Frontend Learning

for building a React – Material UI Frontend,

or

e.g. a Frontend knowledge exam

1. React and JSX basic syntax - phase

- Finally output to browser DOM will be **HTML with DOM JavaScript**
  - e.g. <**i**nput type="submit" onclick="myFunc();" class="style1" >Delete item 101</...
- Before that, **React components** (Possibly w. Mui-React components) to be rendered as HTML etc based on e.g. attribute values
  - e.g. <**B**utton on**C**lick={()**=>**myFunc()} classNames={z.x}>Delete item 101</...>
- Before that we might have **JavaScript run** so that dynamic values are evaluated, e.g. {item.id}.
  - e.g. <Button onClick**={**()=>myFunc()**}** >Delete item **{**item.id**}**</...>
- Before that we might **write** things in **TypeScript**, tsc-compiled to JS

2. Single-page application, SPA

- Browser fetches/loads only one version of the page from the server, in the beginning.
- After that, with the JavaScript code running on the browser, we just update that one page DOM, but to the user it looks like we are navigating through different pages.
- React routing is able to make it look like we are navigating. And, also make the routing programming logical for the programmer.

3. React component state and props

- State created with the **useState** hook(s).
- State fraction(s) updated with the set (setter) function(s).

- Props given in Parent component JSX to the Child component.
- Child component receiving the props …
- … and destructuring them into local consts (or, now often straight in the function parameter list) with the **destructuring assignment**.

4. Rendering single and multiple components

- Mostly wrap your returned components inside parentheses ( ) to avoid mistakes
- Return just single component, e.g. a list. If multiple components, wrap them into a React fragment: <> … </>
- With multiple components (map or other list creation) remember to give a truly unique and permanent **key** property,
  - e.g. pick the id of the element as the value for the key

5. Material UI components

- use only Material UI components to get the styles defined in the Theme. (=> no HTML elements, p, span, if possible, in your JSX)
- think what HTML elements they return. e.g. so we won't get <p> inside of a <p> which is against HTML standard. Or as direct child of <table> or so on.
  - For some MUI-React components you can specify which HTML element will be rendered
- (Start learning Mui React components from very simple examples of yours. Build gradually bigger structures.)

6. Using the Material UI Theme

- Define the Theme in a different file with the **createTheme** function. You can define Palettes, give components special custom styles.
- Wrap the whole application root inside **ThemeProvider**. That already gives Material UI components their default styles.
- If you **only** use Material UI components. Then you'll get the theme styles automatically after theme defined.

- In rare need to use **specific colors, sizes or styles** from the theme, use the **useTheme** hook to use the theme object in component code.

Use redPalette and yellowPalette to spot hardcoded styles, colors

- Make your whole project follow the theme styles.
- This can be checked by flipping all colors to some all-red tint palette, to all-yellow tint palette, and back to your normal color palette.
- If something did not go red (later yellow) you have hard-coded colors in your project!

- Similarly, you can use some funny distinctive broken font from the theme and what is not looking funny, is hard-coded.

<CssBaseline /> - reset the Browser styles to Materia UI:s (Mui:s) own basic styles

- This component is inserted to the root component of the React-Mui app as well
- The idea is to reset all style differences between different browsers
- Gives an explicit style setting for everything and thus
  - The browser differences would hopefully disappear
  - The Material UI styles would stay consistent also in the future

7. Child component updating parent’s state

- (Normal case was: Parent passes **data** to the children in props, and children only show it)

- Special case: Parent will pass ‘event-handler function’ (parent state’s set function) to the child component(s) in props so that child/children can execute it and thus kind of ‘write’ to parent's state.

8. App context

- Creating the context
  - `createContext({thing: 22, thang: “abc” …})`
- Accessing/reading the context values
  - `useContext()` hook to create local reference to the context
  - `+  {myContext.thing}`
- Updating/writing the values to the context
  - `useContext()` hook to create local reference to the context
  - `+  myContext.thing = 33;`

9. The useEffect hook

- For “*side effects*” which means something happening outside the normal “state/prop changes => render happens” -cycle.
  - Usually still essential activity for the app, like fetching data from DB
- useEffect defines three parts:
  - **Action**, function to be run (cannot be awaited, but you can call another function that will wait)
  - **Dependency array**
    - if items given **[user.id, project.count]**, then action runs at mount + if changes in these.
      - By far the most used and most useful. Should be your thinking starting point.
    - Empty **[ ]**, dependency array => runs only once. You sometimes need this.
    - If missing dependency array: **, }** => runs at mount/first render + for any update/re-render.
  - (Action function is possibly returning) the **Cleanup function**

10. Routing

- Look at the given pictures for routing. **Basic routing** includes:
  - The **Route definitions**. They are our mappings between a **Path** and a View **React component** that renders that path.
  - Defining **Links** or **Buttons** that trigger navigation to the Routes
  - **Routes component** (older component was called **Switch**) that marks the place (div) on the page that will be replaced/filled with the “current page”. It also lists many **Route components** as content/children, but only one Route’s View switched each time to be rendered there.

11. Nested Routing

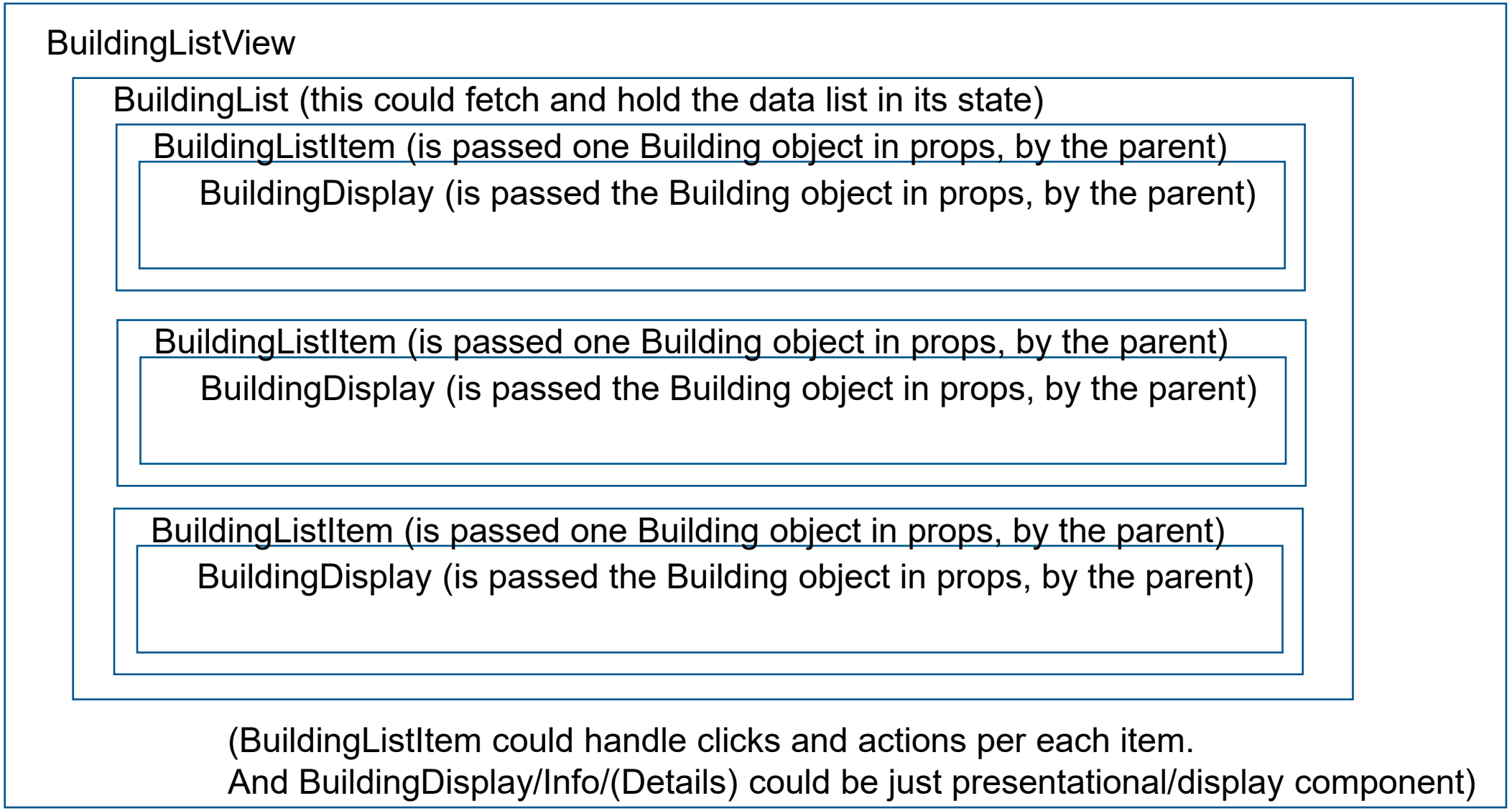
- Look at the given pictures for routing. Nested Routing includes:
  - **Relative paths** for children
  - Possible **index route**, rendering the index path.
  - Possibly **shared layout** component.
  - Possibly with **shared context**?

+ Programmatic Routing

- You can also programmatically **manipulate the Routing history stack:** pop, push, replace.

12. Typical List component composition

- (See random example on the next slide. Idea important, not exact match)
- The example is about Buildings, e.g. three buldings on one campus, two on other.
- SRP = Single Responsibility Principle. Each component doing usually only one thing in the app:
  - Providing navigable view: BuildingList**View**
  - Holding and refreshing data list state, maps w. ListItems: Building**List**
  - Providing actions for one item: Building**ListItem** (clickable, x = delete)
  - Just shows data for one item: Building**Display** / BuildingInfo / B…Details


BuildingListView
BuildingList (this could fetch and hold the data list in its state)
BuildingListItem (is passed one Building object in props, by the parent)
BuildingDisplay (is passed the Building object in props, by the parent)
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BuildingListItem (is passed one Building object in props, by the parent)
BuildingDisplay (is passed the Building object in props, by the parent)
(BuildingListItem could handle clicks and actions per each item.
And BuildingDisplay/Info/(Details) could be just presentational/display component)