**ReactJS Notes**

**What is React js**

* a javascript library for building user interfaces
* client-side (runs on the user browser)
* the page doesn’t need to refresh as it does not need to request a new html page, making it super fast
* reduces code needed
* uses components which has dedicated, but small task
* we use react mainly for single page applications. Sometimes when we click a new tab, it looks like we requested a new html page, but we just changed what is visible
* there is html code in js code, which browser cannot understand which is why there is a ‘build’ process which makes the code readable from the browser, so the code we write is not exactly the same as the code the browser reads

**Installing React**

* first we need to install node js <https://nodejs.org/en/> and download the latest version
* check nodejs is installed by typing node-v into the cmd
* open cmd and cd into a folder where you want the react app to be (such as desktop)
* run in cmd: npx create-react-app INSERT\_APP\_NAME
* once it says happy hacking, you are done
* run in cmd: cd INSERT\_APP\_NAME
* run in cmd: npm start (as long as you keep this up, the website will update depending on code changes)
* this should open a tab on your browser at <http://localhost:3000/>

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* open the react app in a code editor
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* Open src folder, and delete app.test.js, logo.svg, reportWebVitals.js, setupTests.js, and App.css
* You should be left with the following: Graphical user interface, application

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* In src, go to index.js and make it look like the following

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* In src, go to index.css and remove all of it

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* In src, go to app.js and make it the following

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* Open in vscode, go to view, extensions, and type prettier
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* Install it, then go to file, preferences, keyboard shortcuts, type format document, and edit the first one to make a shortcut u want

**Diving into the project**

* We have two js files, index and app. Index is the starting point of our react application, the code in here will be the first code that will be executed in our browser.
* Notice we imported the ReactDOM object from the ‘react-dom’ library
* On the ReactDOM object, we call a render method which allows us to add html code. This html code works because of the build step. This html in js code is called JSX. JSX is not understood by browsers and is converted behind the scenes.



* Notice this code renders our own html element, the <App/> element which is imported from the App file.
* We tell the App element to be placed where the element of id of root is. (you can find the root in public/index.html)
* Index.html is the single html page in the project since react is mainly used for single paged applications
* Notice if you inspect the page, not ctrl U, and open the div with id root, we see code added there even tho we didn’t add it directly on the index.html page.

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**Components**

* Looking at App.js, App is a react component, which is just a standard js function, but it returns JSX code.
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* We export the function using ‘export default AppNAME;’ to make it accessible outside the file
* Also, notice when we inspect the page, we don’t see a div called App, we just see the return value of the App function. This is because these custom elements like App is not understood by the browser.
* We can change the app js code to look like the following
* We just write the html code we want to have appear on the screen

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* Notice the browser auto reloads to detect the changes
* Go to <https://github.com/academind/react-complete-guide-code/blob/zz-reactjs-summary/extra-files/index.css> and copy the css code and put it into index.css
* Go back to app.js and add the card class to a div using the className. Note we don’t use class like html since class is a keyword in javascript.
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**Building and Reusing Components**

* However, right now, all our code is in one component, and we might want to split that up in the future. For example, if we want a second todo, we have to replicate the entire code block. As well, if we want to change all the code blocks, you have to go to each of the code blocks and edit it manually instead of making the change in one location. That’s why react has components
* Create a new folder in the src folder called components
* Create a new file in the components folder which will be the name of your app. The name has to start with a capital to differentiate it from built-in html components.

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* Now make app.js and todo.js look like the following
* Note the Todo app is self closing, we could also write <Todo></Todo>, but since there is not content between it, we can self close it.

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* If we want multiple Todo, we just have to Todo multiple Todo elements and one change in the Todo.js file will change all the Todo elements.

**Props and Dynamic Content in Components**

* We want to pass arguments into the components
* In app.js, add the following

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* In the component, we can add a parameter called props(we can name it whatever we want, but the idea is called props so we’ll use props)
* Props is a js object and all the arguments are key value pairs. So the attribute names such as ‘text’ would be keys will the value would be something like ‘Learn React’
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* Notice we use {} around props.text to tell react this is js and not html, since otherwise, the h2 name would be props.text. Inside the {}, we can have things like 2+2 and it’ll evaluate to 4. You can have any single line expression inside the {}, but you can’t have block expressions like if statements.

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**Handling Events**

* If we want to listen to a button, we add an extra attribute
* Note: all the default HTML elements in the JSX are actually react components, allowing us to add certain attributes that we normally wouldn’t be able to with just HTML
* For any element, we can add an onClick attribute and let it equal some function



* We do not put () after the function name as that executes the function, we only want to point at it.

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**Adding More Components**

* Make a Backdrop and Modal.js file

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* Notice in Backdrop, we can make the div self-closing since it doesn’t have any content inside it.
* However, when we run the program, the website never changes, thus we need state

**State**

* In order to change what we see, we have to change the state of components
* React has a built in concept called state
* We need to import the useState function from ‘react’. We don’t need to have a path since it’s a third party library, we can reference the library name
* 
* With usestate, we register different states
* useState always returns an array with two elements which we can store within a constant with array de-structuring
* we can think of state as a variable that is managed by react
* in our case, we define the initial value to be false. We can access the currently stored value through the modalIsOpen and we change the value through setModalIsOpen function
* 
* Whenever we change the state via the setModalIsOpen, react will re-execute the component function to which the state belongs and update what is rendered on the screen

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* Notice when we click the button, it references the deleteHanlder function which changes the state of the component
* We can remove modal and backdrop from App.js
* Instead, we’ll import Modal and Backdrop in the Todo.js file
* Now, if the modal is meant to be open, we want to display the Modal element, and null otherwise



* The above code is equivalent to using the following, but Backdrop instead of Modal. Using the logical and operator, if both conditions are true, the second value will be executed. The component function will always be true, so it depends on if modalIsOpen is true.



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* Now, if we run our program, the Todo component will execute but since the state for modalIsOpen is false, the Modal and Backdrop app are not displayed. Once we click the button, it references the deleteHandler function which will set ModalIsOpen to true. This will re-execute the Todo component and since modalIsOpen is true, the Modal and Backdrop elements will be executed and displayed.

**Event Props**

* We want to close the modal when the user clicks outside the modal(backdrop), cancel, or confirm, but not the modal itself.
* Thus, we might try to create a closeModalHandler function that changes the state of the component, namely closing the Modal. This closeModalHandler function will be called by clicking on the Backdrop.
* HOWEVER THE BELOW CODE IS INCORRECT (as of now). It is incorrect as the Backdrop component is not a built-in component, so the onclick prop is not defined so clicking the backdrop never calls the closeModalHandler function. Thus, we need to add an onclick prop to the Backdrop component.
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* Below, we add props to the Backdrop component since we want to change the state of the Modal to false when the backdrop div is clicked. First, we add a props parameter object to the Backdrop component. We want to pass in a function that can accessed via props.onClick. Thus, in our div we can add an onClick that points towards the function that is passed in which is props.onClick. Note that the onClick in the div must be called onClick since it is a built-in prop. However, props.onClick could be called props.onCancel or whatever since it is a user-defined prop. So the closeModalHandler function is passed in as an argument for the Backdrop component, which the Backdrop component references when the Backdrop div is clicked. The Backdrop component references this argument function via props.onClick.
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* The same idea is applied for the Modal component. In the Todo component, we want to change the state of the Modal to false when the cancel or confirm button is clicked. First, we add a props parameter object to the Modal Component. We want to pass in a function that is executed when the user clicks confirm and another function when the user clicks cancel. Thus, in the Todo component, we add the onConfirm argument and onCancel argument. These two arguments are both functions, in fact they are the same function as they both reference the closeModalHandler function. These argument functions are passed into the Modal component and accessible via props.onConfirm or props.onCancel. They are referenced when the user clicks the confirm or cancel buttons respectively. Note that it must be called onClick for the button prop since it is a built-in prop, while the onConfirm and onCancel props belong to the user-defined Modal component so we can name those props whatever.

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* Going back to the Todo component, it should look like the below
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**Routing**

* We are going to leave the todo app project and work on a completely new project so redo the installation process
* For the css, use this <https://github.com/academind/react-complete-guide-code/blob/zz-reactjs-summary/code/08-adding-routing/src/index.css>
* Make a components folder

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* Routing is the url that is displayed
* Since we never fetch a new html page, we give the illusion of going to new pages by changing what is visible.
* We add a router which is a special tool that watches changes in the url and then changes what components to render and make visible on the screen depending on the url
* To add the routing functionality, we have to go to cmd in our react-project folder and run: npm install react-router-dom
* Make sure to run npm start after
* Create a new folder inside the src folder called pages. Just like the components folder, it is not mandatory but it is good style.
* Inside the pages folder, we will create new react components which is just like the components before, but will be loaded by the router. We will create the following files.

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* Go to index.js and import BrowserRouter
* BrowserRouter is a component itself so we can use it as an html element and wrap it around the app component for example.
* We initialize the router package and make it aware of this app and changes to the url
* We have to define the urls we want to support and which components to be loaded based on these urls
* Go to app.js and import Route, and all the pages components
* Route is a component whose job is to define different paths and urls and the components that will be loaded based on these urls
* The part after the domain is the path. Ex ‘/hello’ is the path to ‘www.grant.com/hello’.
* We add the route component to the return and beside it we add path = ‘/insertPath’
* Inside the route component, we add the component that should be rendered

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* In the code above, if the path includes ‘/’, then the AllMeetupsPage will be displayed.
* However, if we go to <http://localhost:3000/new-meetup>, we get the following
* A screenshot of a computer screen

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* Both the AllMeetupPage and the AllMeetupPage components are rendered. React router matches all paths and checks if the current path starts/includes the paths. For example, <http://localhost:3000/new-meetup> has a path of ‘/new-meetup’. This path starts with ‘/’, hence why AllMeetupPage component is rendered. But the path also contains ‘/new-meetup’ which is why the AllMeetupPage component was rendered.
* Often times, this is not what we want, thus we also have to import the switch component
* We can use the switch component to wrap our route components and this tells react only one of these routes should be rendered.
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* However, when we go to <http://localhost:3000/new-meetup>, only the AllMeetupsPage component is rendered. This is because Switch stops looking at other routes once it finds a match. And by default, the Route component checks if the current path starts/includes the Route component path. The path of <http://localhost:3000/new-meetup> is /new-meetup. This path starts with ‘/’ which is one of the Route component paths and hence renders the component that corresponds wit the ‘/’ path which is AllMeetupsPage.
* To prevent this issue, we can add the exact prop after the Route component path. This exact prop tells the Route component that it should not check if the current path starts with the Route component path, but rather exactly equals the Route component path.

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* Now, when we run the program, and go to <http://localhost:3000/new-meetup>, the NewMeetupPage component is rendered as desired.
* Right now, we are changing the url manually. In the future, we could have a navigation bar that makes changing the url without having to do it manually possible.

**Adding Links and a Navigation Bar**

* Go to components, and add a new folder called layouts and create a MainNavigation.js file inside it
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* We could use an <a href= ‘’> tag to add links, but that sends a request to the server to get a new html page which is not what we want
* To avoid a new request, we can import the Link component
* The Link component is the same as <a>, but it attaches a click listener to the anchor tag so it doesn’t send a new request to the server. Instead, it’ll just parse the url you want to go to, change it in the url bar, and load the appropriate components.
* The Link component has a ‘to’ prop which is the path the link takes you to
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* Now we can go to the app.js file and import it and add it
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**CSS Modules**

* We probably want different css files for our different components. As well, it would be nice to have our css file to only affect a certain component, and not another one, even if there is a supposed ‘name-conflict’
* CSS modules allow us to scope styles to components, allowing us to attach css files to specific components
* Inside the layouts folder, beside MainNavigation.js, create a MainNavigation.module.css file.
* Add the following code to the css file <https://github.com/academind/react-complete-guide-code/blob/zz-reactjs-summary/code/10-styling-with-css-modules/src/components/layout/MainNavigation.module.css>
* In the MainNavigation.js file, import the MainNavigation.module.css file.
* When we import, we import an object, in our case called classes. All the css classes defined in the css file will be properties of the imported object.
* Behind the scene, the classnames will be name unique per component
* Now, we need to add the desired object classes to the elements

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**Outputting Lists**

* Go to AllMeetup.js
* Create a const array of dummy data found on <https://github.com/academind/react-complete-guide-code/blob/zz-reactjs-summary/code/11-outputting-lists-of-data/src/pages/AllMeetups.js>
* In react, arrays are automatically rendered by react. So {[<li>Item1</li>, <li>Item2</li>]} would become <li>Item1</li>

<li>Item2</li>

* Recall map takes an array, such as DUMMY\_DATA, goes through each element in the array, and creates a new array with changes we made to each element. We want to change our array from an array of object to li elements as shown below. The word meetup represents each element in the DUMMY\_DATA array which are the two big objects. Then, we can specify which property of the two inner objects we want via meetup.propertyName.
* We have to note that each child in a list should have a unique key prop which is a requirement by react, we don’t need to understand this. We just need to know we have to add a unique item for each li item.
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* We want to add styling to the list, but we want to make it component specific, so we’ll create new apps
* We’ll create another folder inside components called meetups. Inside the meetups folder, we’ll create a MeetupItem.js, MeetupList.js, MeetupItem.module.css, and a MeetupList.module.css file.

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* The code for the two css modules can be found at <https://github.com/academind/react-complete-guide-code/tree/zz-reactjs-summary/code/12-adding-more-react-components/src/components/meetups>
* Go to MeetupItem.js

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* This component returns a list item with some divs and other built-in html elements to make a meetup item. Note that the specific content will be passed in via the props object and can be accessed via props.title or whatever.
* Go to MeetupList.js

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* This component returns a list of all the MeetupItems. It takes in a prop object which is passed from AllMeetup.js. One of the prop attributes is meetups (we called it meetups ourselves) which returns the const array where each element is a meetup item that contains id, image, address and other info. Since props.meetups is an array, we can apply the map function on the array which goes through each element of the array. We let meetup represent an item in this array. meetup is the meetup item that contains id, image, address and other info which we can add access via meetup.property. Each of these meetup.property is an argument for the MeetupItem component used to display the MeetupItem component.
* Go to AllMeetups.js, import MeetupList and use this component to display all the Meetups.

**Props Children**

* Suppose we want to create a reusable component that acts as a wrapper around other components and give those components some styling
* In the components folder, create a new folder called ui. In there, we can store general components that don’t belong toa specific feature but instead are used in different places of the app
* Inside the ui folder, create a Card.js and Card.module.css file
* Fill the Card.module.css file with this code <https://github.com/academind/react-complete-guide-code/blob/zz-reactjs-summary/code/13-building-wrapper-components-props-children/src/components/ui/Card.module.css>
* Go to Card.js

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* Now, we go to MeetupItem and we can import the Card component and wrap it around the div
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* However, when we run the program, we can’t see any of the meetup information

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* This is because the Card component simply renders a div and doesn’t know what to do with any wrapped content, so it just doesn’t render the wrapped content.
* To pass wrapped content to the Card component, we use pass in a special prop to the Card component. This prop is called props.children. Every component receives the props.children prop by default and props.children holds the content that is passed between he opening and closing of a component tag.
* Go to Card.js and add props.children

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* We can also add more left/right space by creating a Layout.js and Layout.module.css file inside the layout folder
* In Layout.module.css, add the following code <https://github.com/academind/react-complete-guide-code/blob/zz-reactjs-summary/code/13-building-wrapper-components-props-children/src/components/layout/Layout.module.css>
* Go to App.js, delete the line with the MainNavigation element. Then add the Layout component.

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* Now, the content in between the Layout component is passed to the Layout component and processed inside the function in Layout.js.