

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 03

Introduction of React.js and Material UI

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

Workshop Structure:

1. Review the React ENV locally (15 mins):

In this section, our main objective is to facilitate participants in setting up the local React environment. Please follow the provided instructions to run and debug your local React project using the following commands.

```
npx create-react-app cos30049
```

Inside that directory, you can run several commands:

- npm start
Starts the development server.

- npm run build
Bundles the app into static files for production.

- npm test
Starts the test runner.

We suggest that you begin by typing:

- cd cos30049
- npm start

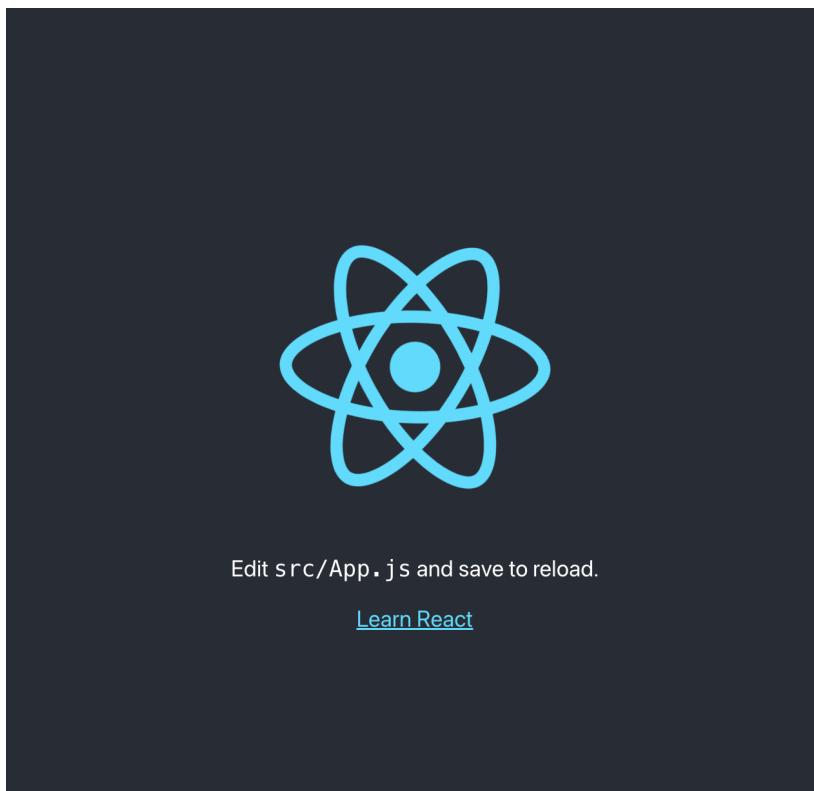
The screenshot shows the VS Code interface with the following details:

- EXPLORER** sidebar: CODE folder containing cos30049, node_modules, public, src, .gitignore, package-lock.json, package.json, and README.md.
- TERMINAL** tab: Displays the output of an npm command:

```
added 1427 packages in 4s
231 packages are looking for funding
  run `npm fund` for details
Initialized a git repository.
Installing template dependencies using npm...
added 74 packages, and changed 1 package in 4s
240 packages are looking for funding
  run `npm fund` for details
Removing template package using npm...

removed 1 package, and audited 1501 packages in 1s
240 packages are looking for funding
  run `npm fund` for details
6 high severity vulnerabilities
To address all issues (including breaking changes), run:
  npm audit fix --force
Run `npm audit` for details.
Created git commit.

Success! Created cos30049 at /Users/xuzhiy/Documents/COS30049-Computing Technology Innovation Project/Code/cos30049
Inside that directory, you can run several commands:
  npm start
    Starts the development server.
  npm run build
    Bundles the app into static files for production.
  npm test
    Starts the test runner.
  npm run eject
    Removes this tool and copies build dependencies, configuration files
    and scripts into the app directory. If you do this, you can't go back!
We suggest that you begin by typing:
  cd cos30049
  npm start
Happy hacking!
```
- OUTPUT** tab: Shows a message: "History restored".
- PROBLEMS** tab: Shows 0 problems.
- DEBUG CONSOLE** tab: Not visible.
- GitHub Copilot** recommendation: "Supercharge your coding experience for as little as \$10/month with cut...".



2. Introduction of the system design (35 mins):

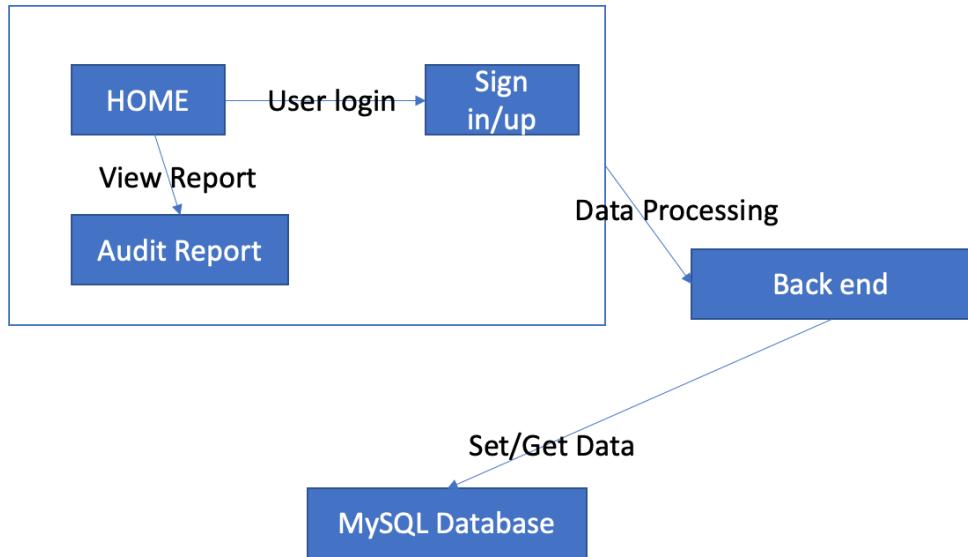
In a web system, the concept of Overall System Design involves creating a comprehensive blueprint that outlines the collaboration among various elements like components, modules, and services. This blueprint aims to ensure the intended features, performance, scalability, and ease of maintenance are achieved through a well-organized architecture and structure.

In this week's seminar, we introduced the concept of system design and how to approach it. In this session, you are expected to apply the insights from the seminar to perform system design for your chosen project. Within your system, you must encompass interactions between the front-end and back-end, blockchain data exchange, and database interactions. Building upon your Week 2 understanding of the overall system requirements, you will now conceptualize an implementation for the system's architecture. Subsequently, you will engage in discussions with your tutor to validate the soundness of your system's structural design.

The system design can be delivered with the following methods:

- sketches on paper
- hand-drawn sketches on an iPad
- design tool
 - Axure <https://www.axure.com/>
 - Sketch <https://www.sketch.com/>
 - Figma <https://www.figma.com/>
 - Powerpoint
 - Or other prototype tools

You will have 20 minutes on system designing and 15 minutes to discuss with the tutor.



Sample System Architecture

3. Config your Material UI (15 mins):

Based on sections 1 of both Week 2 and Week 3, your computers should now have the React environment and NPM environment properly configured. To install MUI, the first step is to navigate to the folder containing your React project and then use the following command to set up the MUI environment.

```

npm install @mui/material @emotion/react @emotion/styled
npm install @mui/icons-material

```

4. Grid System in Material UI (20 mins):

The React Grid system is a fundamental layout structure that empowers developers to create responsive and organized user

interfaces within React applications. It facilitates the arrangement of content into rows and columns, offering a flexible and dynamic approach to designing web layouts.

At its core, the React Grid system is composed of a grid container and grid items. The container establishes the grid context, defining the overall layout and providing a canvas for arranging elements. Within this container, grid items are positioned, allowing developers to finely control their placement and alignment.

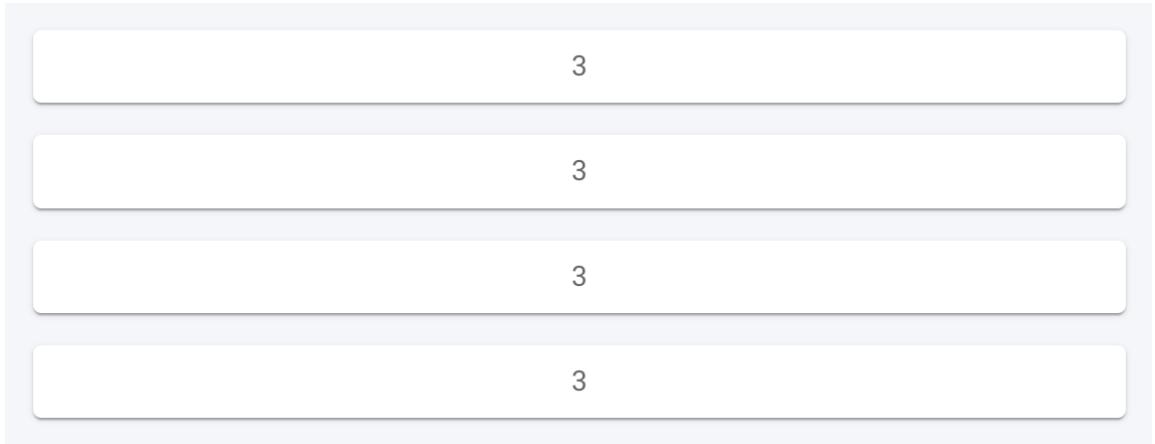
One of the key advantages of the React Grid system is its ability to adapt to various screen sizes and devices. By utilizing responsive breakpoints, developers can specify different layouts for different screen widths, ensuring a seamless user experience across desktops, tablets, and smartphones.

Through the use of CSS Grid or Flexbox, the React Grid system empowers developers with powerful tools for creating intricate and versatile layouts. It offers a structured and intuitive approach to handling complex design challenges, such as aligning, spacing, and ordering elements.

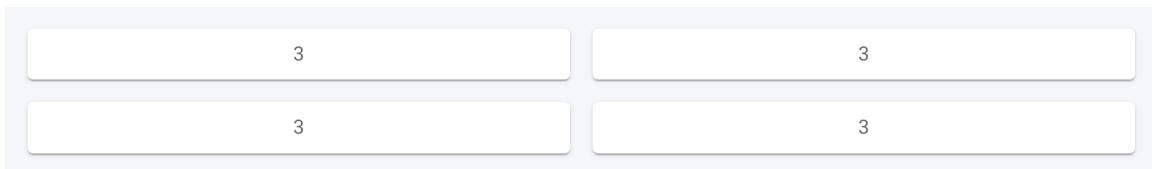
In this section, you are required to implement a Grid system that displays different arrangements based on various screen resolutions.

- **xs**, extra-small: 0 - 600px
- **sm**, small: 600 - 900px
- **md**, medium: 900 - 1200px
- **lg**, large: 1200 - 1536px
- **xl**, extra-large: 1536 + px

In XS



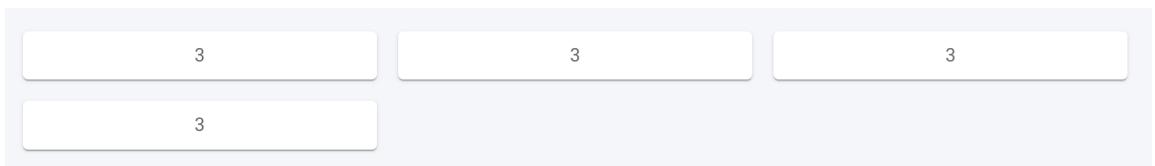
Im SM



in LG



in MD



Once you have completed the aforementioned tasks, attempt to replicate the layout structure from the Amazon screenshot in a Markdown (MD) document. Strive to ensure that the layout is as responsive as possible across different devices of varying sizes.

NOTE: You can change your screen dimension in CHROME Browser



Watch now on Prime



Watch now on Prime

Echo Pop compact speaker

Echo Dot 5th Gen with Clock

Echo Dot 5th Gen

Echo 4th Gen

Home Decor

Bed Skirts



Coffee Makers



Food Storage

See more

Back

Forward

Reload

Save As...

Print...

Cast...

Search Images with Google

Create QR code for this page

Translate to 中文 (简体)

View Page Source

Inspect

Frequently repurchased in Personal Care and Home

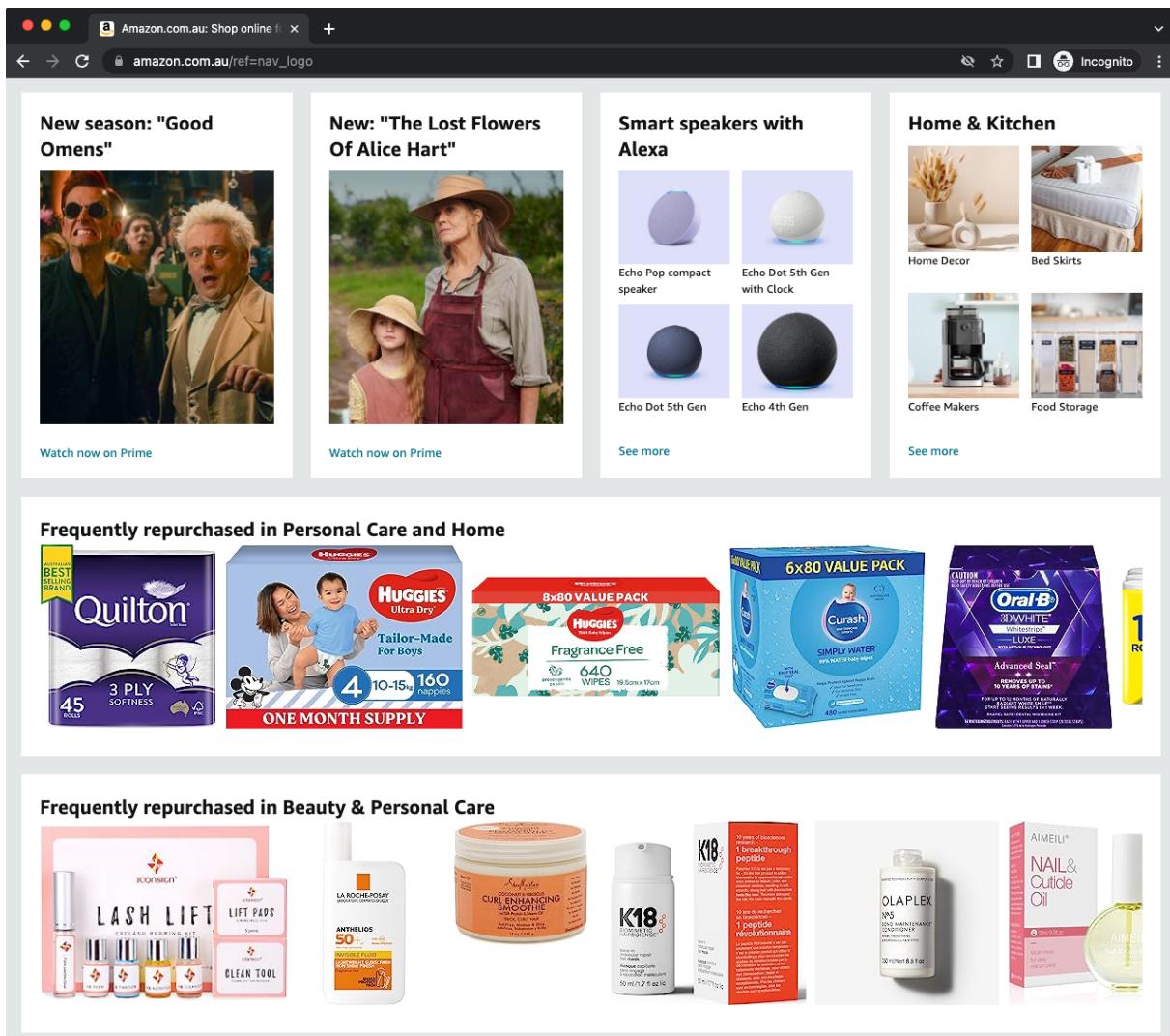


Frequently repurchased in Beauty & Personal Care



Dimensions: Responsive ▾ 400 x 1188 100% No throttling ▾

The screenshot shows the Chrome DevTools interface with the 'Elements' tab selected. The main preview area displays a portion of an Amazon website. A red arrow points to the 'Dimensions' dropdown menu at the top left of the preview, which is set to 'Responsive'. The preview shows a grid layout with various product cards and promotional sections. The right side of the interface contains the standard DevTools sidebar with file navigation, breakpoints, threads, and a call stack.



5. Content block in Material UI (15 mins):

In this section, endeavor to create an information block that includes both an image and relevant textual content. You can source images from Unsplash to complement the textual information.

<https://unsplash.com/>



Standard license
Full resolution 1920x1080 • JPEG
ID: 1030114
[Remove](#)

\$19.00

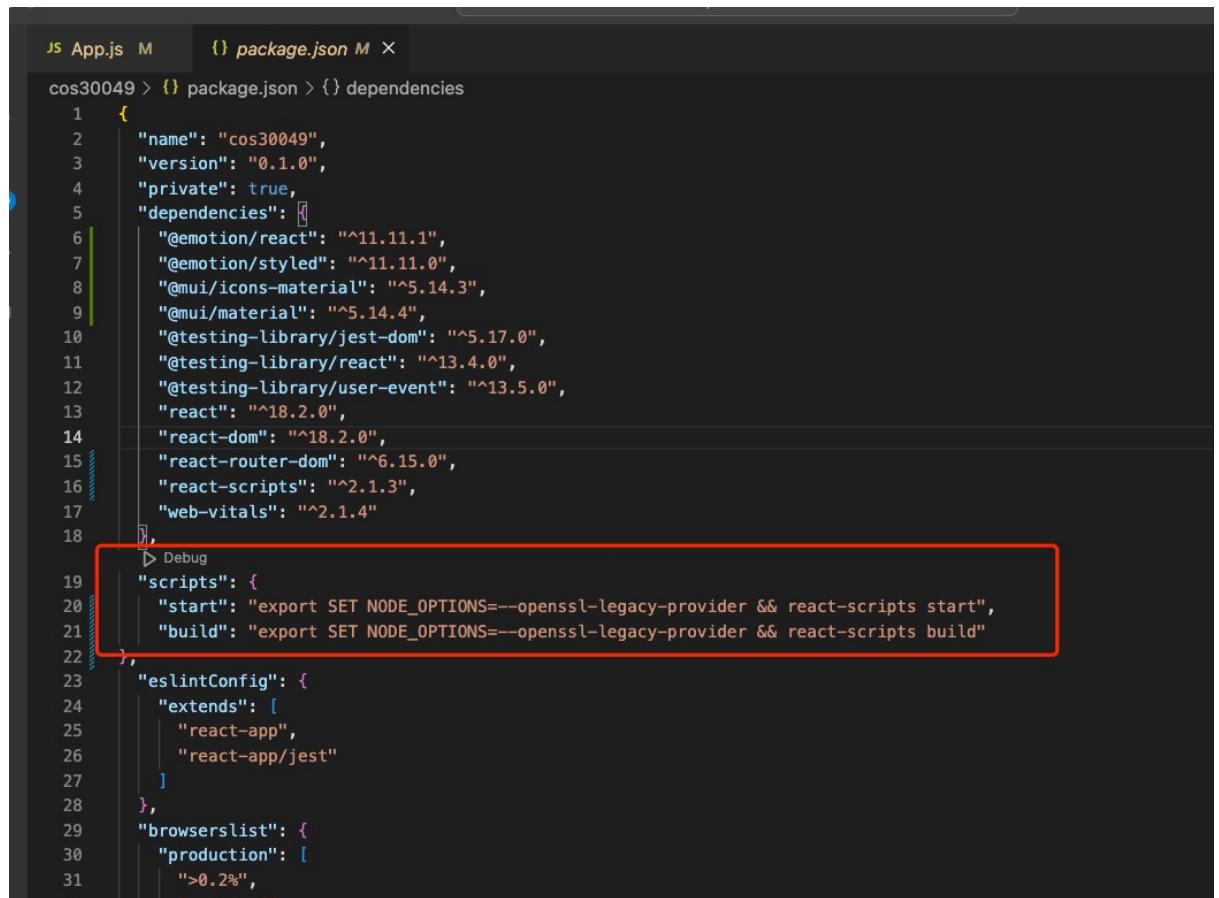
6. Navigation in Material UI (15 mins):

Having accomplished the aforementioned tasks, you should now have two component files. Proceed to implement a navigation bar that enables seamless navigation between these two pages.

Here are the code hints that you can use in your page navigation

Change your code in package.json (with React version 18 +)

```
"scripts": { "start": "export SET NODE_OPTIONS=--openssl-legacy-provider && react-scripts start", "build": "export SET NODE_OPTIONS=--openssl-legacy-provider && react-scripts build" },
```



```
cos30049 > {} package.json M X
JS App.js M {} package.json M X
cos30049 > {} package.json > {} dependencies
1 {
2   "name": "cos30049",
3   "version": "0.1.0",
4   "private": true,
5   "dependencies": [
6     "@emotion/react": "^11.11.1",
7     "@emotion/styled": "^11.11.0",
8     "@mui/icons-material": "^5.14.3",
9     "@mui/material": "^5.14.4",
10    "@testing-library/jest-dom": "^5.17.0",
11    "@testing-library/react": "^13.4.0",
12    "@testing-library/user-event": "^13.5.0",
13    "react": "^18.2.0",
14    "react-dom": "^18.2.0",
15    "react-router-dom": "^6.15.0",
16    "react-scripts": "^2.1.3",
17    "web-vitals": "^2.1.4"
18  ],
19  "scripts": {
20    "start": "export SET NODE_OPTIONS=--openssl-legacy-provider && react-scripts start",
21    "build": "export SET NODE_OPTIONS=--openssl-legacy-provider && react-scripts build"
22  },
23  "eslintConfig": {
24    "extends": [
25      "react-app",
26      "react-app/jest"
27    ]
28  },
29  "browserslist": {
30    "production": [
31      ">0.2%",
32      "not ie 11"
33    ]
34  }
35}
```

Install dependency of react router
npm install react-router-dom

The Link component is built on top of the Typography component, meaning that you can use its props.

```
import React from 'react';
import { Link } from 'react-router-dom';

function Navigation() {
  return (
    <div>
      <Link to="/">Home</Link>
      <Link to="/about">About</Link>
    </div>
  );
}

export default Navigation;
```

```
import React from 'react';
import { BrowserRouter as Router, Route } from 'react-router-dom';
import Home from './Home';
import About from './About';

function App() {
  return (
    <Router>
      <Route path="/" exact component={Home} />
      <Route path="/about" component={About} />
    </Router>
  );
}

export default App;
```

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

Define Your Project Requirements: 11 Steps

<https://www.bairesdev.com/blog/define-your-project-requirements/>

React Playground

<https://playcode.io/react>

HTML Tag

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 Flexbox ?

<https://css-tricks.com/snippets/css/a-guide-to-flexbox/>

What is the Grid system ?

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

Breakpoints in MUI

<https://mui.com/material-ui/customization/breakpoints/>

Link in MUI

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