

**1** You have a **PriceEditor** component that has one property called **price**. How would you use that component?

- <code>editPrice(23.47)</code>
- <code>PriceEditor.property("price23.47")</code>

**C** <code>PriceEditor.price("23.47")</code> **J E B A H**

**2** You have a **Probability** component that has one property called **price**. How would you make use of that property in the component?

**S H A D** **B** **E** **G** **H** **I** **C** **F** **J**

**3** How does React keep track of changes to data in a naming application? Choose two.

- An internal database
- No database is used at all
- A flat database
- A tree-based database

**4** How does React's virtual DOM recognize when something has changed?

State needs to be checked for current and previous values

React checks for changes in state

React checks for changes in props

**R E B H C**

**5** Is or Not?

You can modify a state variable by modifying it directly.

**Y E S** **D H C F G**

**6** State variables are declared using which symbol?

- colon symbol in front of variable
- colon symbol in variable
- colon symbol in front of variable name
- colon symbol in variable name

**7** Why is it important to use the `set` method that `useState` provides to update your state variable?

It makes it easy to update the state

It makes it easy to use the state

**R E B H C** **D A W**

**8** What does this call the flow of data changes from child components to parent?

Reverse flow

Inverse flow

**H C D** **E G F** **I J**

**9** Properties flow from ...?

Children to their parent

Parents to their children

**10** Where should state data be placed in a component hierarchy?

in the higher component in the hierarchy

in the highest common component in the hierarchy

in the same component where the data is being used

**11** How do you modify the state variables that are higher up in the component hierarchy?

Using the reference to the component

Using the reference to the component's parent

**12** Is or Not?

Is the latest version of your app made working with state from a service?

**Y E S** **N O D H C**

**13** Is or Not?

All these components have to be updated?

**Y E S** **D B C H**

**14** How does the following piece of code cause the component lifecycle to behave?

```
useState(() => {})
```

Initializes the component

Initializes the component and performs the effect

Initializes the component and performs the effect, then runs the effect

**15** How does the following piece of code cause the component lifecycle to behave?

```
useState(() => {}, [state])
```

Initializes the component

Initializes the component and performs the effect

Initializes the component and performs the effect, then runs the effect

**16** How does the following piece of code cause the component lifecycle to behave?

```
useState(() => {}, [1, 2])
```

Runs the effect when the component and parent component are mounted

Runs the effect when the component and parent component are unmounted

**17** Which piece of code needs to only run the effect on the initial render?

useState(() => {}, [1, 2])

useState(() => {}, [1])

useState(() => {}, [1, 2, 3])

**18** Is or Not?

In the following piece of code, state can be a React prop?

```
useState(() => {}, [state])
```

**Y E S** **N O H G C**

1

You have a **PriceEditor** component that has one property called **price**. How would you use that component?

<PriceEditor 23.67 />

<PriceEditor property="price:23.67" />

C

<PriceEditor price="23.67" />

J

E

B

A

H

2

You have a **PriceEditor** component that has one property called **price**. How would you make use of that property in the component definition? Choose *two*



**props.price**  
Assuming props has been declared a param as `{props}`



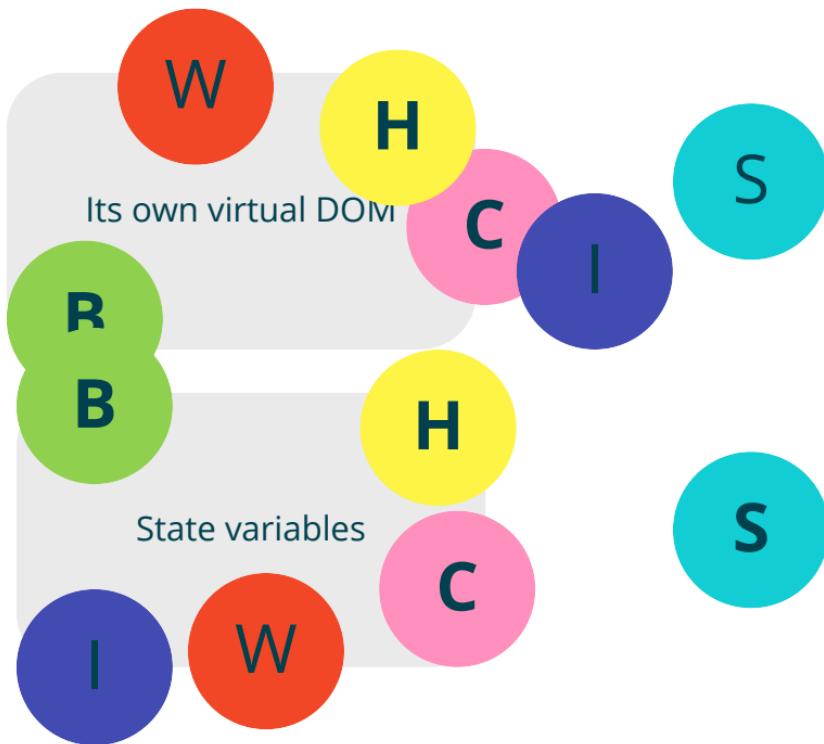
**const {price} = useProps()**

3

How does React keep track of changes to data in a running application? Choose *two*

An internal database

The browser's Local and Session storage

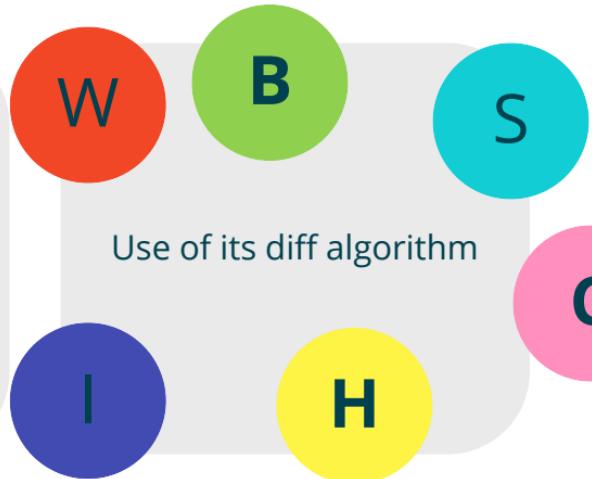


## 4

How does React's virtual DOM recognize when something has changed?

State hooks cause React to check current and previous state values

Scanning your code's state variables

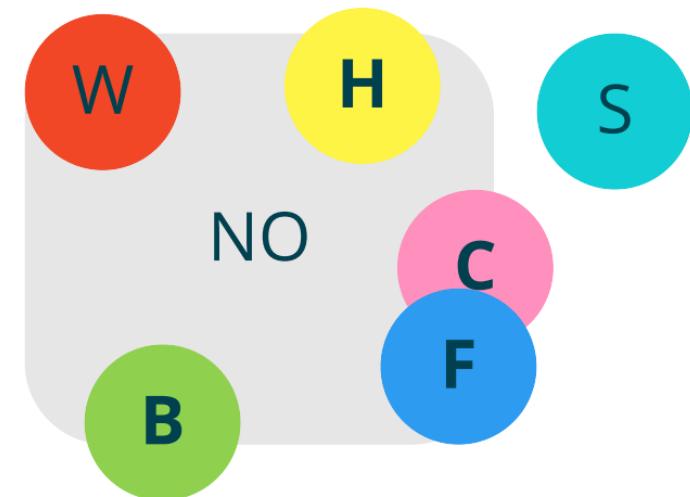


5

**Yes or No?**

You can modify a state variable by modifying it directly.

YES



6

## State variables are declared using which syntax?

`const variable = <some initial value>`

`const variable = useState()`

`const [variable, setterForVariable] = useState()`

B

C

S

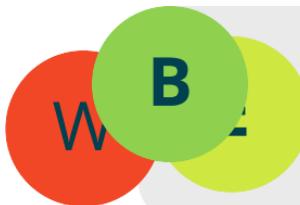
D

W

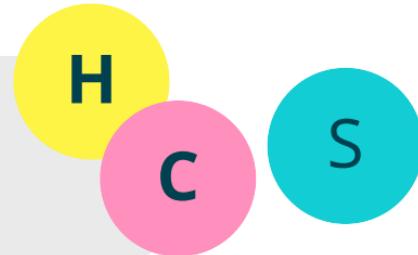
H

7

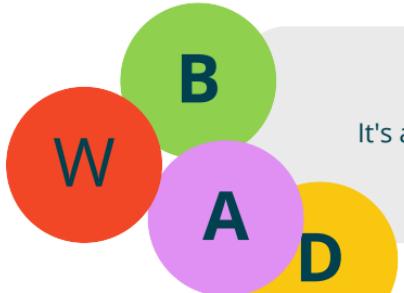
Why is it important to use the setter method that useState() provides to update your state variable?  
Choose two



It causes React to perform a diff on the state data



It's a safer and OO way of updating the variable



It's a hook that causes React to perform other internal actions



8

What does React call the flow of data changes from child components to parents?

Reverse flow



Inverse flow



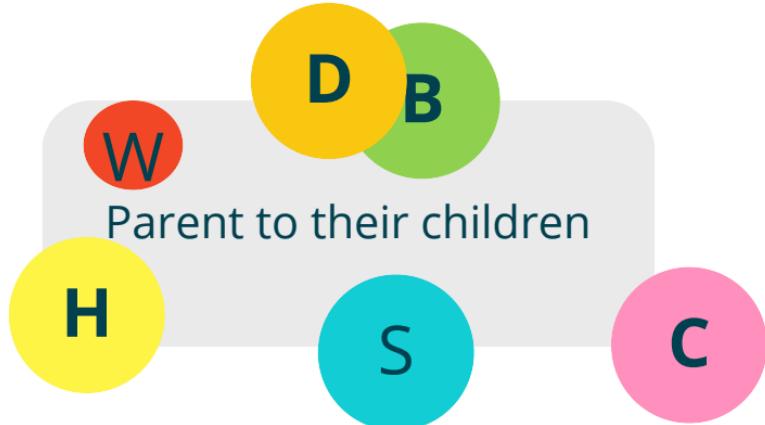
B

Unidirectional flow

9

Properties flow from...?

Children to their parent



10

Where should state data be placed in a component hierarchy?

In the highest component in the hierarchy



In the highest common component in the hierarchy

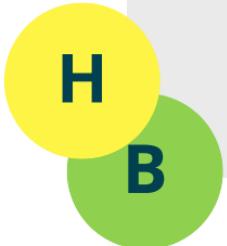
In the same component where the data is being used

11

How do you modify the state variables that are higher up in the component hierarchy?



By providing a callback to the child components



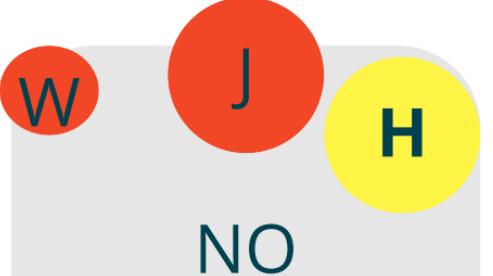
By passing the state variable down the hierarchy as a property

12

**Yes or No?**

Does a static version of your app involve working with data from a server?

YES



W

J

H

NO

S

B

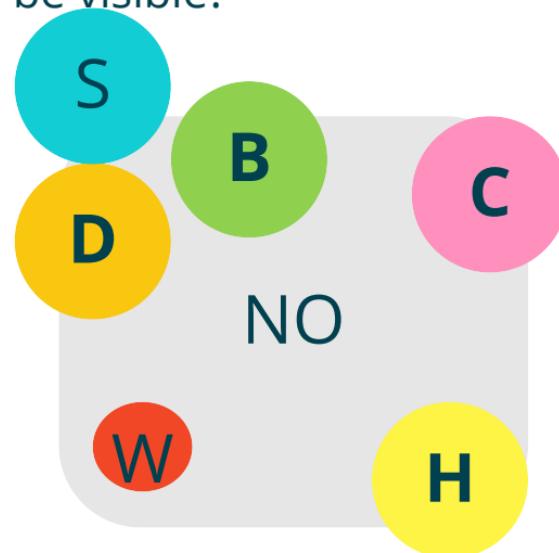
C

13

**Yes or No?**

Do all React components have to be visible?

YES



14

How does the following piece of code cause the component lifecycle to behave?

```
useEffect( ()=> { ... } )
```

D

W

S

Runs the effect every time for CDM, CDU  
and possibly CWU

Runs the effect only once

Runs the effect every time one of its state  
variables change

H

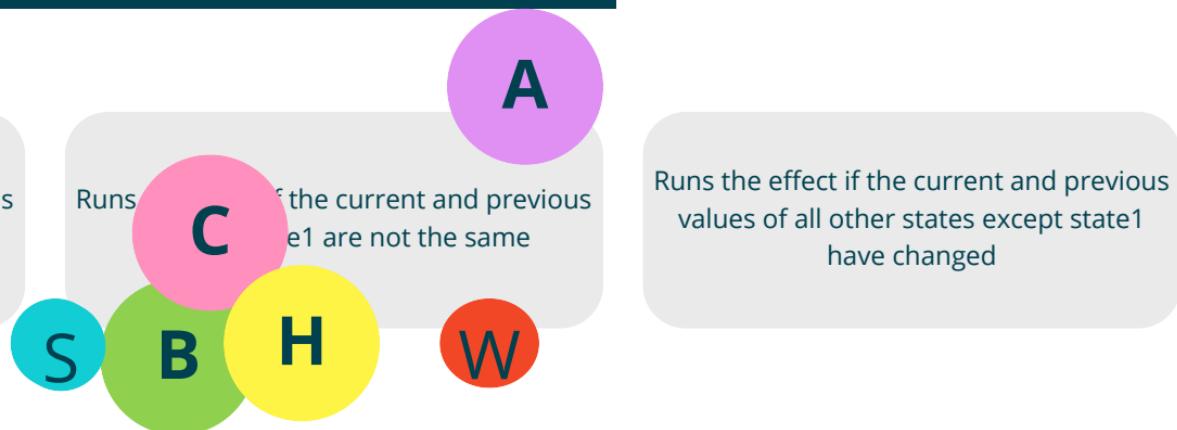
B

C

15

How does the following piece of code cause the component lifecycle to behave?

```
useEffect( ()=>{ ... }, [state1] )
```



16

How does the following piece of code cause the component lifecycle to behave?

```
useEffect( ()=>{ ... }, [s1, s2] )
```

C

W

Runs the effect if the current and previous value of s1 or s2 differ

S

B

H

D

Runs the effect if the current and previous value of s1 and s2 are unchanged

17

Which piece of code tells React to only run the effect on the initial render?

W

C

H

E

S

B

`useEffect( ()=>{ ... }, [] )`

`useEffect( ()=>{ ... } )`

`useEffect( ()=>{ ... }, [dataState] )`

18

**Yes or No?**

In the following piece of code, data can be a React prop?

```
useEffect( () => { ... }, [data] )
```

W

YES

G

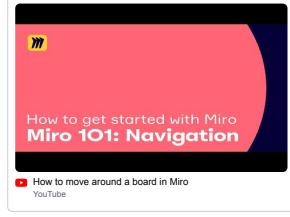
S

H

B

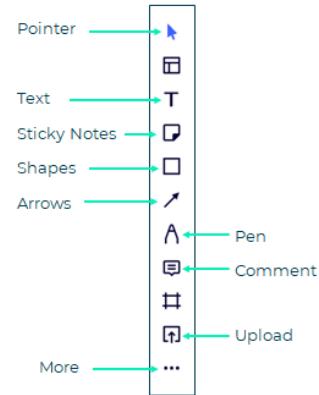
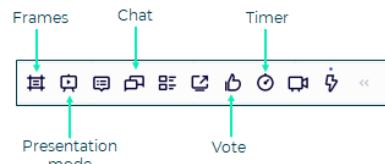
C

NO

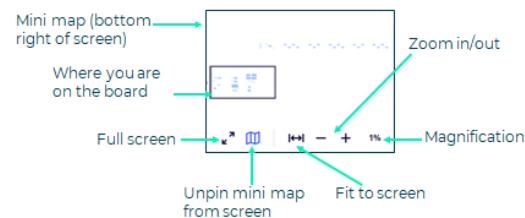


## QA Basic navigation tools...

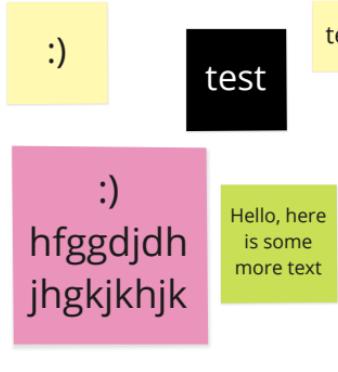
- Main navigation tools (visible to everyone) are on left-hand side of screen
- Can use keyboard shortcuts – e.g. CTRL-C, CTRL-V
- Tools (bottom left of screen) visible to you



## QA Basic navigation tools...

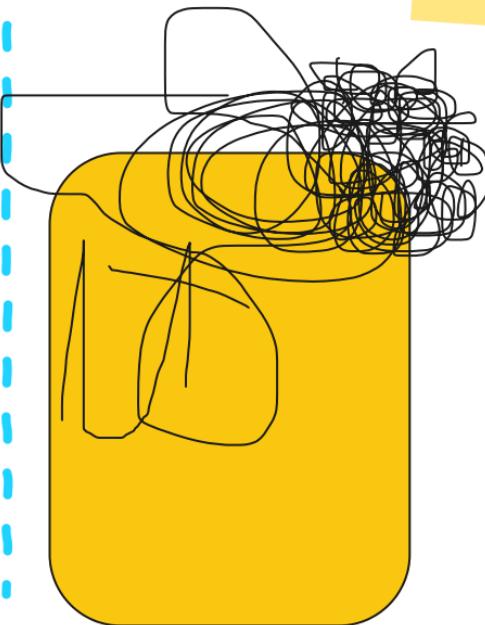


# Add some post its!



Press N to  
create your  
own sticky  
notes

# Draw something



Press P to  
create your art

# Write something

I am writing something



Some text

hello

hello

Press T to  
express your  
thoughts

# Objectives for this event

Practice a project in React. More understanding of how props is transferred up components

Deeper understanding of React

Understand how useReducer works

More practice and confidence in React, particularly with useState, props, useEffect

Refresh knowledge

Better understanding of props

observing teaching techniques for ReactJS

Testing of components

*Regarding webcams*

*Regarding mute*

*Frequency of breaks*

*Regarding group participation*

*Regarding questions*

*Anything else*

15 min for tea and coffee  
60 mins for lunch  
offer optional 5 mins  
9:30 start  
16:30 end

Name

Organisation

Role

Project Types

Cameron  
Guthrie

QA  
Ltd

Senior  
Technical  
Learning  
Specialist

Trainer for  
corporate clients.  
SME for various  
content  
generation roles

- 1 You have a `ProductList` component that has one property called `price`. How would you use that component?**

`<ProductList price={25.97} />`

`<ProductList price="price 25.97" />`

`<ProductList price="25.97" />` ✓

**2 You have an `OrderDetail` component that has one property called `price`. How would you make use of that property in the component's `componentDidMount` function?**

✓ `propagate` `mounting prop to state`

✓ `price` `using prop as return value (SOLID)`

✓ `use prop as a state property`

**3 How does React keep track of changes to data in your application? Choose two.**

An external database ✓

An in-memory state ✓

Has its own local and persistent storage ✓

Has no state ✓

**4 How does React's virtual DOM recognize when something has changed?**

Only tracks user input ✓

Only tracks component state ✓

Only tracks the whole application ✓

✓

**5 Yes or No? You can modify a state variable by modifying it directly.**

YES ✓

NO ✓

**6 State variables are declared using which syntax?**

const state = useState(initialValue) ✓

const variable = useState(initialValue) ✓

const [variable, setVariable] = useState(initialValue) ✓

**7 Why is it important to use the `setInterval` method that `useState` provides to update your state variable?**

It makes the code more readable ✓

It makes it easier to apply hooks ✓

It makes the code easier to get rid of when needed ✓

✓

**8 What does React call the flow of data changes from child components to parents?**

Reverse flow ✓

Unidirectional flow ✓

Unidirectional flow

**9 Properties flow from...?**

Children to their parent ✓

Parent to their children ✓

**10 Where should state data be placed in a component hierarchy?**

In the highest component in the hierarchy ✓

In the highest-level component in the hierarchy ✓

In the same component where the data is being used ✓

**11 How do you modify the state variables that are higher up in the component hierarchy?**

By passing the state up as a prop ✓

By passing the state down as a prop ✓

**12 You are No? You are running an older version of your app. Is code working with state from a service?**

YES ✓

NO ✓

**13 Yes or No? Do all React components have to be valid?**

YES ✓

NO ✓

**14 How does the following piece of code cause the component lifecycle to behave?**

`useEffect(() => { ... })` ✓

Only runs once when the component mounts and then never again

Mounts on every render

Mounts on every render and handles state changes

**15 How does the following piece of code cause the component lifecycle to behave?**

`useEffect(() => { ... }, [state])` ✓

Only runs once when the component mounts and then never again

Mounts on every render

Mounts on every render and handles state changes

**16 How does the following piece of code cause the component lifecycle to behave?**

`useEffect(() => { ... }, [x, y])` ✓

Only runs once when the component mounts and then never again

Mounts on every render

Mounts on every render and handles state changes

**17 Which piece of code tells React to only run the effect on the initial render?**

✓ `useEffect(() => { ... }, [])`

`useEffect(() => { ... }, [x])`

`useEffect(() => { ... }, [state])`

**18 Yes or No? In the following piece of code, does `useEffect` run first?**

`useEffect(() => { ... }, [state])` ✓

YES ✓

NO ✓

1

You have a **PriceEditor** component that has one property called **price**. How would you use that component?

<PriceEditor 23.67 />

<PriceEditor property="price:23.67" />

<PriceEditor price="23.67" />



2

You have a **PriceEditor** component that has one property called **price**. How would you make use of that property in the component definition? Choose *two*



**props.price**

Assuming props is a param of the component

**props.price**

Assuming props has been declared as a param as  
**({props})**



**price**

Assuming props has been declared as a param as  
**({props})**

**const {price} = useProps()**

3

How does React keep track of changes to data in a running application? Choose *two*

An internal database

Its own virtual DOM

The browser's Local and Session storage

State variables



## 4

How does React's virtual DOM recognize when something has changed?

State hooks cause React to check current and previous state values

Scanning your code's state variables

Use of its diff algorithm



5

**Yes** or **No**?

You can modify a state variable by modifying it directly.

YES

NO



6

## State variables are declared using which syntax?

const variable = <some initial value>

const variable = useState()

const [variable, setterForVariable] = useState()



7

## Why is it important to use the setter method that useState() provides to update your state variable?

It causes React to perform a diff on the state data



It's a safer and OO way of updating the variable



It's a hook that causes React to perform other internal actions

8

What does React call the flow of data changes from child components to parents?

Reverse flow

Inverse flow

Unidirectional flow



9

Properties flow from...?

Children to their parent

Parent to their children



10

Where should state data be placed in a component hierarchy?

In the highest component in the hierarchy

In the highest common component in the hierarchy

In the same component where the data is being used



11

How do you modify the state variables that are higher up in the component hierarchy?

By providing a callback to the child components



By passing the state variable down the hierarchy as a property

12

Yes or No?

Does a static version of your app involve working with data from a server?

YES

NO



13

Yes or No?

Do all React components have to be visible?

YES

NO



14

How does the following piece of code cause the component lifecycle to behave?

```
useEffect( ()=> { ... } )
```



Runs the effect every time for CDM, CDU  
and possibly CWU

Runs the effect only once

Runs the effect every time one of its state  
variables change

15

How does the following piece of code cause the component lifecycle to behave?

```
useEffect( ()=> { ... }, [state1] )
```

Runs the effect if the current and previous value of state1 are the same

Runs the effect if the current and previous value of state1 are not the same

Runs the effect if the current and previous values of all other states except state1 have changed



16

How does the following piece of code cause the component lifecycle to behave?

```
useEffect( ()=> { ... }, [s1, s2] )
```

 Runs the effect if the current and previous value of s1 or s2 differ

Runs the effect if the current and previous value of s1 and s2 are unchanged

17

Which piece of code tells React to only run the effect on the initial render?

useEffect( ()=>{ ... }, [] )

useEffect( ()=>{ ... } )

useEffect( ()=>{ ... }, [dataState] )

18

Yes or No?

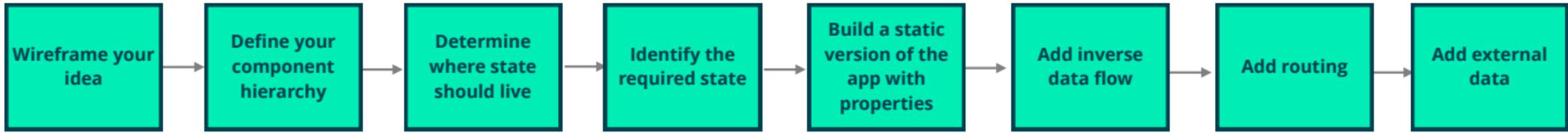
In the following piece of code, data can be a React prop?

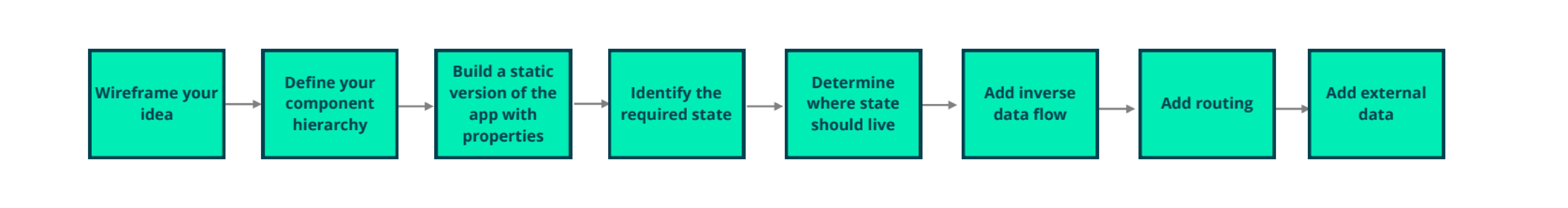
```
useEffect( () => { ... }, [data] )
```

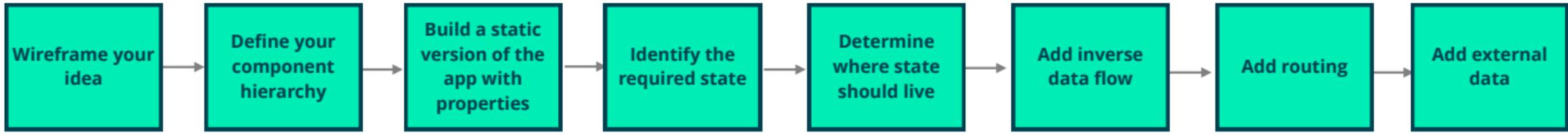


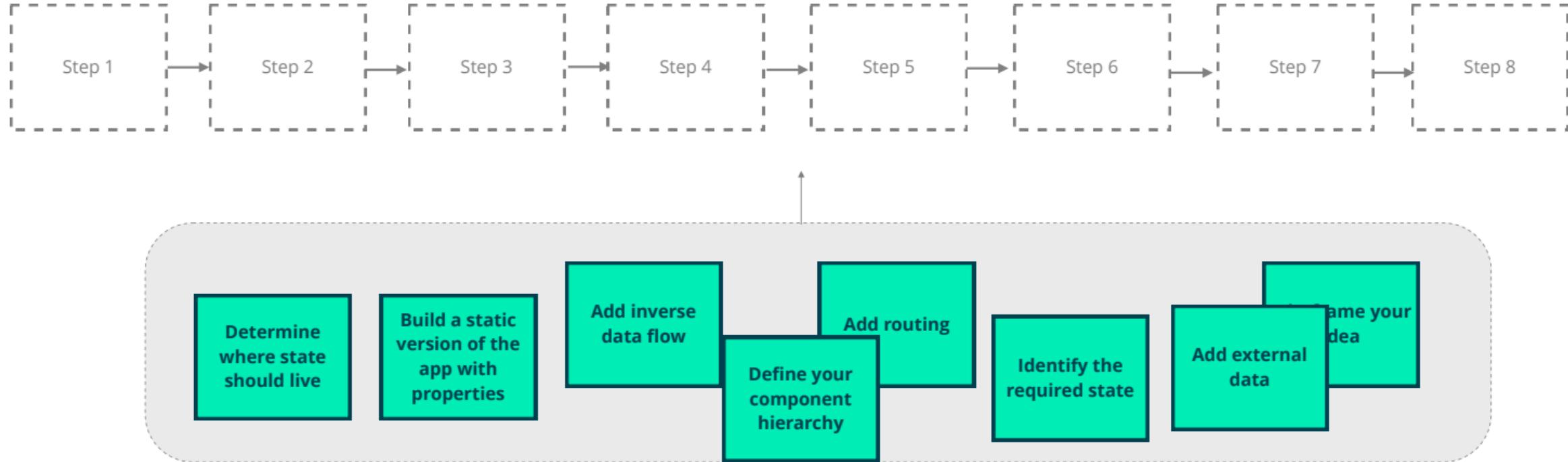
YES

NO









# Mini Lab - VAT Calculator

During your Digital Phase you completed labs for a **ToDo** application

As a refresher and to consolidate what you have learnt, you will now develop a simple **VAT Calculator**

localhost:3000

### VAT CALCULATOR

VAT Rate:

Price excl VAT:

VAT to pay: 10

Price incl VAT:

## User Stories

1

As a user, I want to be able to calculate the VAT to pay and the net price (price excluding VAT) given the gross price of an item (price including VAT).

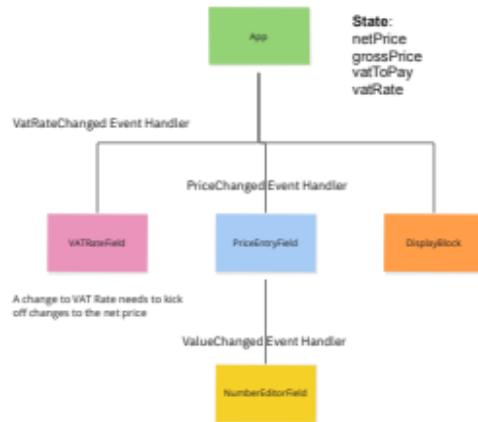
2

As a user, I want to be able to adjust the VAT rate so that I can meet different government VAT requirements. The VAT rates should be 20%, 15%, 12.5% and 0% (Exempt).

3

As a user, I want to be able to calculate the total VAT to pay on an item and the total cost of the item including VAT (gross price) given its price excluding VAT (net price).

## Suggested Components



localhost:3000

### VAT CALCULATOR

VAT Rate:

Price excl VAT:

VAT to pay: 10

Price incl VAT:

## Code in Pairs

### Option 1

Code the solution for the VAT calculator in pairs.

### Option 2

Code the solution for the VAT calculator along with your instructor.

## Mini Lab - Key Takeaways

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Add stickies describing your key takeaways from this activity.

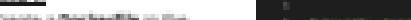
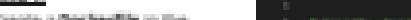
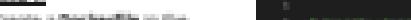
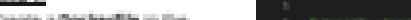
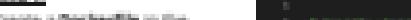
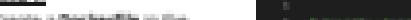


# Dockerizing a React Application

**Step 1:**  
Create a Dockerfile in the root of your React Application directory

```
vat-calculator> nano Dockerfile
# Step 1: Set the base image to use nodejs
FROM node:12-alpine
# Step 2: Create a .dockerignore file in the root of your React Application directory
# Step 3: Copy the React App to the root directory in the container
COPY . /app
# Step 4: Set the working directory in the container
WORKDIR /app
# Step 5: Install app dependencies
RUN npm install
# Step 6: Run the application
EXPOSE 4250
CMD ["node", "index.js"]
```

Right-click picture and select "Run in terminal" to run叩叩命令



## Step 1:

Create a **Dockerfile** in the root of your React Application directory

```
vat-calculator > 🏡 Dockerfile > ...
1  # Set the base image to node:17-alpine
2  FROM node:17-alpine as build
3
4  # Specify where our app will live in the container
5  WORKDIR /app
6
7  # Copy the React App to the app directory in the container
8  COPY . /app/
9
10 # Install the app dependencies
11 RUN npm install
12 # Build a production version
13 RUN npm run build
14
15 # Prepare nginx
16 FROM nginx:1.21.6-alpine
17 # Copy the built react app from alpine container to nginx container
18 COPY --from=build /app/build /usr/share/nginx/html
19 # Copy our new config file for nginx
20 COPY nginx/nginx.conf /etc/nginx/conf.d/default.conf
21
22 # Start nginx|
23 EXPOSE 80
24 CMD ["nginx", "-g", "daemon off;"]
25
```

Right click picture and select  
"Send to back" to reveal copyable code

## Step 2:

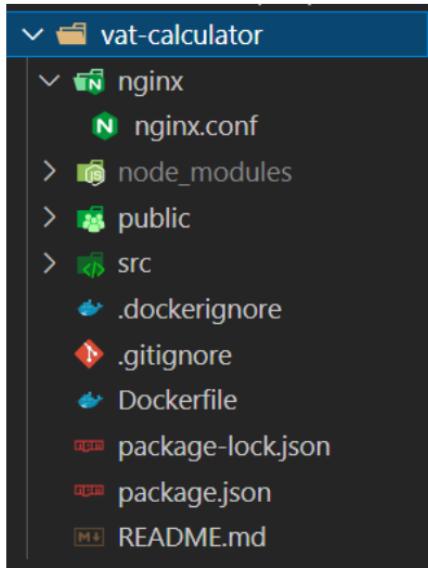
Create a **.dockerignore** file in the root of your React Application directory

```
vat-calculator > ⚡ .dockerignore
  1   node_modules
  2 |
```

### Step 3:

Create an **nginx** folder in the root of your React Application folder.

Add a file: **nginx.conf**



```
vat-calculator > nginx > N nginx.conf
1 server {
2
3     listen 80;
4
5     location / {
6         root    /usr/share/nginx/html;
7         index  index.html index.htm;
8         try_files $uri $uri/ /index.html;
9     }
10
11    error_page 500 502 503 504 /50x.html;
12
13    location = /50x.html {
14        root /usr/share/nginx/html;
15    }
16
17 }
```

Right click picture and select "Send to back" to reveal copyable code

#### Step 4:

Build your docker image and tag it as **vat-calculator:1.0**

```
C:\Total_LearningReact\ReactDemos\vat-calculator>docker build --tag vat-calculator:1.0 .
[+] Building 671.4s (18/18) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 631B
=> [internal] load .dockerignore
```

**docker build --tag vat-calculator:1.0 .**

## Step 5:

Verify your image exists using the **docker images** command

```
C:\Total_LearningReact\React\React-Demos\vat-calculator>docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
vat-calculator	1.0	36c290509464	4 minutes ago	20.9MB
mongo	4.2	0df68ce04956	5 days ago	388MB

Create and run a container based on the image

Name the container **vat-container** and expose it on an un-used port, for example: **4250**

```
C:\Total_LearningReact\React\React-Demos\vat-calculator>docker run -p 4250:80 -d --name vat-container vat-calculator:1.0  
783b0b28dbdf014302b4e04ffcbefdd5fdc40152a125e1dfc7368247d177d
```

**docker run -p 4250:80 -d --name vat-container vat-calculator:1.0**

## Step 6:

Browse to the port you exposed and confirm your application is running.

The screenshot shows a web browser window with the address bar displaying "localhost:4250". The main content area is titled "VAT CALCULATOR". A green rectangular box highlights the input fields for VAT Rate, Price excl VAT, VAT to pay, and Price incl VAT. The "VAT Rate" dropdown shows "20%". The "Price excl VAT" input field contains "10". The "VAT to pay" text area displays "2". The "Price incl VAT" input field contains "12".

VAT CALCULATOR

VAT Rate: 20%

Price excl VAT: 10

VAT to pay: 2

Price incl VAT: 12

## CI/CD: Deploying a React Application



## .gitlab-ci.yml

```
vat-calculator > 🌟 .gitlab-ci.yml > ...
  gitlab-ci (ci.json)
1  # A BUILD stage to confirm the React App Builds
2  # A TEST stage to run any React tests
3  # A DOCKER-BUILD stage to containerize the app using a Dockerfile and push the image to the Container Registry
4  # A DEPLOY stage to pull the image onto an AWS EC2 instance and spin up a container
5  stages:
6    - build
7    - test
8    - docker-build
9    - deploy
10
11 build:
12   stage: build
13   image: node
14   script:
15     - echo "Start building App"
16     - npm install
17     - npm run build
18     - echo "Built successfully!"
19   artifacts:
20     expire_in: 1 hour
21     paths:
22       - build
23       - node_modules/
24
```

Right click picture and select "Send to back" to reveal copyable code

```
24
25  test:
26    stage: test
27    image: node
28    script:
29      - echo "Testing App"
30      - CI=true npm test
31      - echo "Tested successfully!"
32
```

Right click picture and select "Send to back"to reveal copyable code

```
32
33 docker-build:
34   stage: docker-build
35   # this version of docker is used to prevent 'access denied' errors when connecting from EC2
36   image: docker:19.03.12
37   services:
38     - name: docker:19.03.12-dind
39   before_script:
40     # login to GitLab's docker registry using the built-in stored credentials
41     - docker login -u "$CI_REGISTRY_USER" -p "$CI_REGISTRY_PASSWORD" $CI_REGISTRY
42   script:
43     # Build the image from the Dockerfile. Ensure the base images are up-to-date by pulling the
44     # latest images referenced
45     # Tag the image with the address of the project's Container Registry
46     - docker build --pull -t "$CI_REGISTRY_IMAGE" .
47     # Push the new image to the Container Registry
48     - docker push "$CI_REGISTRY_IMAGE"
49
```

Right click picture and select "Send to back"to reveal copyable code

```
deploy:
  stage: deploy
  # need an image that will enable us to ssh int our cloud server
  image: kroniak/ssh-client
  before_script:
    - echo "Deploying app"
    # need variable in gitlab: SSH_PRIVATE_KEY and PROD_SERVER_IP
  script:
    - chmod 400 $SSH_PRIVATE_KEY
    - ssh -o StrictHostKeyChecking=no -i $SSH_PRIVATE_KEY ec2-user@$PROD_SERVER_IP "echo 'hello from your AWS EC2 instance'"
    - echo "Did I connect to EC2?"
    - ssh -o StrictHostKeyChecking=no -i $SSH_PRIVATE_KEY ec2-user@$PROD_SERVER_IP "echo 'try to peform a docker login'"
    - ssh -o StrictHostKeyChecking=no -i $SSH_PRIVATE_KEY ec2-user@$PROD_SERVER_IP "sudo docker login -u \"$CI_REGISTRY_USER\" -p \"$CI_REGISTRY_PASSWORD\" $CI_REGISTRY"

    - ssh -o StrictHostKeyChecking=no -i $SSH_PRIVATE_KEY ec2-user@$PROD_SERVER_IP "sudo docker pull registry.gitlab.com/qa167/vat-calculator"
    - echo "Pulled"
    - ssh -o StrictHostKeyChecking=no -i $SSH_PRIVATE_KEY ec2-user@$PROD_SERVER_IP "docker stop vatcontainer || true && docker rm vatcontainer || true"
    - ssh -o StrictHostKeyChecking=no -i $SSH_PRIVATE_KEY ec2-user@$PROD_SERVER_IP "docker run -p 3001:80 -d --name vatcontainer registry.gitlab.com/qa167/vat-calculator"
```

Right click picture and select "Send to back"to reveal copyable code



Not secure

3.250.223.42:3001

## VAT CALCULATOR

VAT Rate:  ▾

Price excl VAT:

VAT to pay: 0

Price incl VAT:

### Instances (1) Info

Search Instance state = running X Clear filters

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IP
<input type="checkbox"/>	Demo App Ser...	i-0d6c313af718f7ee8	<span>Running</span> 	t2.micro	<span>2/2 checks passed</span> 	No alarms 	eu-west-1b	ec2-3-250-223-42.eu-w...	3.250.22

### Inbound rules (5)

Filter security group rules < 1 > ⚙️

<input type="checkbox"/>	Name	Security group rule...	IP version	Type	Protocol	Port range
<input type="checkbox"/>	-	sgr-050c5d0ddaa6e888...	IPv4	Custom TCP	TCP	3005
<input type="checkbox"/>	-	sgr-0ac385047b786ab...	IPv4	HTTPS	TCP	443
<input type="checkbox"/>	-	sgr-00c7bd301e077db...	IPv4	Custom TCP	TCP	3001
<input type="checkbox"/>	-	sgr-0d2e0bd8d5c597ffc	IPv4	HTTP	TCP	80
<input type="checkbox"/>	-	sgr-017253aa9df0856b1	IPv4	SSH	TCP	22

## Open EC2 instance command line interface:

The screenshot shows the AWS Management Console with the EC2 service selected. In the main pane, there is a table titled 'Instances (1/2) Info' listing two instances. The first instance is named 'MyInstance' and the second is 'MyVATCALCUL...'. Both instances are in a 'Running' state. A red circle highlights the 'Connect' button located in the top right corner of the instance row for 'MyVATCALCUL...'. Below the table, a detailed view of the second instance is shown with tabs for 'Details', 'Security', 'Networking', 'Storage', 'Status checks', 'Monitoring', and 'Tags'. Under the 'Details' tab, it shows the instance ID 'i-0af8a9c6aa534ce7e' and its name 'MyVATCALCULATOR'. It also lists the public IPv4 address '13.40.74.118' and the private IPv4 address '172.31.35.167'.

## Install Docker on your Amazon Linux 2 instance:

```
sudo yum update -y
sudo amazon-linux-extras install docker
sudo service docker start
sudo systemctl enable docker
sudo usermod -a -G docker ec2-user
```

Log out of your instance, then log back in to confirm your permissions

```
docker info
```

```
$ ssh-keygen -m PEM -t rsa -b 4096 -C "yourAWSemail@email.com"
```

```
$ cat ~/.ssh/id_rsa
```

```
$ cat ~/.ssh/id_rsa.pub >> ~/.ssh/authorized_keys
```

```
[ec2-user@ip-172-31-35-72 ~]$ cat ~/.ssh/id_rsa
-----BEGIN RSA PRIVATE KEY-----
MIIEJKAAKCAgEAAsvnGAXayl6C12ej0yVxej1rmABgYgj5YumbkoTuqB+1LysV
abOsXRIeDNclu619q9o+kE/pZwFN9QTDDOpvqlY1VNsss16TnAoygM/NWFOZjpoD
xBiPw2mE81xQ+sOYvcnrut9IhztDHcFfsd+XvPG909JRP31nF0DAmldLqmsH1Ax9
gFO92/dtcvWCFnSYyXr4/5onh+e7dgKawIOLu0Lh0Q2bt7cFbXWPcgj7kE1b3mq
rVIPTStAD34v6789fx05A0vtRXDouQEpEKnypGVuMuZ/h5DcuxvRlg8DqVwttFMJ
gAifHpf0dw7A/7vHx74K7ni2Tqj7IQnWvoyK55q6P3z+sBx7zRNYnxD+skPD/Nq/
-----END RSA PRIVATE KEY-----
```

Be sure to include these lines  
when copying

```
PQCKydEiqU1AXdXbrA1Az/SgVKYj2FRB41NQERAP1YNKBBu+jDBXyHp1bGSjib4s9
yR9q/e+muIYcAgyNUdKtDPaXVG455O/hbNGEX/V9hx5HmgMz1aIx0/51Cb9dtsX
psSG8MKPE/ssTN97G0JDR76rvapOR3LTm0Gha1gXe2+aR9nxNuc9cOERwMM=
-----END RSA PRIVATE KEY-----
```

Consider using a tool like PUTTY to run the above scripts simply because it's easier to select, copy and paste the private key ready for the next step

Merge requests
CI/CD
Security & Compliance
Deployments
Monitor
Infrastructure
Packages & Registries
Analytics
Wiki
Snippets
Settings
General
Integrations
Webhooks

## Variables

Variables store information, like passwords and secret keys, that you can use in job scripts. [Learn more.](#)

Variables can be:

- Protected: Only exposed to protected branches or tags.
- Masked: Hidden in job logs. Must match masking requirements. [Learn more.](#)

Environment variables are configured by your administrator to be [protected](#) by default.

Type	↑ Key	Value	Protected	Masked	Environments	
Variable	PROD_SERVER_IP	*****	✓	✗	All (default)	
File	SSH_PRIVATE_KEY	*****	✓	✗	All (default)	

[Add variable](#) [Reveal values](#)

Copy the whole private key into a GitLab project [file](#) called:  
**SSH\_PRIVATE\_KEY**

Copy the AWS EC2 instance's Public IP address into a GitLab project [variable](#) called: **PROD\_SERVER\_IP**

public IP address of  
AWS EC2 instance

Update variable

Key

Value

Type  Environment scope

Flags  Protect variable Export variable to pipelines running on protected branches and tags only.  Mask variable Variable will be masked in job logs. Requires values to meet regular expression requirements. More information

[Cancel](#) [Delete variable](#) [Update variable](#)

From previous step

Update variable

Key

Value

Type  Environment scope

Flags  Protect variable Export variable to pipelines running on protected branches and tags only.  Mask variable Variable will be masked in job logs. Requires values to meet regular expression requirements. More information

[Cancel](#) [Delete variable](#) [Update variable](#)

Push some code changes to your GitLab repository and watch the pipeline stages run.

Status	Pipeline	Triggerer	Stages	
<div><span>passed</span></div> ⌚ 00:10:09 ⌚ 35 minutes ago	Added comments to pipeline and an Orange border <a href="#">#519789447</a> ⌚ main -O <code>6ccaaaf2c</code> 🎨 latest		<span>✓</span> <span>✓</span> <span>✓</span> <span>✓</span>	

Status	Pipeline	Triggerer	Stages	
<div><span>passed</span></div> ⌚ 00:09:32 ⌚ 44 seconds ago	Added word-wrap to yml and a Magenta border <a href="#">#519855776</a> ⌚ main -O <code>0d95ba10</code> 🎨 latest		<span>✓</span> <span>✓</span> <span>✓</span> <span>✓</span>	



Not secure

3.250.223.42:3001

## VAT CALCULATOR

VAT Rate:  ▾

Price excl VAT:

VAT to pay: 0

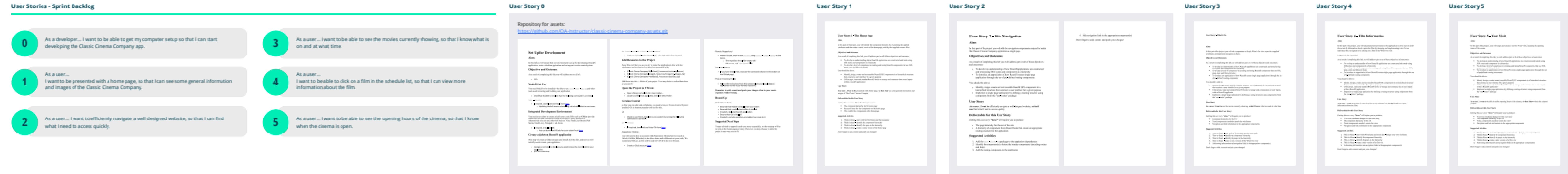
Price incl VAT:

Create a GitLab project and push your React App code to its repository.

Add a GitLab pipeline to the project by adding a special file called: **.gitlab-ci.yml**

The screenshot shows a GitLab project named "vat-calculator". The left sidebar contains navigation links for Project information, Repository, Issues, Merge requests, CI/CD, Security & Compliance, Deployments, Monitor, Infrastructure, Packages & Registries, Analytics, Wiki, Snippets, and Settings. The main content area displays the project's repository details: 22 Commits, 1 Branch, 0 Tags, 440 KB Files, and 49.5 MB Storage. A commit history table lists the following commits:

Name	Last commit	Last update
nginx	Initial commit	3 weeks ago
public	Initialize project using Create React App	3 weeks ago
src	Added comments to pipeline and an Orange...	1 hour ago
.dockercignore	Added blank line to .dockercignore	5 hours ago
.gitignore	Initialize project using Create React App	3 weeks ago
.gitlab-ci.yml	Added comments to pipeline and an Orange...	1 hour ago
Dockerfile	Updated images in Dockerfile	4 hours ago
README.md	Initialize project using Create React App	3 weeks ago
package-lock.json	Initialize project using Create React App	3 weeks ago
package.json	Initialize project using Create React App	3 weeks ago



**User Story 0**

**User Story 1**

**User Story 2**

**User Story 3**

**User Story 4**

**User Story 5**

**Repository for assets:**  
<https://github.com/CA-Instruction/Classic-Cinema-a-commerce-project>

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Name  Select an option

Email  john.smith@example.com

Phone  01234567890

Date of birth  DD/MM/YYYY

Gender  Female  Male

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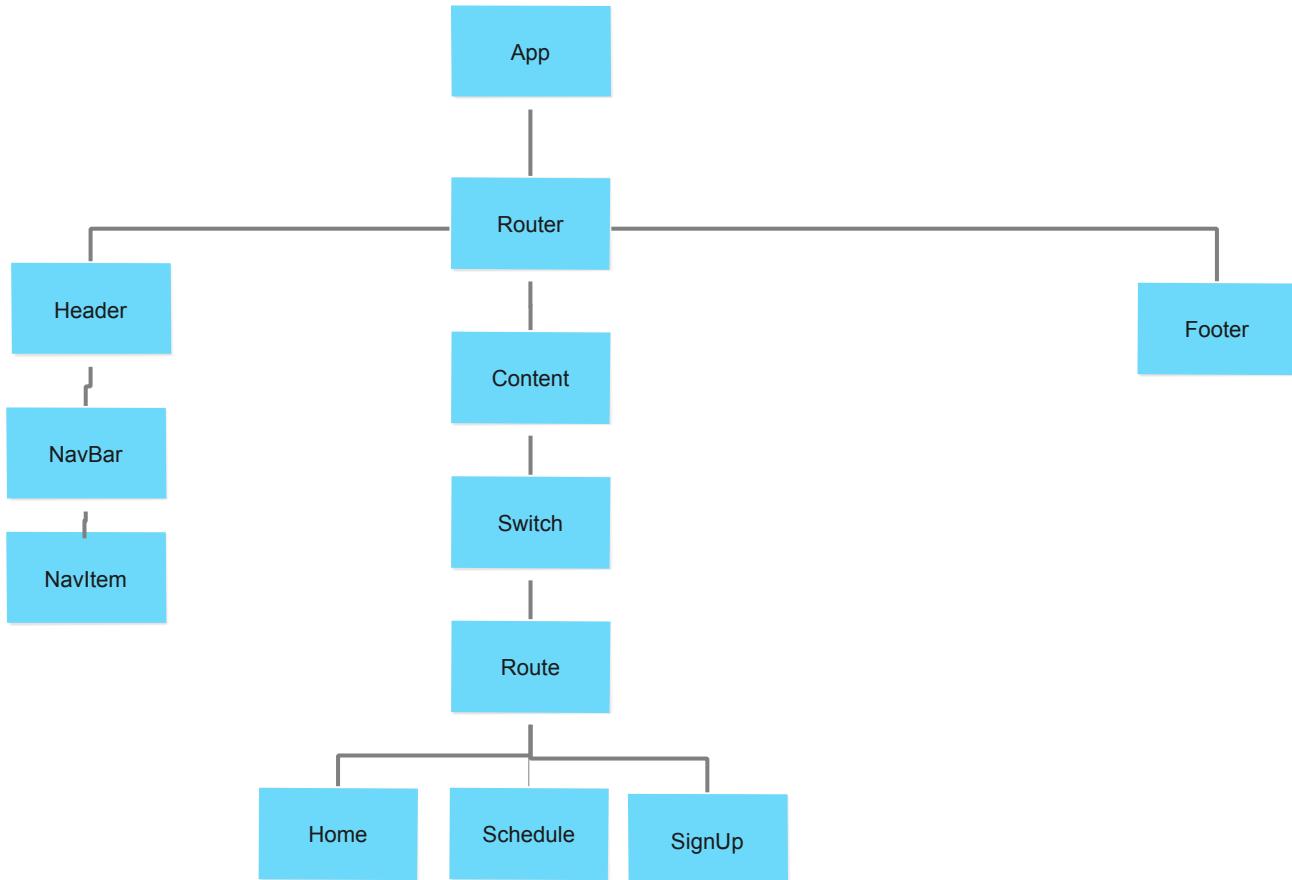
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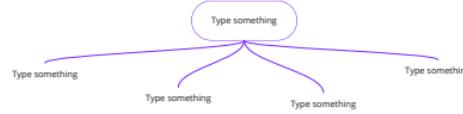
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In Progress	In Progress	Done
1	2	3

In Progress	In Progress	Done
1	2	3

- 

As a User, I want to be able to leave a review for a movie, so that other users can decide whether the Movie is worth going to see.
- 

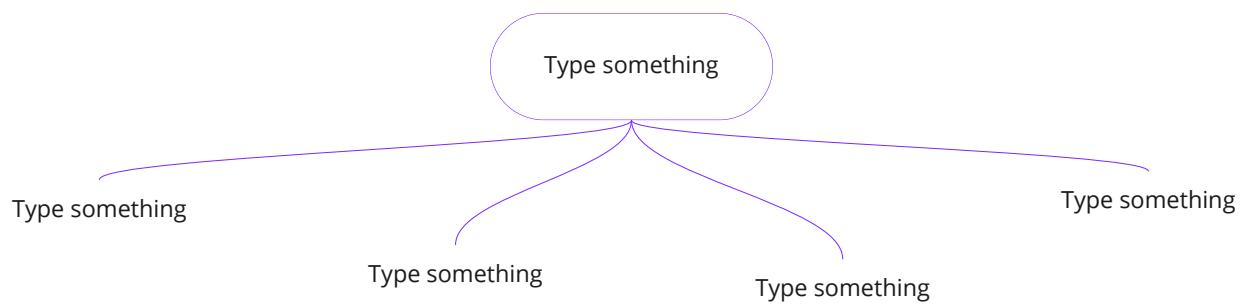
As a User, I want to be able to access the reviews on an app review, so that I can access the information I need on the device of my choice.
- 

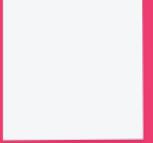
As a User, I want to be able to subscribe to the newsletter, so that I can receive the latest promotions and information.
- 

As a User, I want to be able to login to the device, so that I have access to user specific features like reviews.
- 

As a User, I want to be able to register to the site, so that I can login to the site and use special features.

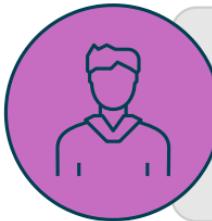




To do	In progress	Done
 		
 		
 		



As a User, I want to be able to leave a review for a movie, so that other Users can decide whether the Movie is worth going to see.



As a User, I want to be able to access the website on any device, so that I can access the information I need on the device of my choice.



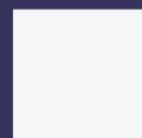
As a User, I want to be able to subscribe to the website using a form, so that I can receive the latest promotions and information.



As a User, I want to be able to login to the service, so that I have access to user specific features like reviews.



As a User, I want to be able to register to the site, so that I can login to the site and use special features.

To do	In progress	Done
 		
 		
 		

What was good?

What was bad?

Ideas

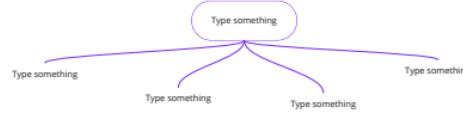
Actions

What was good?

What was bad?

Ideas

Actions



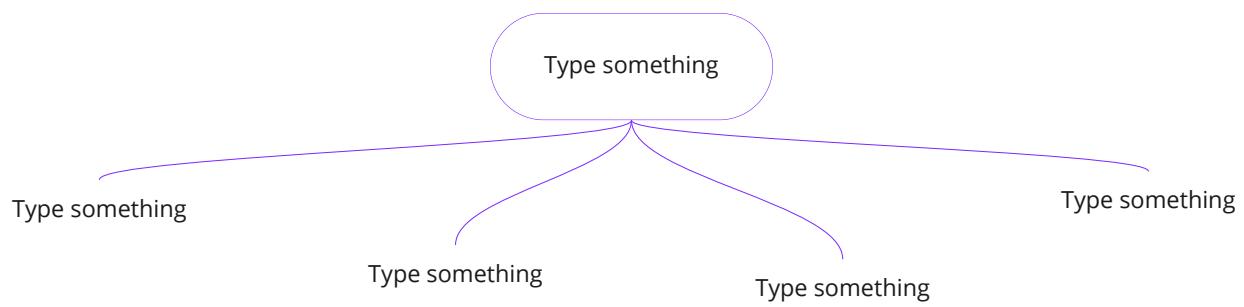
In Progress	In Progress	Done
1	2	3

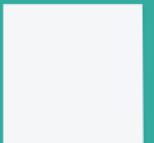
In Progress	In Progress	Done
1	2	3

- 
- Pink User:** As a User, I want to be able to leave a review for a movie, so that other users can decide whether the Movie is worth going to see.
  - Purple User:** As a User, I want to be able to access the reviews on an app review, so that I can access the information I need on the device of my choice.
  - Orange User:** As a User, I want to be able to subscribe to the service, so that I can receive the latest promotions and information.
  - Yellow User:** As a User, I want to be able to register to the site, so that I can login to the site and use specific features.

Ideas	Actions	What was good?	What was bad?

Ideas	Actions	What was good?	What was bad?



To do	In progress	Done
 		
 		
 		



As a User, I want to be able to leave a review for a movie, so that other Users can decide whether the Movie is worth going to see.



As a User, I want to be able to access the website on any device, so that I can access the information I need on the device of my choice.



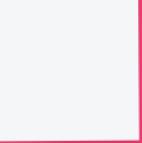
As a User, I want to be able to subscribe to the website using a form, so that I can receive the latest promotions and information.



As a User, I want to be able to login to the service, so that I have access to user specific features like reviews.



As a User, I want to be able to register to the site, so that I can login to the site and use special features.

To do	In progress	Done
 		
 		
 		

What was good?

What was bad?

Ideas

Actions

What was good?

What was bad?

Ideas

Actions



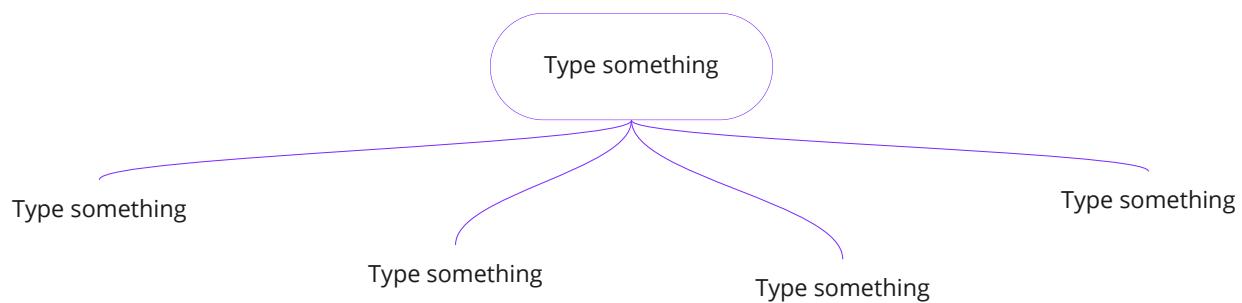
In progress	In progress	Done
1	2	3

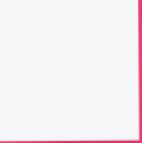
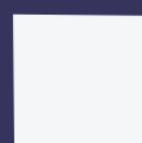
In progress	In progress	Done
1	2	3

- 
- Pink User:** As a User, I want to be able to leave a review for a movie, so that other users can decide whether the Movie is worth going to see.
  - Purple User:** As a User, I want to be able to access the reviews on my device, so that I can access the information I need on the device of my choice.
  - Orange User:** As a User, I want to be able to subscribe to the service, so that I can receive the latest promotions and information.
  - Yellow User:** As a User, I want to be able to register to the site, so that I can login to the site and use special features.

What was good?	What was bad?
Ideas	Actions

What was good?	What was bad?
Ideas	Actions



To do	In progress	Done
 		
 		
 		



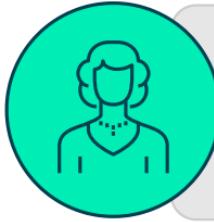
As a User, I want to be able to leave a review for a movie, so that other Users can decide whether the Movie is worth going to see.



As a User, I want to be able to access the website on any device, so that I can access the information I need on the device of my choice.



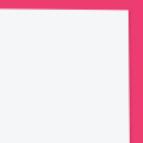
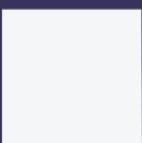
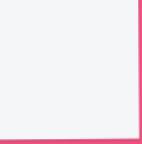
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To do	In progress	Done
 		
 		
 		

What was good?

What was bad?

Ideas

Actions

What was good?

What was bad?

Ideas

Actions

# Securing a React Application with JWT

```
const LogIn = () => {
  const [username, setUsername] = useState('');
  const [password, setPassword] = useState('');

  const [isSubmitting, setIsSubmitting] = useState(false);

  const handleChange = (event) => {
    setUsername(event.target.value);
    setPassword(event.target.value);
  };

  const login = () => {
    fetch('http://localhost:3001/login', {
      method: 'POST',
      body: JSON.stringify({username, password}),
    })
    .then(res => {
      if (!res.ok) {
        const jwtToken = res.headers.get('Authorization');
        if (jwtToken) {
          localStorage.setItem('token', jwtToken);
          return;
        }
      }
      alert('Check your username and password');
      setPassword('');
    })
    .catch(error => console.error(error));
  };

  return (
    <div>
      <Formik</Formik>
      <button type="button" onClick={login}>Login</button>
    </div>
  );
};

export default LogIn;
```

+ 

```
function LogIn({onSuccess}) {
  // This component consumes an incoming user input and sends it to the external Backend API
  // to receive a token from the external Backend API
  // and includes it in the Authorization header
  const [username, setUsername] = useState('');
  const [password, setPassword] = useState('');

  const handleChange = (event) => {
    setUsername(event.target.value);
    setPassword(event.target.value);
  };

  const login = () => {
    const options = {
      headers: { 'Content-Type': 'application/json' },
      method: 'POST',
      body: JSON.stringify({username, password}),
    };
    fetch('http://localhost:3001/login', options)
      .then(response => {
        if (response.ok) {
          onSuccess();
        } else {
          alert('Check your username and password');
        }
      })
      .catch(error => console.error(error));
  };

  return (
    <div>
      <Formik</Formik>
      <button type="button" onClick={login}>Login</button>
    </div>
  );
};

export default LogIn;
```

+ 

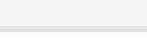
```
function LogIn({onSuccess}) {
  // Read the token from the session storage
  // and include it in the Authorization header
  const token = sessionStorage.getItem('token');
  const options = {
    headers: { 'Authorization': `Bearer ${token}` },
    method: 'POST',
    body: JSON.stringify({username, password}),
  };
  fetch('http://localhost:3001/login', options)
    .then(response => {
      if (response.ok) {
        onSuccess();
      } else {
        alert('Check your username and password');
      }
    })
    .catch(error => console.error(error));
};

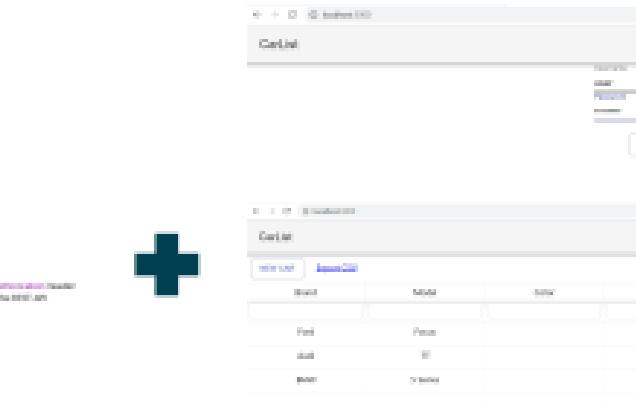
export default LogIn;
```

+ 

```
// Add the code
function LogIn({onSuccess}) {
  const token = sessionStorage.getItem('token');
  const options = {
    method: 'POST',
    headers: { 'Content-Type': 'application/json' },
    'Authorization': `Bearer ${token}`,
  };
  fetch('http://localhost:3001/login', options)
    .then(response => {
      if (response.ok) {
        onSuccess();
      } else {
        alert('Check your username and password');
      }
    })
    .catch(error => console.error(error));
};

export default LogIn;
```

+ 



The screenshot shows the Backend API interface with a successful response. The status is 200 OK, and the response body contains a JSON object with the following fields:

exp	iat	nbf	r	sub
2024-01-15T12:00:00Z	2024-01-15T11:59:59Z	2024-01-15T11:59:59Z	1	user

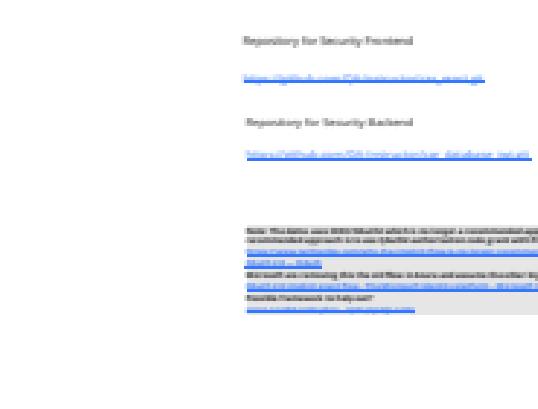
+ 



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+ 



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+ 



The screenshot shows the Backend API interface with a successful response. The status is 200 OK, and the response body contains a JSON object with the following fields:

exp	iat	nbf	r	sub
2024-01-15T12:00:00Z	2024-01-15T11:59:59Z	2024-01-15T11:59:59Z	1	user

```
const Login = () => {
  const [user, setUser] = useState({username: '', password: ''})
  const [isAuthenticated, setAuth] = useState(false);

  const handleChange = (event) => {
    setUser({...user, [event.target.name]: event.target.value})
  }
```

```
const login = () => {
  fetch(SERVER_URL + 'login', {
    method: 'POST',
    body: JSON.stringify(user)
  })
  .then(res => {
    const jwtToken = res.headers.get('Authorization');
    if (jwtToken !== null) {
      sessionStorage.setItem("jwt", jwtToken);
      setAuth(true);
    }
    else {
      toast.warn("Check your username and password", {
        position: toast.POSITION.BOTTOM_LEFT
      })
    }
  })
  .catch(err => console.error(err))
}
```

The React Login component submits (POSTs) the user state object to the REST API's login endpoint and then checks for an **Authorization** Header in the returned **Response** object

It stores the value of the Authorization Header (the sent JSON Web Token (**JWT**)) in Session storage

It then sets the **isAuthenticated** state variable to *true*

```
if (isAuthenticated === true) {
  return (<Carlist />)
}
else {
  return (
    <div>
      <TextField name="username"
        label="Username" onChange={handleChange} /><br/>
      <TextField type="password" name="password"
        label="Password" onChange={handleChange} /><br/><br/>
      <Button variant="outlined" color="primary"
        onClick={login}>
        Login
      </Button>
      <ToastContainer autoClose={1500} />
    </div>
  );
}

export default Login;
```

```
fetchCars = () => {
  // Read the token from the session storage
  // and include it in the Authorization header
  const token = sessionStorage.getItem("jwt");
  fetch(SERVER_URL + 'api/cars',
    {
      headers: { 'Authorization': token }
    })
  .then((response) => response.json())
  .then((responseData) => {
    this.setState({
      cars: responseData._embedded.cars,
    });
  })
  .catch(err => console.error(err));
}
```

All other component functions attach the JWT to the [Request](#) header from Session storage.

```
// Add new car
addCar(car) {
  const token = sessionStorage.getItem("jwt");
  fetch(SERVER_URL + 'api/cars',
    {
      method: 'POST',
      headers: {
        'Content-Type': 'application/json',
        'Authorization': token
      },
      body: JSON.stringify(car)
    })
  .then(res => this.fetchCars())
  .catch(err => console.error(err))
}
```

POST localhost:8888/login

Send

Params Authorization Headers (10) Body Pre-request Script Tests Settings

Cookies

 none  form-data  x-www-form-urlencoded  raw  binary  GraphQL Text

1 {"username": "admin", "password": "adminpass"}

Body Cookies (1) Headers (15) Test Results

Status: 200 OK Time: 109 ms Size: 615 B Save Response

KEY	VALUE
Vary	Origin
Vary	Access-Control-Request-Method
Vary	Access-Control-Request-Headers
Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWlIiOiJhZG1pbilsmV4cCl6MTY1MDcyOTgwNn0.DW...
Access-Control-Expose-Headers	Authorization
X-Content-Type-Options	nosniff
X-XSS-Protection	1; mode=block
Cache-Control	no-cache, no-store, max-age=0, must-revalidate
Pragma	no-cache
Expires	0

Postman shows the [Authorization](#) header that is returned from the REST API

## CarList

Username

Password

After a successful login, the app shows a list of Cars that can be edited or deleted

## CarList

[NEW CAR](#) [Export CSV](#)

Brand	Model	Color	Year	Price €		
Ford	Focus		2017	59000	<a href="#">EDIT</a>	<a href="#">DELETE</a>
Audi	TT		2014	29000	<a href="#">EDIT</a>	<a href="#">DELETE</a>
BMW	5 Series		2018	39000	<a href="#">EDIT</a>	<a href="#">DELETE</a>

Repository for Security Frontend

[https://github.com/QA-Instructor/car\\_react.git](https://github.com/QA-Instructor/car_react.git)

Repository for Security Backend

[https://github.com/QA-Instructor/car\\_database\\_jwt.git](https://github.com/QA-Instructor/car_database_jwt.git)

Note: The demo uses OIDC/OAuth2 which is no longer a recommended approach to protect public applications. The new recommended approach is to use OAuth2 authorisation code grant with Proof key for code exchange (PKCS). See:

<https://www.taithienbo.com/why-the-implicit-flow-is-no-longer-recommended-for-protecting-a-public-client>

[OAuth 2.0 – OAuth](#)

Microsoft are removing this the old flow in Azure and assume the other big players will follow:

[OAuth 2.0 implicit grant flow - The Microsoft identity platform - Microsoft Entra | Microsoft Learn](#)

Possible framework to help out?

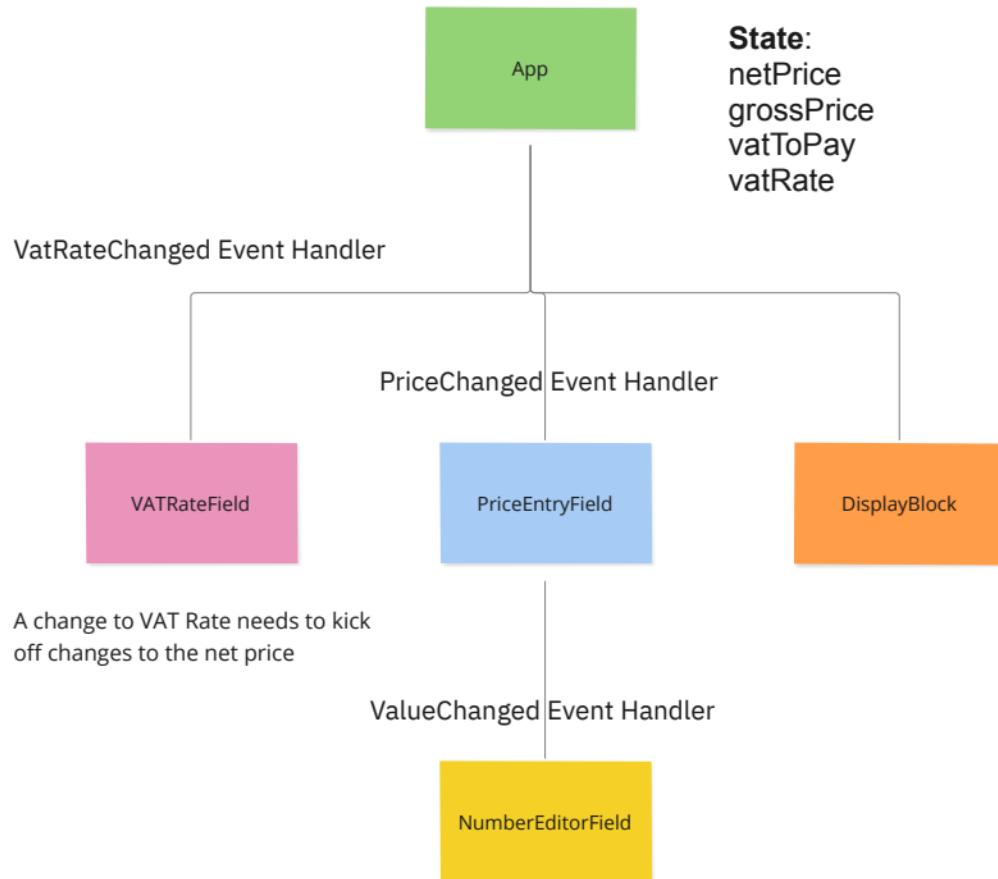
[react-oauth2-code-pkce - npm \(npmjs.com\)](#)

Images, CSS and DATA

[QACS-TL/QACinemaResources \(github.com\)](#)

One solution to the VAT calculator :

<https://github.com/QA-Instructor/vat-calculator>



← → ⌂ i localhost:3000

### VAT CALCULATOR

VAT Rate: 20%

Price excl VAT: 50

VAT to pay: 10

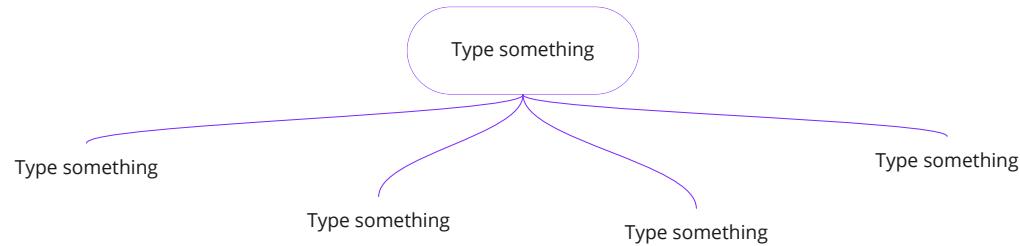
Price incl VAT: 60

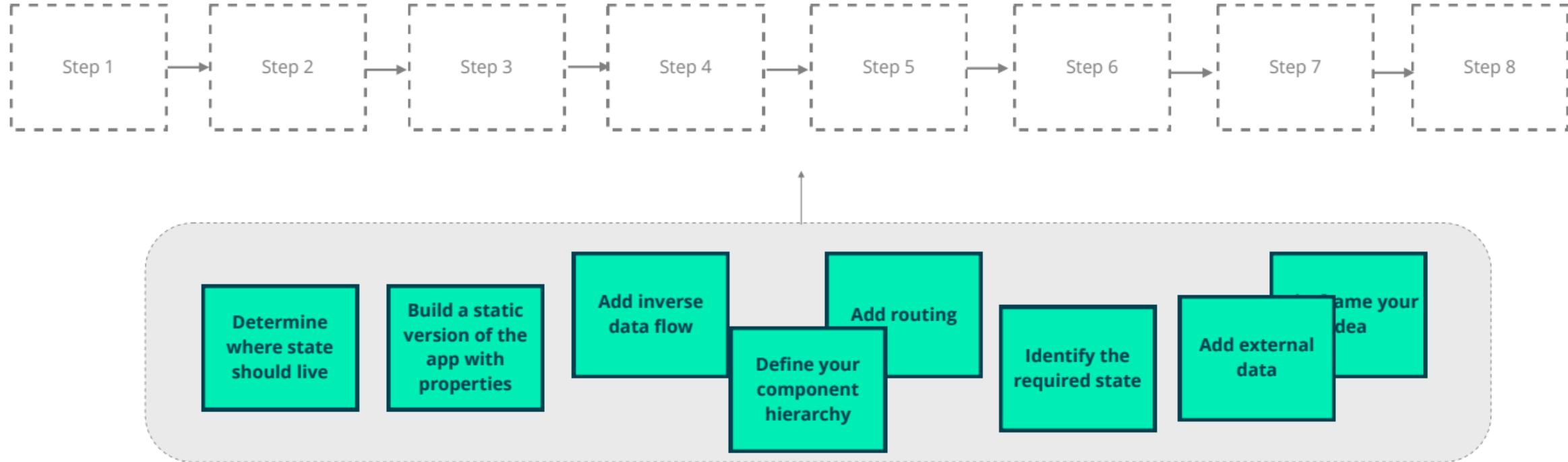
```
graph LR; App[App] -- "VatRateChanged Event Handler" --> VATRateField[VATRateField]; App -- "PriceChanged Event Handler" --> PriceEntryField[PriceEntryField]; App -- "ValueChanged Event Handler" --> NumberEditorField[NumberEditorField]; note [A change to VAT Rate needs to kick off changes to the net price];
```

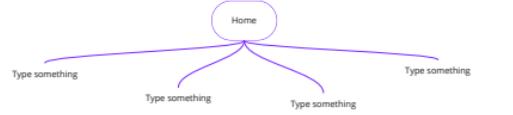
## G3 - Mini Lab - Component Hierarchy

---

Based on the user stories, design a component hierarchy for the VAT calculator.  
Consider how you might re-use components.





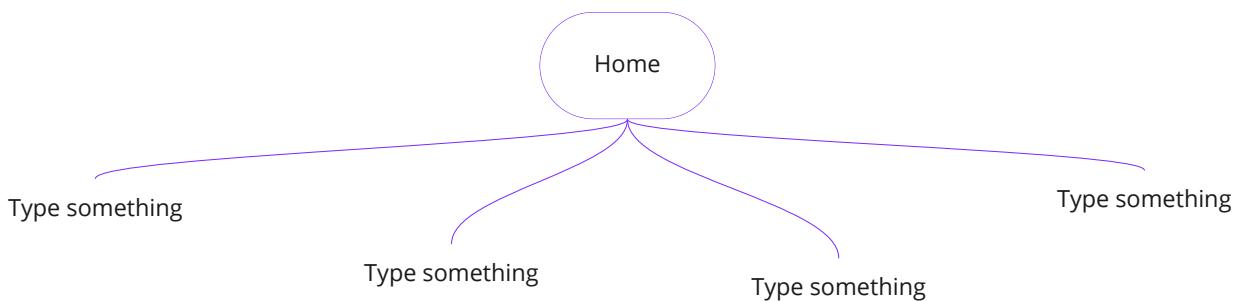


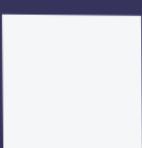
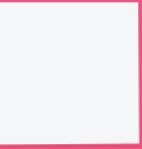
In progress	In progress	Done
1	2	3

In progress	In progress	Done
1	2	3

- As a User, I want to be able to leave a review for a movie, so that other users can decide whether the Movie is worth going to see.
- As a User, I want to be able to access the reviews of an item/review, so that I can access the information I need on the device of my choice.
- As a User, I want to be able to subscribe to the reviews of the items that I can receive the latest promotions and information.
- As a User, I want to be able to login to the device, so that I have access to user specific features like reviews.
- As a User, I want to be able to register to the site, so that I can login to the site and use special features.





To do	In progress	Done
 		
 		
 		



As a User, I want to be able to leave a review for a movie, so that other Users can decide whether the Movie is worth going to see.



As a User, I want to be able to access the website on any device, so that I can access the information I need on the device of my choice.



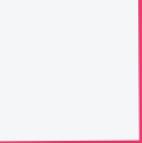
As a User, I want to be able to subscribe to the website using a form, so that I can receive the latest promotions and information.



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As a User, I want to be able to register to the site, so that I can login to the site and use special features.

To do	In progress	Done
 		
 		
 		

What was good?

What was bad?

Ideas

Actions

What was good?

What was bad?

Ideas

Actions

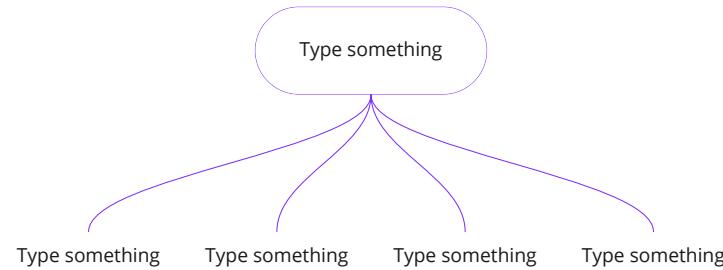




### G3 - Mini Lab - Component Hierarchy

---

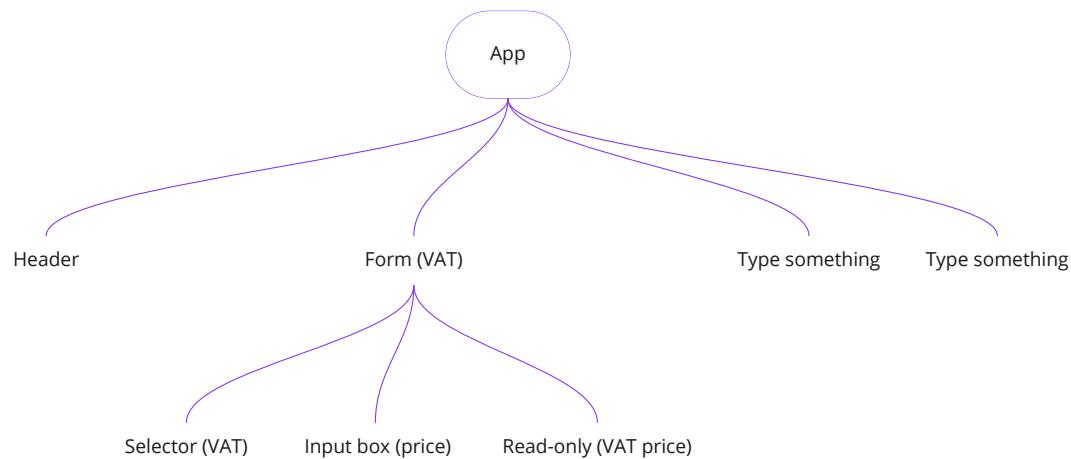
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Consider how you might re-use components.



## G3 - Mini Lab - Component Hierarchy

---

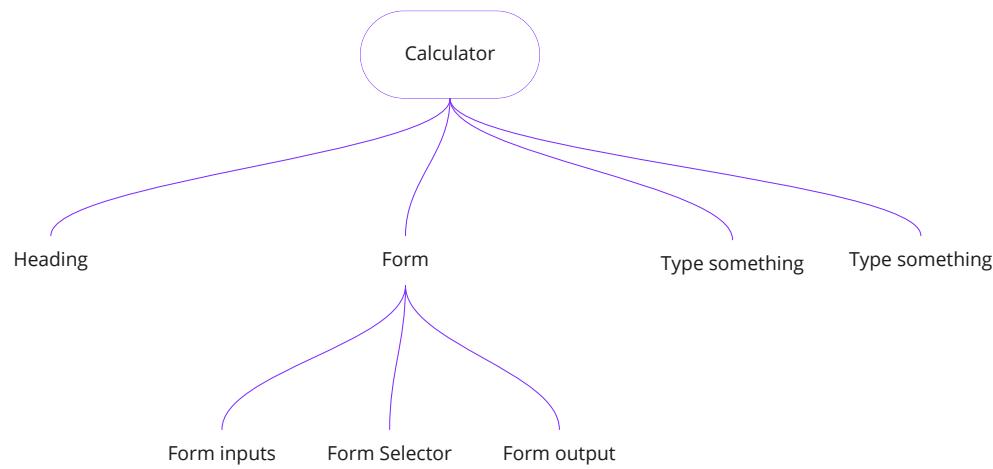
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## G3 - Mini Lab - Component Hierarchy

---

Based on the user stories, design a component hierarchy for the VAT calculator.  
Consider how you might re-use components.



Routing V6.0 app:

[QACS-TL/ReactTL-RouterV6Films \(github.com\)](#)

Routing V5.0 app:

[QACS-TL/ReactTL-RouterV5Films \(github.com\)](#)

**A possible solution to the Cinema Lab uses a C# .NET app as server:**  
[QACS-TL/QACinemaProjectSolution \(github.com\)](https://github.com/QACS-TL/QACinemaProjectSolution)

Another possible solution (using Wonkymotion films) and json serve:r  
[QACS-TL/ReactCinemaRouterV6WonkymotionEdition \(github.com\)](https://github.com/QACS-TL/ReactCinemaRouterV6WonkymotionEdition)