

## 2023-COS30049-Computing Technology Innovation Project

### Workshop Guide

**Note:** It's crucial to modify the distribution of time according to your specific requirements. You might also need to devise your own PowerPoint presentation in line with the guidelines of the workshop.

# Workshop 04

## Introduction of Material UI and D3.js

**Objective:** By the end of this workshop, students should have an understanding of the basic concepts of web design and be able to develop web components based on Material UI and D3.js.

### Workshop Structure:

#### 1. Build the grid system of a sample web page (15 mins):

When designing a website, it's crucial to follow a systematic approach to ensure a clear direction and plan during the development process.

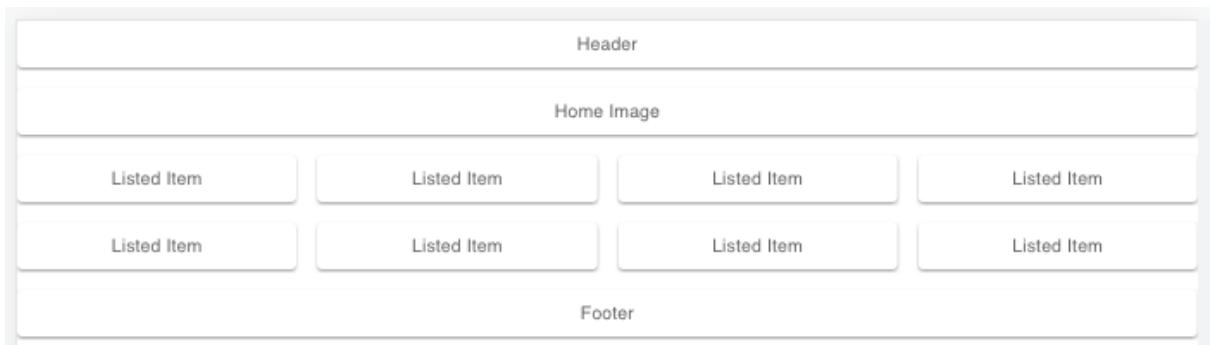
- **Define Objectives:** Start by clarifying the goals and purposes of the website. What message or information do you want to convey through the website? Is it for showcasing products, providing services, or sharing content?
- **Content Strategy:** Determine the content you want to present on the website. This could include text, images, videos, charts, etc. Plan the layout and arrangement of the content.
- **Website Structure:** Design the overall structure of the website, including the number of pages, main navigation, and sub-navigation. Creating a sitemap helps visualize the hierarchical structure of the website.
- **Page Layout Design:** Based on the website structure, consider the layout of each page. Use a Grid System to

- divide the page into different sections, such as header, navigation, content area, sidebar, and footer.
- **Responsive Design:** Consider the display on various devices and design responsive layouts to ensure optimal presentation on different screen sizes.

In this section, you need to draw the structure of a website based on the Grid System, refer to the following picture for the specific structure.

*Documentation of Grid system:*

<https://mui.com/material-ui/react-grid/>



## 2. Build the header of a sample web page (15 mins):

The header of a website plays a significant role in the user interface and serves various functions, including but not limited to the following:

- **Navigation:** The header typically includes the main navigation menu of the website, allowing users to quickly browse and access different pages and sections. The navigation menu can encompass primary pages, subpages, product categories, etc., helping users find content of interest.
- **Branding:** The header often incorporates the website's branding elements, such as the brand logo, website name, or tagline. This aids users in swiftly identifying the website they are on.
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In this section, you need to design a Header to tell the user the structure of the site. For the header design, you can refer to MUI's App Bar. When you build the web page, try to make each element as a component, so that we can reuse the component.

*Choose one of the App bar style in your page*

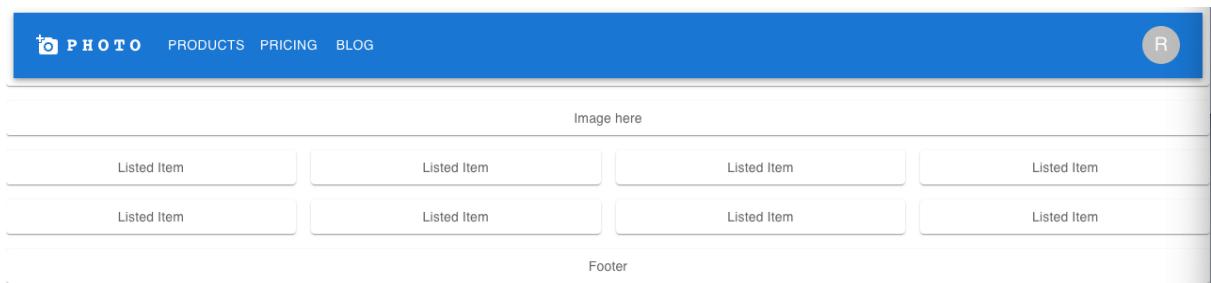
<https://mui.com/material-ui/react-app-bar/>

At the same time, you need to replace the default icon in the App Bar component with another ICON, as described in material-icons

*Change replace the default icon with the icon you choose in:*

<https://mui.com/material-ui/material-icons/>

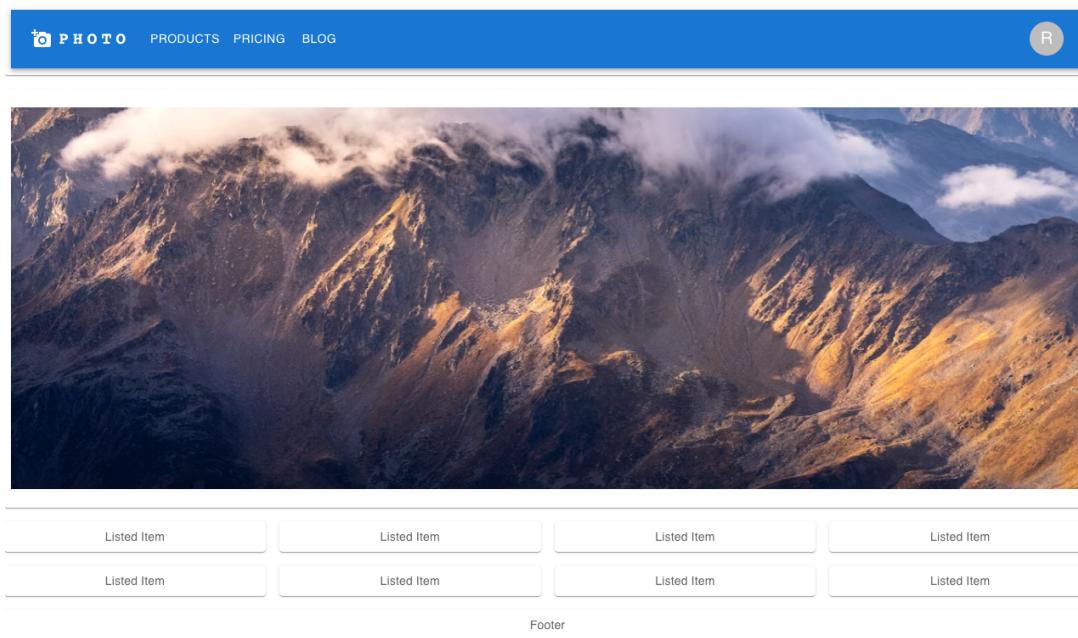
The image below is a reference example



### **3. Insert an image of a sample web page (15 mins):**

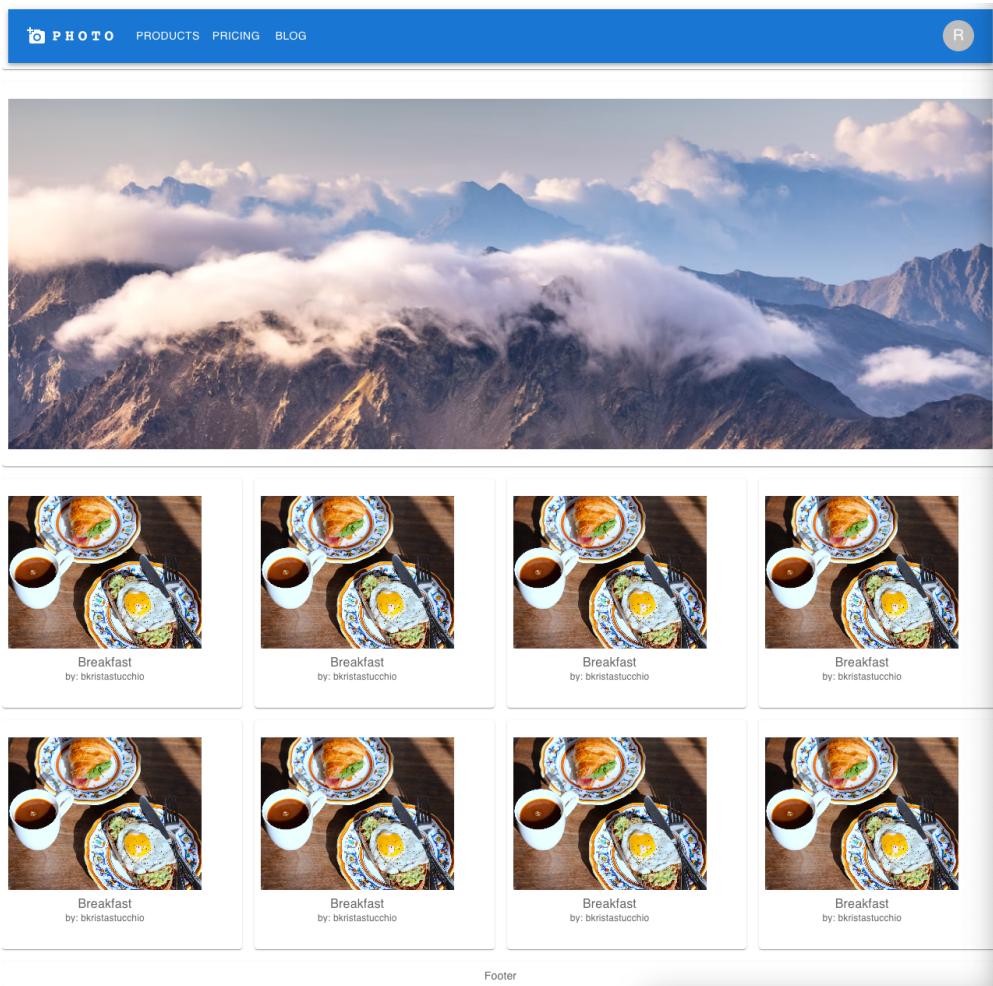
After completing the above steps, I believe your site has a basic Header. Next, in this section, we want to put a picture on the homepage of the site, so that the whole site looks more beautiful. Refer to the Image List tag in MUI to add an image to your home page. Add the image with: <https://mui.com/material-ui/react-image-list/>. When you build the web page, try to make each element as a component, so that we can reuse the component.

After this section is complete, your page should look like the image below



### **4. Build the main content of a web page (35 mins):**

Next we are going to add some content to the web page, in this section we are going to show the images and text information within the website. Refer to the ImageList to add : <https://mui.com/material-ui/react-image-list/>. When you build the web page, try to make each element as a component, so that we can reuse the component.



After completing the content of the display, I believe you are able to display the picture information and author information. We are now placing the entire image content as a component outside and referencing it in. At this time, we need to consider the transfer of values between components, we need to pass the image information through the way between components, so that the sub-component can display the content. Refer to the official react documentation for passing values between components.

<https://react.dev/learn/passing-props-to-a-component>

## 5. Build the footer of a web page (15 mins):

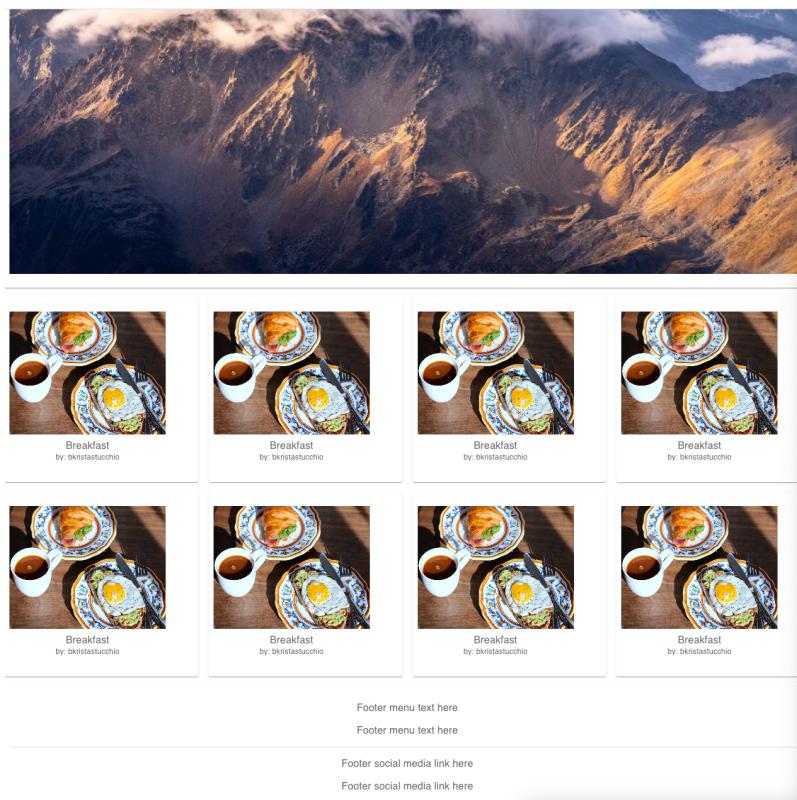
The footer of a website serves crucial purposes within the user interface, offering not only information about the website but also fulfilling various key functions. Here are some primary roles of a website footer:

- **Navigation Links:** Footers typically include navigation links that provide an alternate way to access important pages of the website. These links can encompass pages like About Us, Contact, Privacy Policy, Terms of Service, and more.
- **Social Media Links:** If the website maintains a presence on social media platforms, the footer may include social media icons and links, enabling users to engage with the website on other platforms.

Use the Menu tag in MUI to create a simple footer component.

<https://mui.com/material-ui/react-menu/>

When you build the web page, try to make each element as a component, so that we can reuse the component.



## 6. Integrate D3.js into a React page (20 mins):

D3.js (Data-Driven Documents) is a powerful JavaScript library for creating data visualizations and interactive charts. It connects data to DOM elements, allowing dynamic mapping of data to element attributes and styles. D3.js offers rich drawing and layout tools, enabling the creation of various charts such as line charts, bar charts, pie charts, and more. By utilizing D3.js, developers can customize data visualizations, achieve highly tailored visual representation, and provide users with the ability to interactively explore data.

Inside the Seminar class, we explain the Bar chart in D3.js in detail, including how to define styles and render data. In this section, we need to draw a Bar chart based on D3.js.

Bar chart example:

<https://observablehq.com/@d3/bar-chart/2?intent=fork>

Before using the D3.js , you will need to install:

***npm install d3***

The displayed bar chart does not need to be very complex, but the properties mentioned above in the seminar need to be covered. You can refer to the following image to draw the bar chart.

For more chart styles, please refer to

[https://observablehq.com/@d3/gallery?utm\\_source=d3js-org&utm\\_medium=hero&utm\\_campaign=try-observable](https://observablehq.com/@d3/gallery?utm_source=d3js-org&utm_medium=hero&utm_campaign=try-observable)

<https://observablehq.com/@d3/collapsible-tree>



Here are a few graph repositories you could consider integrating into your project. Feel free to choose another repository that you're more at ease with, as long as it can achieve the fundamental functionalities.

## Graph Repo

<https://github.com/vasturiano/react-force-graph>

Other (D3):

1. <https://observablehq.com/@d3/collapsible-tree>
2. <https://bkrem.github.io/react-d3-tree/docs/>

## 7. Reflection (5 mins)

Give students the opportunity to share what they learned, found interesting, or had difficulty understanding. Offer additional resources for them to learn more about React.js

React Playground

<https://playcode.io/react>

HTML Tag

[https://www.w3schools.com/tags/tag\\_html.asp](https://www.w3schools.com/tags/tag_html.asp)

React Documentation

<https://react.dev/learn/describing-the-ui>

MUI Documentation

<https://mui.com/material-ui/getting-started/>

What is the Grid system ?

<https://mui.com/material-ui/react-grid/>

D3.js Documentation

<https://d3js.org/>

Data visualization in React using React D3

[https://www.youtube.com/watch?v=YKDIxA4OAc&ab\\_channel=LogRocket](https://www.youtube.com/watch?v=YKDIxA4OAc&ab_channel=LogRocket)

