import PropTypes from 'prop-types'
import { ReactReduxContext } from './Context'
export default class Provider extends Component {
    static propTypes = {
        store: PropTypes.shape({
          subscribe: PropTypes.func.isRequired,
          dispatch: PropTypes.func.isRequired,
          getState: PropTypes.func.isRequired
        }),
        children: PropTypes.any
    }
    constructor(props) {
        super(props)
    }
    render() {
        return (
          <ReactReduxContext.Provider value={{store:this.props.store}}>
            {this.props.children}
          ReactReduxContext.Provider>
        )
      }
}
```

8.5 react-redux\connect.js [#]()

src\react-redux\connect.js [connect.js (https://github.com/reduxjs/react-redux/blob/master/src/connect/connect.js)](https://github.com/reduxjs/react-redux/blob/master/src/connect/connect.js)

```
import React from "react";
import { bindActionCreators } from "../redux";
import { ReactReduxContext } from "./Context";
export default function(mapStateToProps, mapDispatchToProps) {
  return function wrapWithConnect(WrappedComponent) {
    return class extends React.Component {
      static contextType = ReactReduxContext;
      constructor(props, context) {
        super(props);
        this.state = mapStateToProps(context.store.getState());
      }
      componentDidMount() {
        this.unsubscribe = this.context.store.subscribe(() =>
          this.setState(mapStateToProps(this.context.store.getState()))
        );
      }
      shouldComponentUpdate() {
        if (this.state === mapStateToProps(this.context.store.getState())) {
          return false;
        }
        return true;
      }
      componentWillUnmount() {
        this.unsubscribe();
      }
      render() {
        let actions = bindActionCreators(
          mapDispatchToProps,
          this.context.store.dispatch
        );
        return <WrappedComponent {...this.state} {...actions} />;
      }
    };
  };
}
```

8.6 react-redux\Context.js [#]()

src\react-redux\Context.js [Context.js (https://github.com/reduxjs/react-redux/blob/master/src/components/Context.js)](https://github.com/reduxjs/react-redux/blob/master/src/components/Context.js)

```
import React from 'react'

export const ReactReduxContext = React.createContext(null)

export default ReactReduxContext
```

9. react-redux-old [#]()

9.1 react-redux-old\Provider.js [#]()

src\react-redux-old\Provider.js

```
import React, { Component } from 'react'
import PropTypes from 'prop-types'
export default class Provider extends Component {
    static propTypes = {
        store: PropTypes.shape({
          subscribe: PropTypes.func.isRequired,
          dispatch: PropTypes.func.isRequired,
          getState: PropTypes.func.isRequired
        }),
        children: PropTypes.any
    }
    constructor(props) {
        super(props);
    }
    static  childContextTypes = {
       store: PropTypes.shape({
          subscribe: PropTypes.func.isRequired,
          dispatch: PropTypes.func.isRequired,
          getState: PropTypes.func.isRequired
       })
    }
    getChildContext(){
      return {store:this.props.store};
    }
    render() {
        return this.props.children
    }
}
```

9.2 react-redux-old\connect.js

src\react-redux-old\connect.js

- connect方法将检查mapStateToProps方法返回的props对象是否变更以决定是否需要更新组件。为了提高这个检查变更的性能，connect方法基于Immutabe状态对象进行改进，使用浅引用相等性检查来探测变更。这意味着对对象或数组的直接变更将无法被探测，导致组件无法更新。

```
import React from 'react';
import {bindActionCreators} from '../redux';
import PropTypes from 'prop-types';
export default function(mapStateToProps,mapDispatchToProps){
    return function wrapWithConnect(WrappedComponent) {
        return class  extends React.Component{
            constructor(props,context){
                super(props);
                this.state = mapStateToProps(context.store.getState());
            }
            static contextTypes = {
                 store: PropTypes.shape({
                    subscribe: PropTypes.func.isRequired,
                    dispatch: PropTypes.func.isRequired,
                    getState: PropTypes.func.isRequired
                })
            }
            componentDidMount(){
                this.unsubscribe = this.context.store.subscribe(
                    ()=>this.setState(mapStateToProps(this.context.store.getState()))
                );
            }
            componentWillUnmount(){
                this.unsubscribe();
            }
            render(){
                let actions = bindActionCreators(mapDispatchToProps,this.context.store.dispatch);
                return <WrappedComponent {...this.state} {...actions}/>
            }
        }
    }
}
```

附录

- redux (https://github.com/reduxjs/redux)
- redux (https://github.com/reduxjs/react-redux)
- learn-redux (https://gitee.com/zhufengpeixun/learn-redux)