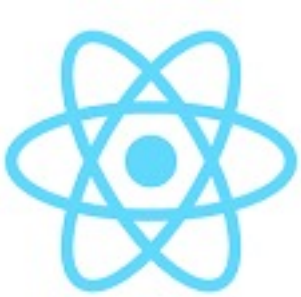


ReactJS.

The Component model

Topics

- **Component State.**
  - **Basis for dynamic, interactive UI.**
- **Data Flow patterns.**
- **Hooks.**

Component DATA

- **A component has two sources of data:**

  1. Props **- Passed in to a component; Immutable; the** props **object.**
  2. *State* **- Internal to the component; Causes the component to** re-render **when changed / mutated.**

  – **Both can be any data type - primitive, object, array.**

- **Props-related features:**
  – **Default values.**
  – **Type-checking.**

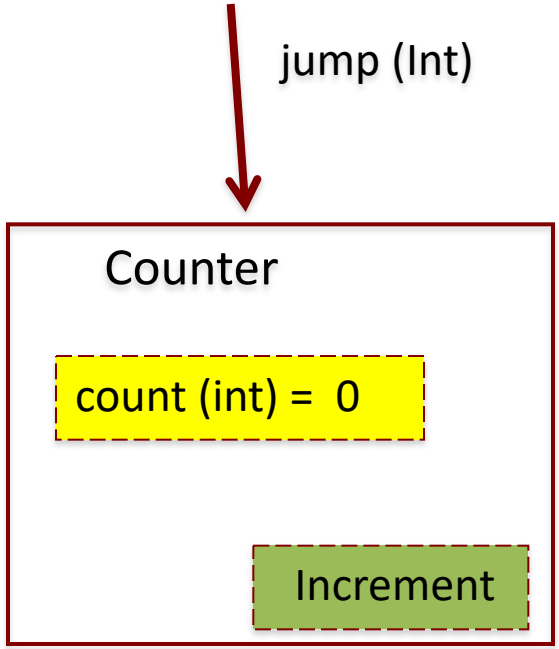
- **State-related features:**
  – **Initialization.**
  – **Mutation – using a** setter **method.**
    – Automatically causes component to re-render. ***
    – **Performs an overwrite operation, not a merge.**

Stateful Component Example

- **The Counter component.**
- **Ref.** basicReactLab **samples – sample 06.**
- **The** useState() **function:**
  - **Declares a state variable.**
  - **Returns a Setter / Mutator method.**
  - **Termed a React** hook.

- **Aside: Static function property,**

  e.g. defaultProps, proptypes



React's event system.

- **Cross-browser support.**
- **Event handlers receive a** SyntheticEvent **– a cross-browser wrapper for the browser's native event.**
- **React event naming convention slightly different to native:**

React	Native
onClick	onclick
onChange	onchange
onSubmit	onsubmit

- See https://reactjs.org/docs/events.html for full details,

Automatic Re-rendering.

- **EX.: The Counter component.**

User clicks button

→ *onClick event handler executes (incrementCounter)*

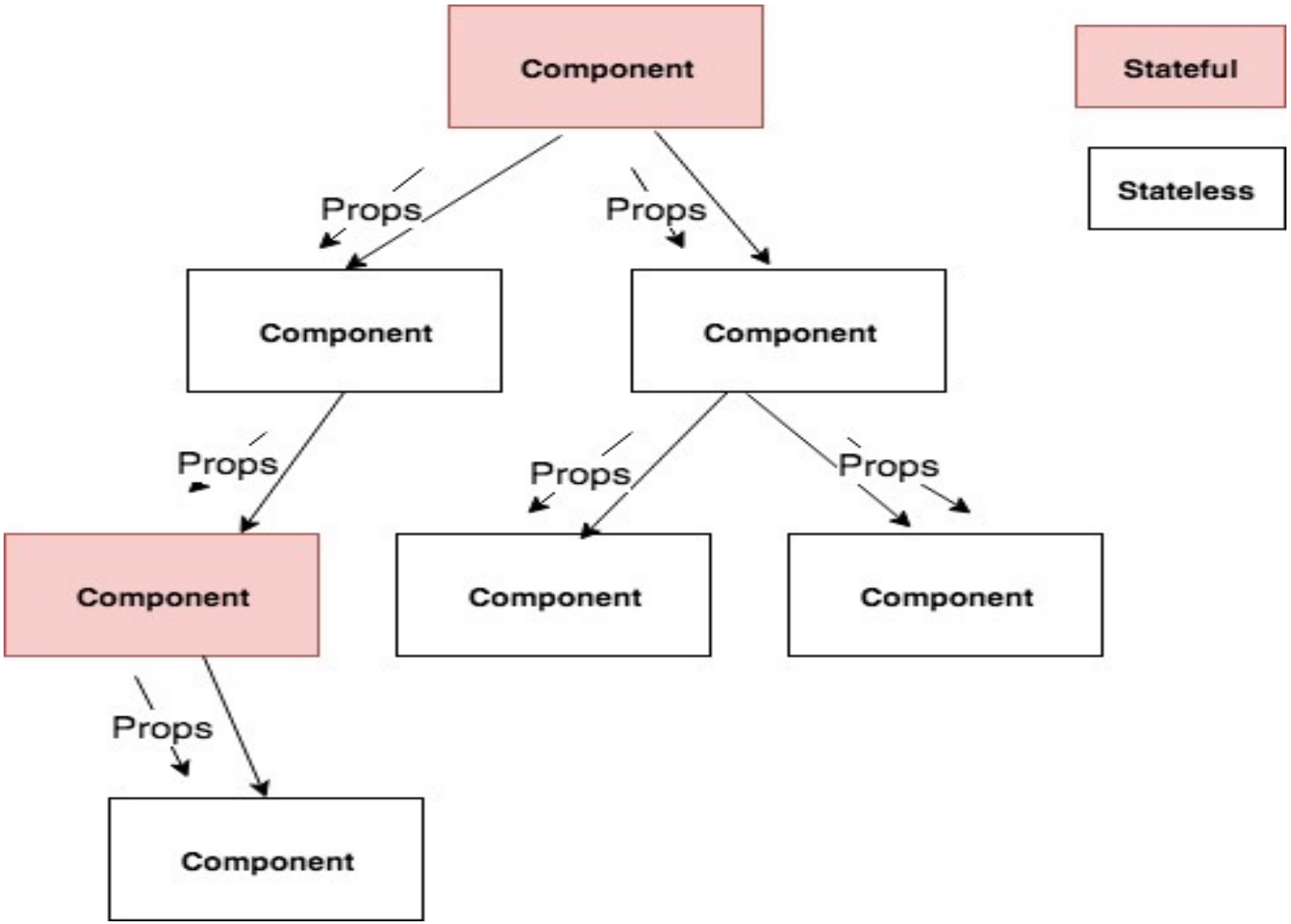
→ *component state variable is changed (setCount())*

→ *component function re- executed (**re-rendering**)* 

Topics

- **Component State.** ✔
- **Data Flow patterns.**
- **Hooks.**

Unidirectional data flow



Unidirectional data flow

- **In a React app, data flows** unidirectionally **ONLY.**
  - **Other SPA frameworks use** two-way data binding**.**

- **Typical React app pattern: A** small subset **of the components are** stateful**; the majority are** stateless**.**
- **Typical Stateful component execution flow:**
  1. **User interaction causes a state change in a component.**
  2. **That component re-renders (re-executes).**
  3. **It recomputes the props for its subordinate components.**
  4. **Subordinate components re-render, and recomputes props for its subordinates.**
  5. **etc.**

Topics

- **Component State.** ✔
- **Data Flow patterns.** ✔ *(more later)*
- **Hooks**

React Hooks

- **Introduced in version 16.8.0 (February 2019)**

- **React Hooks are:**
  1. **Functions (some are HOFs).**
  2. **That** *manipulate* **the** *state* **and** *manage* **a component's** *lifecycle***.**

- **Examples: useState, useEffect, useContext, useRef, etc**
  - **'use' prefix is necessary for linting tools.**

- **Hook usage rules:**
  1. **Can only call hooks at the 'top level' in a component.**
     - **Don't call hooks inside loops or condition statements.**
  2. **Only call hooks from React component functions.**

useEffect Hook

- **Used when a component needs to perform** side effects**.**

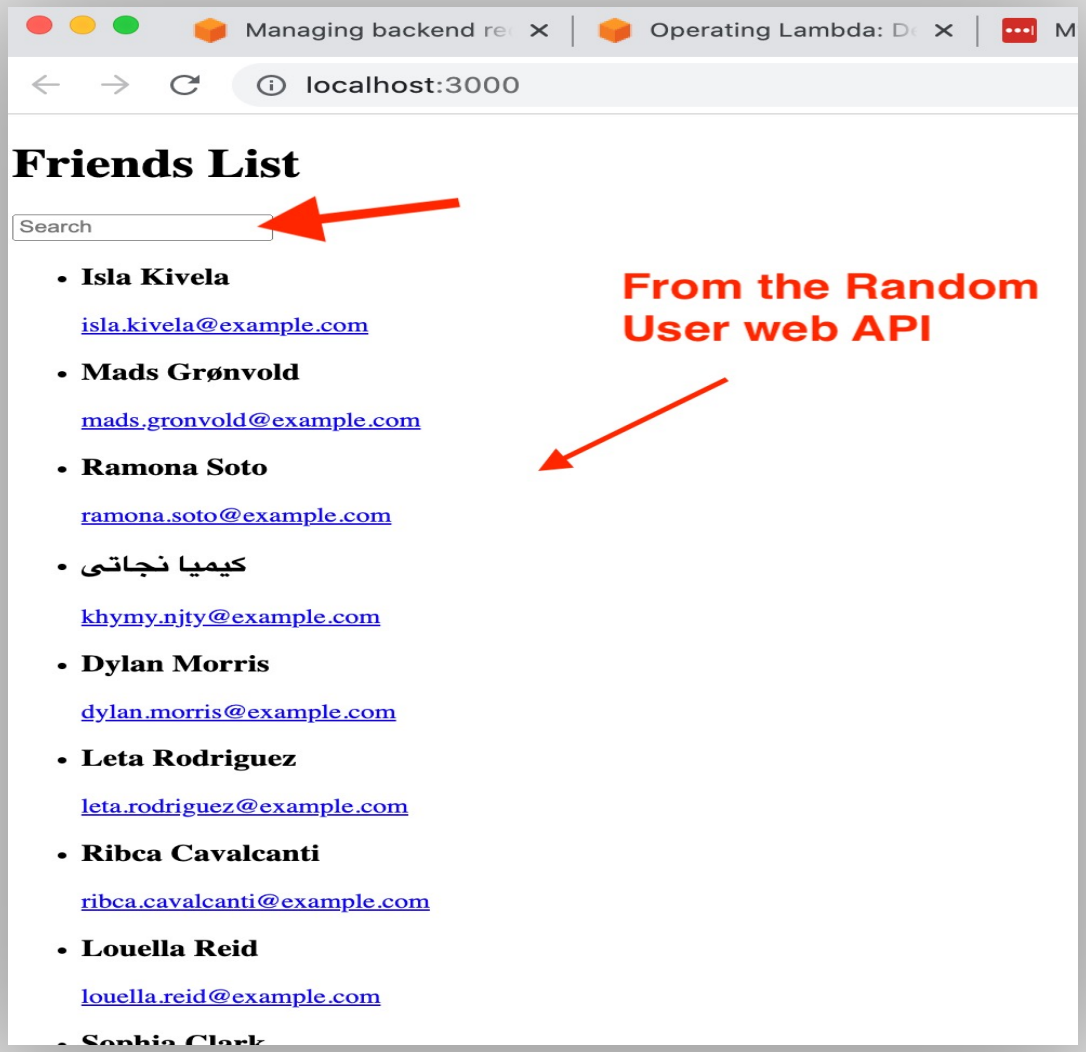
- **Side Effect example:**
  - **fetching data from a web API.**
  - **Subscribe to browser events, e.g. window resize.**

- **Signature:** useEffect(callback, dependency array)
  - **The** *callback* **contains the side effect code**

- **When is useEffect() executed?**
  1. **On mounting.**
  2. **On every rendering, provided a dependency array entry has changed value since the previous rendering.**

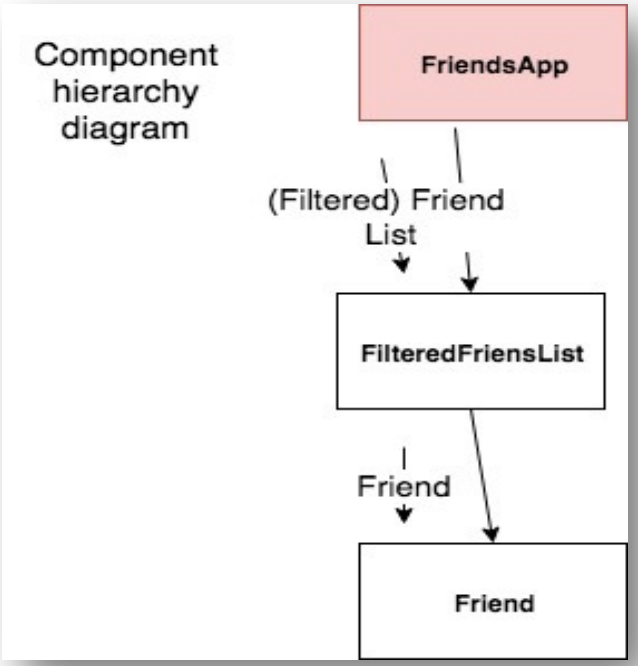
  - **An** empty dependency array **restricts execution to mount-time only.**

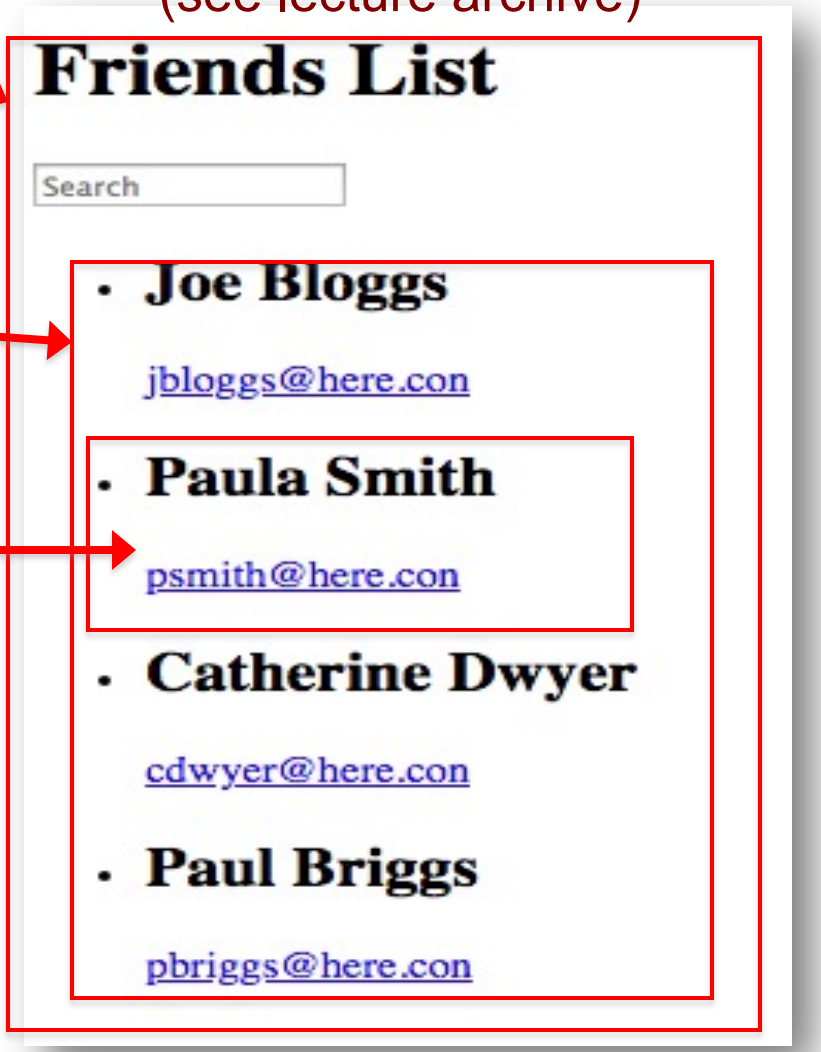
Sample App


Managing backend re
Operating Lambda: D
M
localhost:3000
Friends List
Search
Isla Kivela
isla.kivela@example.com
Mads Grønvold
mads.gronvold@example.com
Ramona Soto
ramona.soto@example.com
کیمیا نجاتی
khymy.njty@example.com
Dylan Morris
dylan.morris@example.com
Leta Rodriguez
leta.rodriguez@example.com
Ribca Cavalcanti
ribca.cavalcanti@example.com
Louella Reid
louella.reid@example.com
From the Random User web API

Sample App 1

(see lecture archive)





FriendsApp **component:**

1. Manages state **(i.e. text box, full list of friends).**

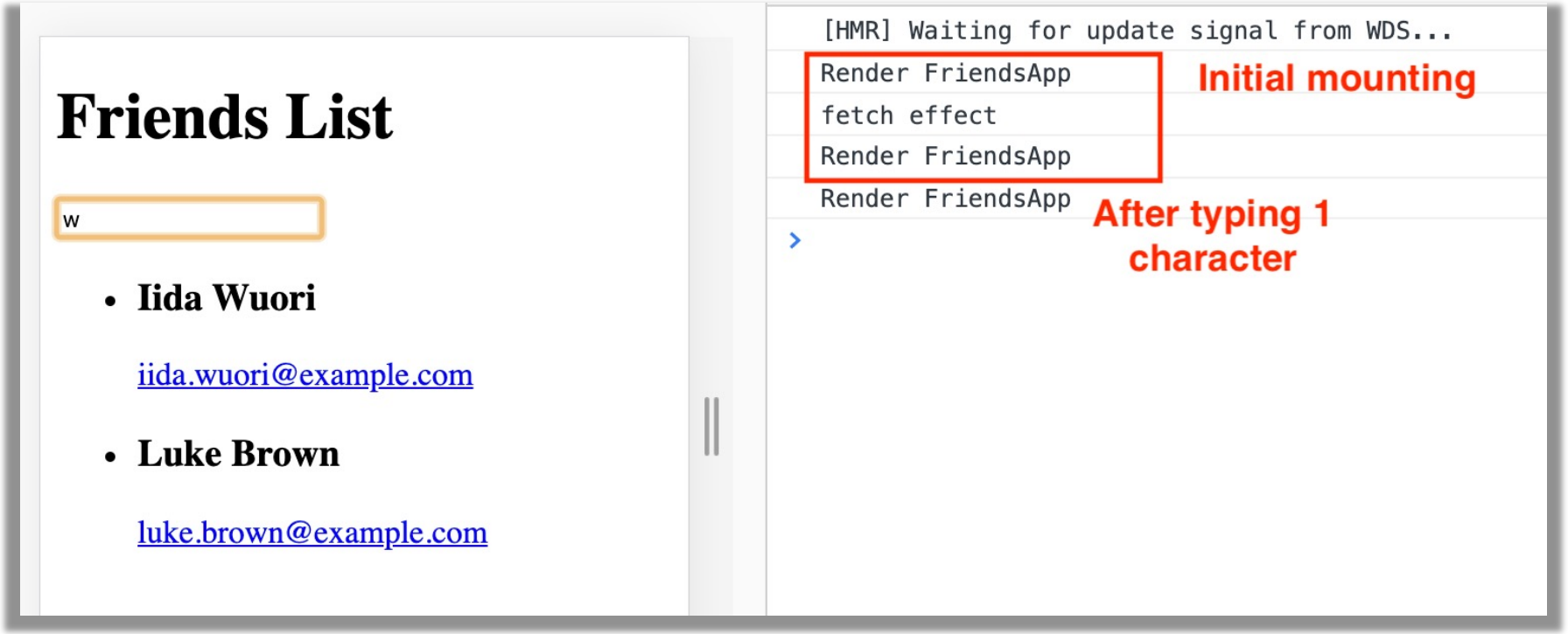
2. Fetches data from a web API – side effect.

3. Computes matching friends.

4. Controls list rendering.

Sample App - *useEffect* Hook

- **useEffect runs AT THE END of a component's mount process.**
  i.e. First rendering occurs BEFORE the API data is available.
  - **We must accommodate this in the implementation.**



Sample App - *useEffect* Hook

- **You must allow for asynchronous nature of API calls, by**
  1. **Not 'freezing' the browser while waiting for data.**
  2. **Allowing components to render without real data.**

- **Correct solution:**

```
const [friends, setFriends] = useState( [ ] ) ;
```

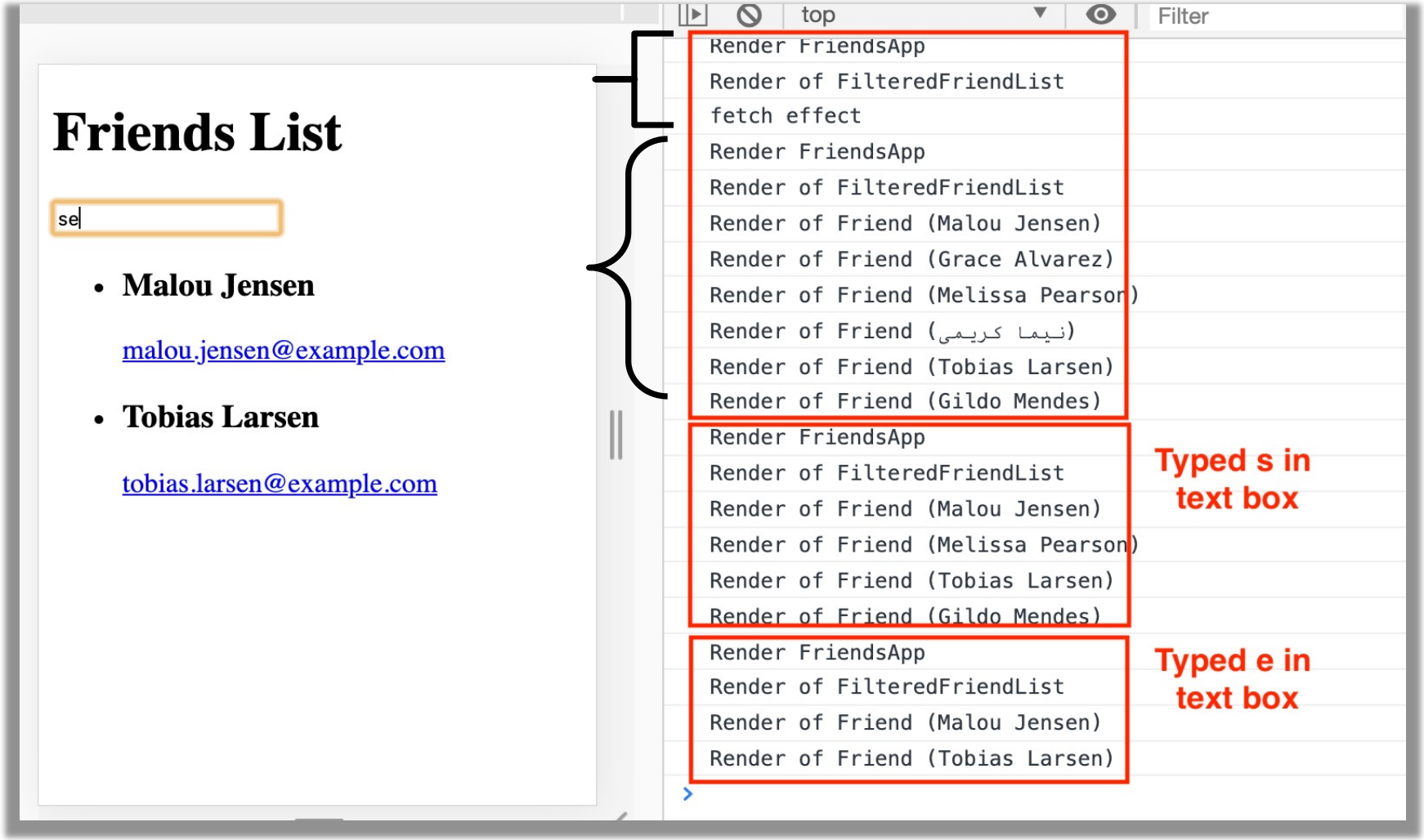
- **Incorrect solution:**

```
const [friends, setFriends] = useState(null);
```

TypeError: Cannot read property 'filter' of null

Unidirectional data flow & **Re-rendering**

(Assume we request 6 friends from web API)



More to come ….

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