Managing customization in UI library

How to allow customization with complex components
The example of MUI

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- **83k** Stars on GitHub

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The **wikidata** for **food**

- **2.7M** products

Some context

Some context

Internal tools or MVP

Some context

Internal tools or MVP

Final product

Some context

Internal tools or MVP   Final product

Work out of the box   🟢🟢🟢   🟢⚪⚪

Some context

	Internal tools or MVP	Final product
Work out of the box	●●●	●○○
Beginner friendly	●●●	●●●

Some context

	Internal tools or MVP	Final product
Work out of the box	●●●	●○○
Beginner friendly	●●●	●●●
Customisable	●○○	●●●

Some context

Internal tools or MVP

Final product

Work out of the box

Beginner friendly

Customisable

Let's go on an adventure

Basic customization

🧑‍🎨 Buttons should be green

button {background-color: 'green'} 🧑‍💻

Basic customization

🧑‍🎨 Buttons should be green

button {background-color: 'green'} 🧑‍💻

🧑‍🎨 Disabled buttons should be red

button.disabled {background-color: 'red'} 🧑‍💻

Basic customization

👨‍🎨 Buttons should be green

button {background-color: 'green'} 👨‍💻

👨‍🎨 Disabled buttons should be red
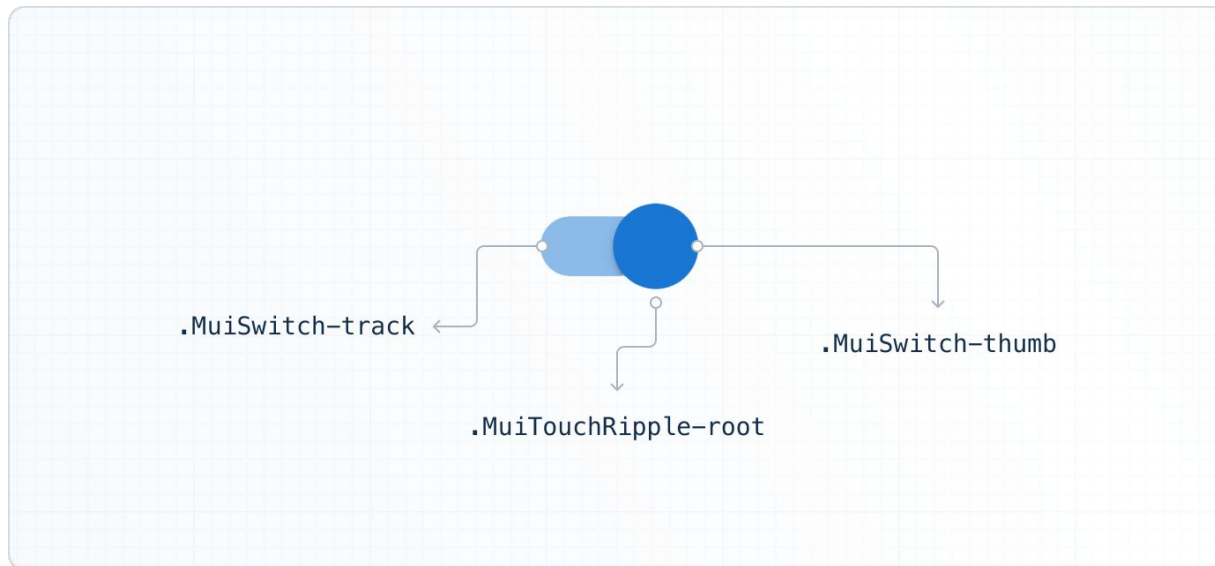
button.disabled {background-color: 'red'} 👨‍💻

👨‍🎨 This one should be orange

button.disabled.special-one {background-color: 'orange'} 👨‍💻

Basic customization

Basic customization

🧑 I can click on disabled button

`<button disabled />` 🧑‍💻

Basic customization

👦 I can click on disabled button

<button disabled /> 🧑‍💻

👦 Can you add an icon?

<Button endIcon={<SendIcon />} /> 🧑‍💻

Get started ›

Basic customization

🧑‍🎨 Style modification

    => CSS

🧑 Behavior modification

    => props

🧑‍💻 Level Up

MUI

Get started ›

🧑‍💻 Level Up

Get started

Trades, October 2020

	Desk	Commodity	Filled Quantity	Trader Email	Quantity	Trader Nar
☐	D-7850	Milk	38.02 %	zog@kicculhiv.sa	90,348	Robert S
☐	D-3867	Cotton No.2	6.7 %	vitit@fafli.ng	98,337	Jane Mil
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☐	D-2294	Coffee C	61.367 %	tedabiv@fivhu.aw	2,019	Francisc
☐	D-2299	Cocoa	45.83 %	ral@pe.sg	100,001	Rhoda S
☐	D-2577	Coffee C	61.68 %	rifedzib@hap.fi	71,548	Evan Co
☐	D-3419	Soybeans	43.145 %	nakum@gib.ec	4,821	Barry Fr

🧑‍💻 Level Up

```jsx
const rows = [
    { id: 0, name: "Fauquette", role: "dev"},
    { … }
]

const columns = [
    { field: 'name'},
    { field: 'role'},
]


return
<div className='grid-container'>
    <DataGrid
        rows={rows}
        columns={columns}
    />
</div>
```

🧑‍💻 Level Up

- Paginating
- Filtering
- Sorting
- Selecting
- Editing
- Exporting
- Grouping
- Rendering
- …ing

Challenges

👷 Internal code structure

📚 Documentation

😵 Consistent interface

First issue

First issue

I'm looking at how to sort columns in filter panel by alphabetical order

First issue

```
<DataGrid
  rows={rows}
  columns={columns}
  filterPanelColumnSelectOptionsOrder="asc"
/>
```

First issue

```
<DataGrid
  rows={rows}
  columns={columns}
  filterPanelColumnSelectOptionsOrder="asc"
/>
```

Solutions

- Headless (react-table, @mui/base)

- Composition (react-admin)

- Slots (@mui/...)

Remove the problem (ex: react-table, @mui/base)

```
 0  const {
 1    getTableProps,
 2    rows,
 3    prepareRow,
 4    state,
 5    setGlobalFilter,
 6    ...
 7  } = useTable(
 8    {
 9      columns,
10      data,
11      defaultColumn, // Be sure to pass the defaultColumn option
12      filterTypes,
13    },
14    useFilters, // useFilters!
15    useGlobalFilter // useGlobalFilter!
16  }
17
```

Remove the problem (ex: react-table, @mui/base)

```
 0  const {
 1    getTableProps,
 2    rows,
 3    prepareRow,
 4    state,
 5    setGlobalFilter,
 6    ...
 7  } = useTable(
 8    {
 9      columns,
10      data,
11      defaultColumn, // Be sure to pass the defaultColumn option
12      filterTypes,
13    },
14    useFilters, // useFilters!
15    useGlobalFilter // useGlobalFilter!
16  }
17
```

- Customization ✅

- Out of the box ❌

- Beginner friendly 🤔

Provide basics components (ex: react-admin)

Provide basics components (ex: react-admin)

```
0 const App = () => (
1     <Admin dataProvider={dataProvider}>
2         <Resource name="users" list={ListGuesser} />
3     </Admin>
4 );
```

Provide basics components (ex: react-admin)

```
0  const App = () => (
1      <Admin dataProvider={dataProvider}>
2          <Resource name="users" list={ListGuesser} />
3      </Admin>
4  );
```

To override

Provide basics components (ex: react-admin)

```
 0 import { List, Datagrid, TextField, DateField, BooleanField } from 'react-admin';
 1
 2 export const PostList = () => (
 3     <List>
 4         <Datagrid>
 5             <TextField source="id" />
 6             <TextField source="title" />
 7             <DateField source="published_at" />
 8             <TextField source="category" />
 9             <BooleanField source="commentable" />
10         </Datagrid>
11     </List>
12 );
```

Provide basics components (ex: react-admin)

Components

Providers

Provide basics components (ex: react-admin)

Provide basics components (ex: react-admin)

Provide basics components (ex: react-admin)

```
 0  <FormControl variant="standard">
 1    <InputLabel {...}>Age</InputLabel>
 2    <Select {...}>
 3      <MenuItem value={10}>Ten</MenuItem>
 4      {...}
 5    </Select>
 6  </FormControl>
 7
 8  <FormControl variant="standard">
 9    <InputLabel {...}>Name</InputLabel>
10    <TextField {...} />
11  </FormControl>
12
```

Provide basics components (ex: react-admin)

```
0  <FormControl variant="standard">
1    <InputLabel {...}>Age</InputLabel>
2    <Select {...}>
3      <MenuItem value={10}>Ten</MenuItem>
4      {...}
5    </Select>
6  </FormControl>
7
8  <FormControl variant="standard">
9    <InputLabel {...}>Name</InputLabel>
10   <TextField {...} />
11 </FormControl>
12
```

Age ▼
_____

Name

Provide basics components (ex: react-admin)

```
0  <FormControl variant="standard">
1    <InputLabel {...}>Age</InputLabel>
2    <Select {...}>
3      <MenuItem value={10}>Ten</MenuItem>
4      {...}
5    </Select>
6  </FormControl>
7
8  <FormControl variant="standard">
9    <InputLabel {...}>Name</InputLabel>
10   <TextField {...} />        ⬅ This is already a FormControl
11 </FormControl>
12
```

Provide basics components (ex: react-admin)

```
0  <FormControl variant="standard">
1    <InputLabel {...}>Age</InputLabel>
2    <Select {...}>
3      <MenuItem value={10}>Ten</MenuItem>
4      {...}
5    </Select>
6  </FormControl>
7
8  <TextField {...} label='Name' variant="standard" />
9
10
11
12
```
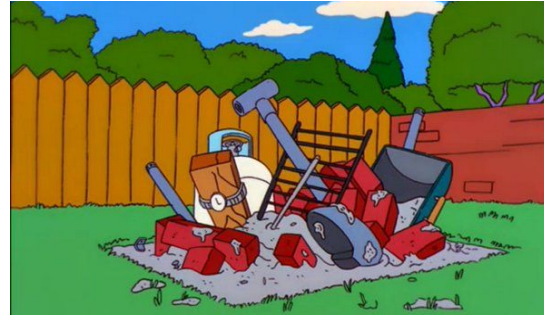
Provide basics components (ex: react-admin)
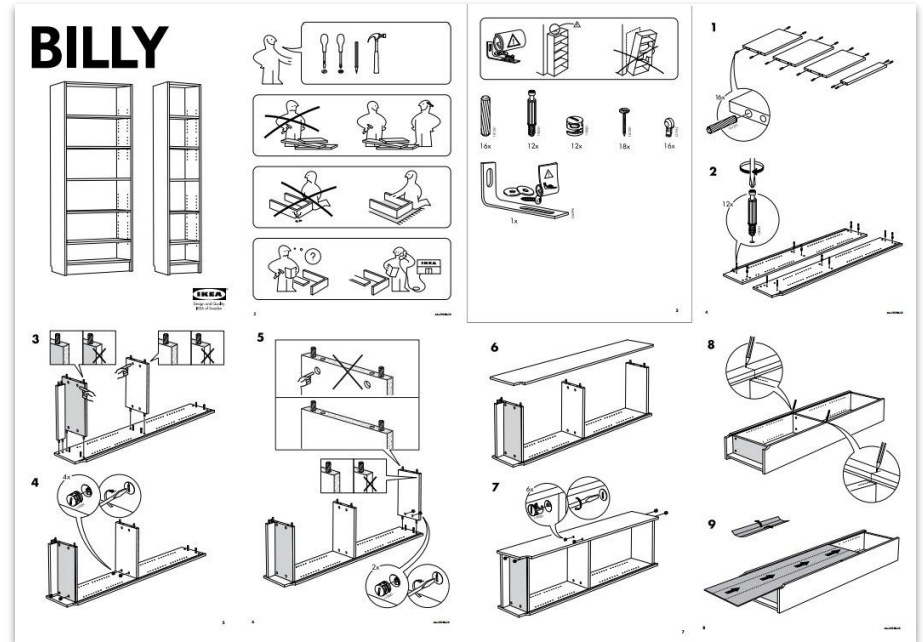
Provide basics components (ex: react-admin)
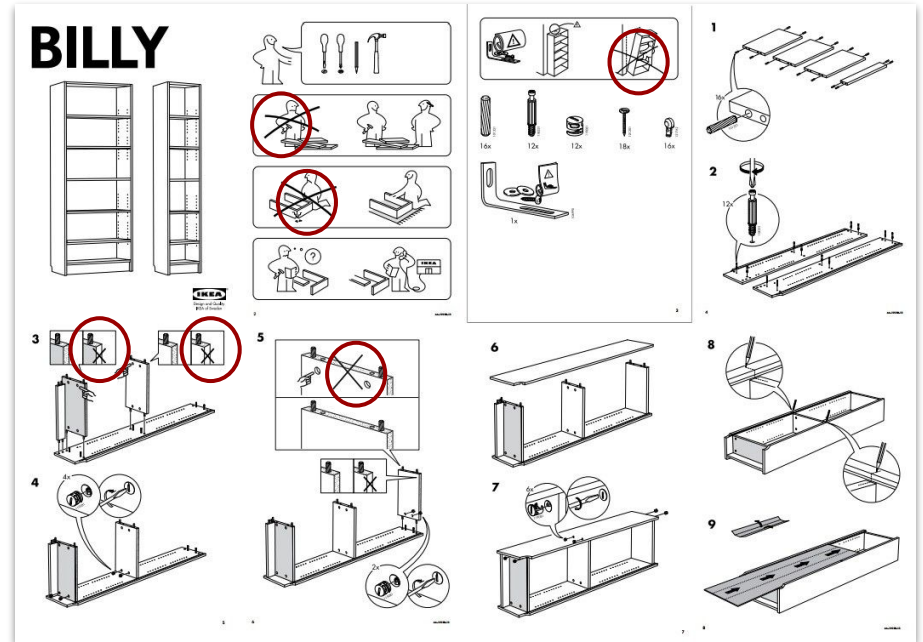
Provide basics components (ex: react-admin)

- Customization ✅

- Out of the box ✅

- Beginner friendly ❌
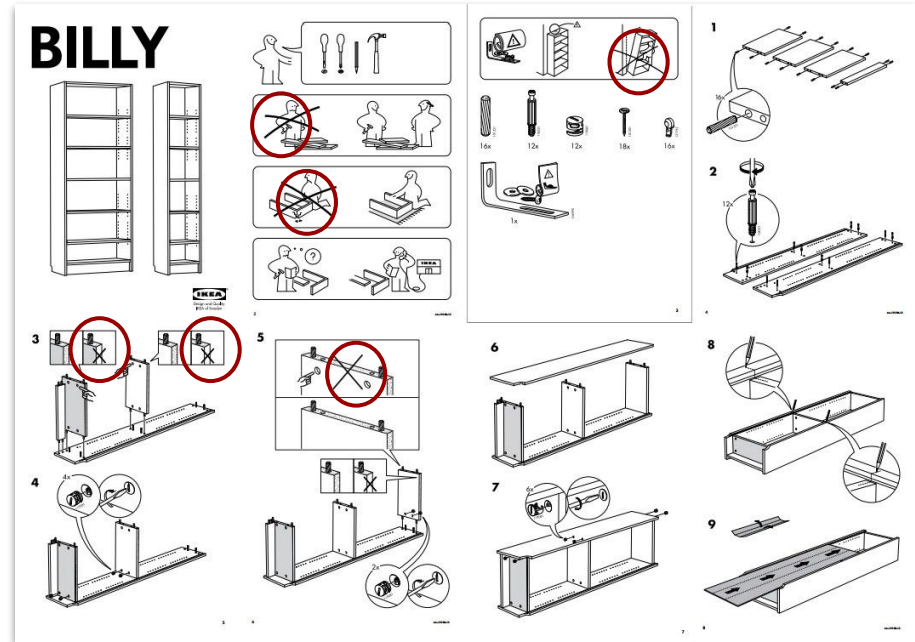
Provide slots (ex: MUI)

Provide slots (ex: MUI)

```
<Button
    endIcon={SendIcon}
/>
```

Provide slots (ex: MUI)

```
<DataGrid
    FilterPanel={CustomFilterPanel}
/>
```

Provide slots (ex: MUI)

```
<DataGrid
    slots={{
        filterPanel: CustomFilterPanel
    }}
/>
```

Provide slots (ex: MUI)

```
<DataGrid
    slots={{
        filterPanel: CustomFilterPanel
    }}
/>
```

		Columns		Operator		Value	
✕		Rating	▼	>	▼	2	
		Columns		Operator		Value	
✕	And ▼	Country	▼	is not	▼	United States	▼
		Columns		Operator			
✕	And ▼	Salary	▼	is not empty	▼		

+ ADD FILTER

Provide slots (ex: MUI)

```
<DataGrid
    slotProps={{
        filterPanel: {
            columnsSort: "asc",
        }
    }}
/>
```

Provide slots (ex: MUI)

```
<DataGrid
    slotProps={{
        filterPanel: {
            columnsSort: "asc",
        }
    }}
/>
```

- Customization ✅

- Out of the box ✅

- Beginner friendly ✅

Which one is the best?

Customization

Headless

Composition

Slots

Dev Exp

Do not choose

Do not choose

```
const CustomFilterPanel = (props) => {
  const { filterItemsProps, addItem } = useFilterPanel(props);

  return <div>
    {filterItemsProps.map(
        (itemProps) => <FilterItem {...itemProps} />
    )}
    <button onClick={addItem}>Add Filter</button>
    <button onClick={props.close}>Close</button>
  </div>
}

<DataGrid
  slots={{
    filterPanel: CustomFilterPanel
  }}
/>
```
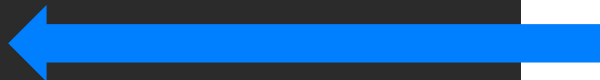
Do not choose

```
const CustomFilterPanel = (props) => {
  const { filterItemsProps, addItem } = useFilterPanel(props);

  return <div>
    {filterItemsProps.map(
        (itemProps) => <FilterItem {...itemProps} />
    )}
    <button onClick={addItem}>Add Filter</button>
    <button onClick={props.close}>Close</button>
  </div>
}

<DataGrid
  slots={{
    filterPanel: CustomFilterPanel
  }}
/>
```

slots

Do not choose

```
const CustomFilterPanel = (props) => {
  const { filterItemsProps, addItem } = useFilterPanel(props);    ← headless

  return <div>
    {filterItemsProps.map(
        (itemProps) => <FilterItem {...itemProps} />
    )}
    <button onClick={addItem}>Add Filter</button>
    <button onClick={props.close}>Close</button>
  </div>
}

<DataGrid
  slots={{
    filterPanel: CustomFilterPanel                                ← slots
  }}
/>
```
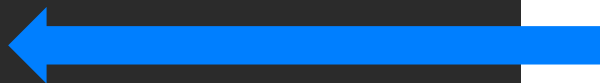
Do not choose

```
const CustomFilterPanel = (props) => {
  const { filterItemsProps, addItem } = useFilterPanel(props);        ← headless

  return <div>
    {filterItemsProps.map(
        (itemProps) => <FilterItem {...itemProps} />                  ← sub-components
    )}
    <button onClick={addItem}>Add Filter</button>
    <button onClick={props.close}>Close</button>
  </div>
}

<DataGrid
  slots={{
    filterPanel: CustomFilterPanel                                    ← slots
  }}
/>
```

Thanks