SE3040

Application Frameworks (AF)

Makeup Exam - 2021

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Category : Online Learning

Scenario

iLearn is an online learning system. Online learning systems are very popular these days due to the due to the social distancing measures in this post Covid-19 period.

The basic idea of this web application is to provide a platform for teachers and students to continue their teaching and learning processes online through a quizzing format. This simple web application allows the teachers to add quizzes with several questions and short answers relevant to different subjects or topics. The students can try the questions out and the results will be provided immediately after the submission of the answers.

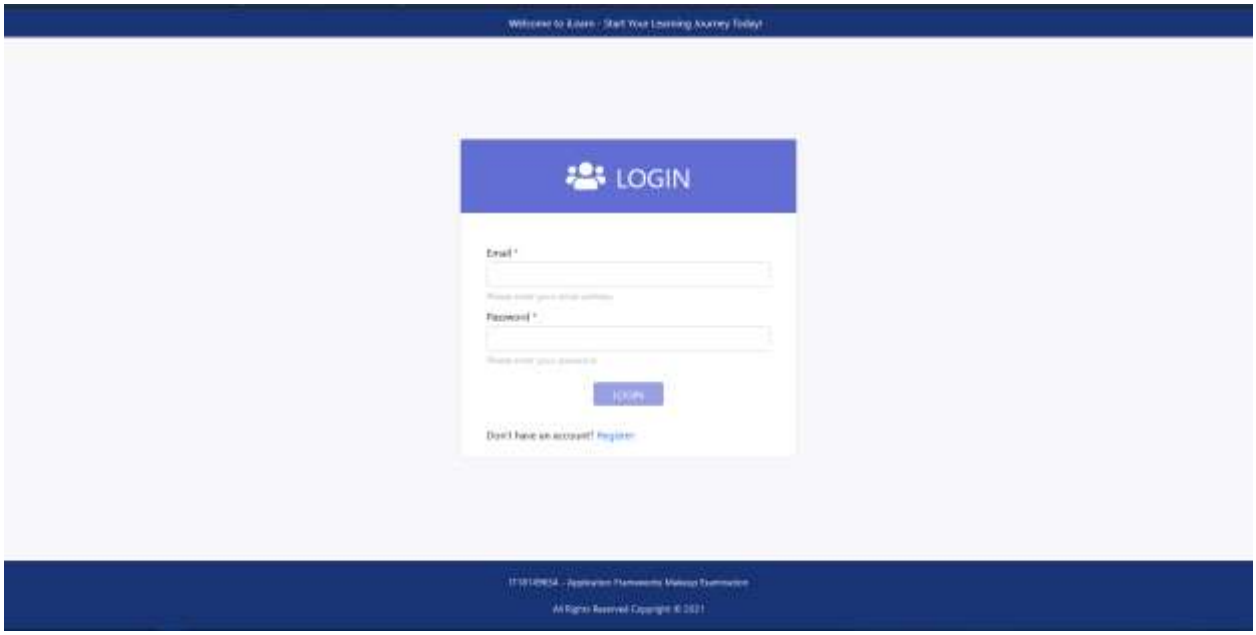
There are so many video streaming platforms these days to connect the teachers and students for delivering lectures and lessons. But there are not many applications for providing this service, the iLearn web application is providing. This question-answer format of learning is very important for students of any level and any age to really grasp the content of the learned material. This iLearn application provides a very simple and basic version of this service.

There are two main actors in this scenario.

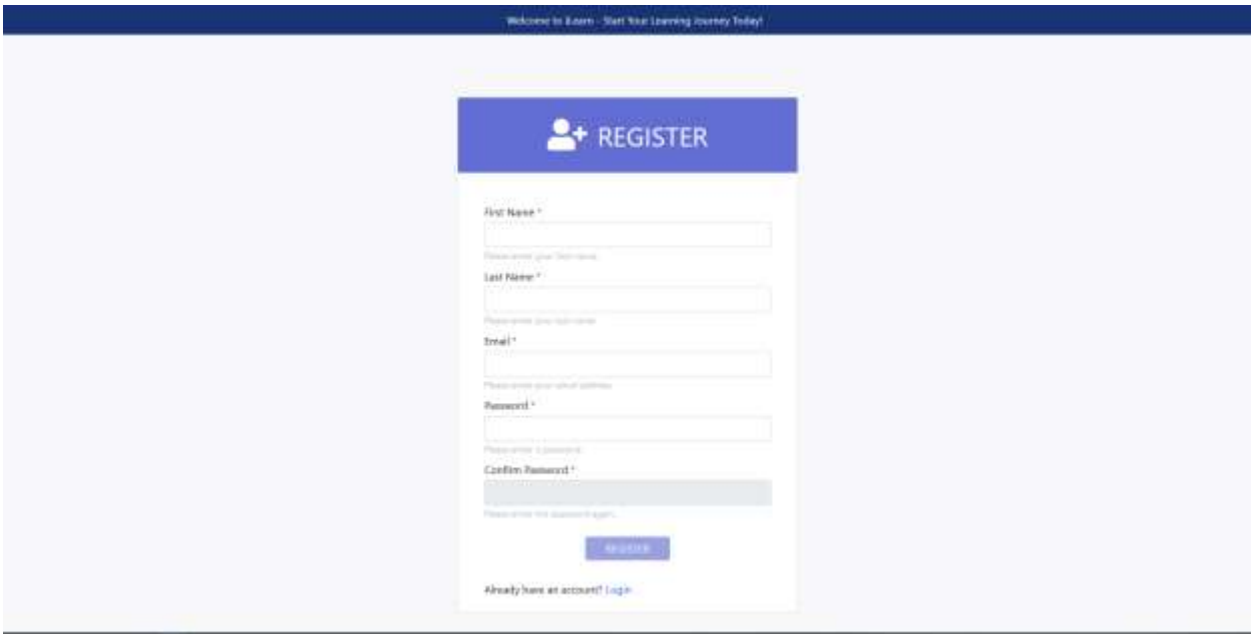
1. Teacher
2. Student

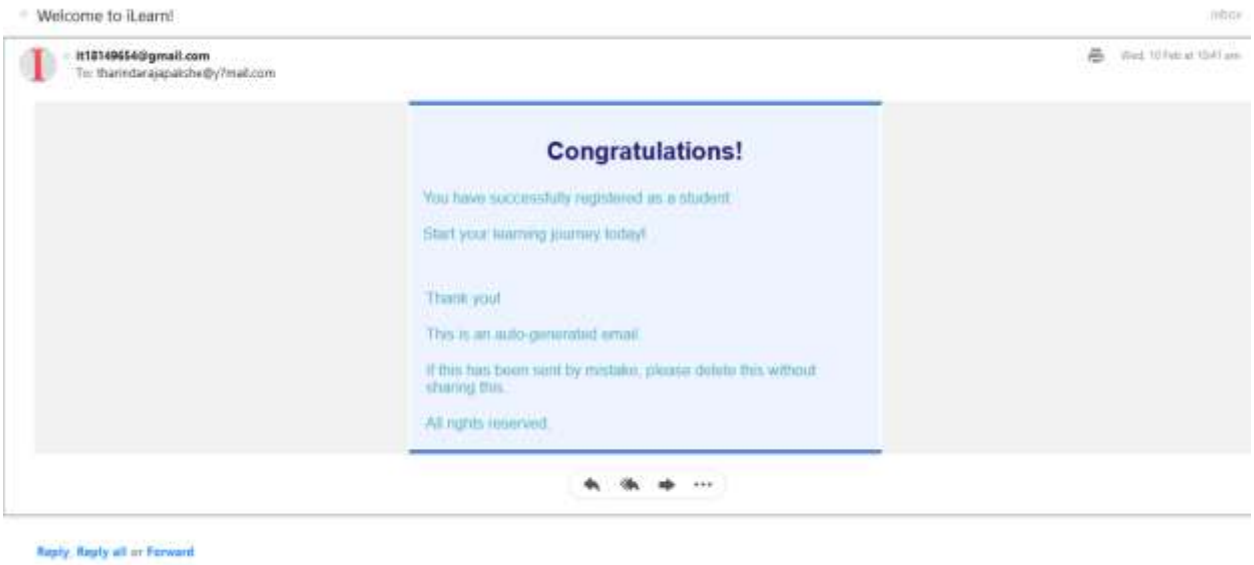
All the users use one login page to login to the system. System can identify the logged in user's type and provide only the permitted functionality for that user type. The navigation bar will be updated accordingly as well.

All the pages of the application are properly secured so that no unauthorized user can access them without the necessary permissions being granted.



The new students can register to the system and create a new account. They will also receive an email confirming their registration.

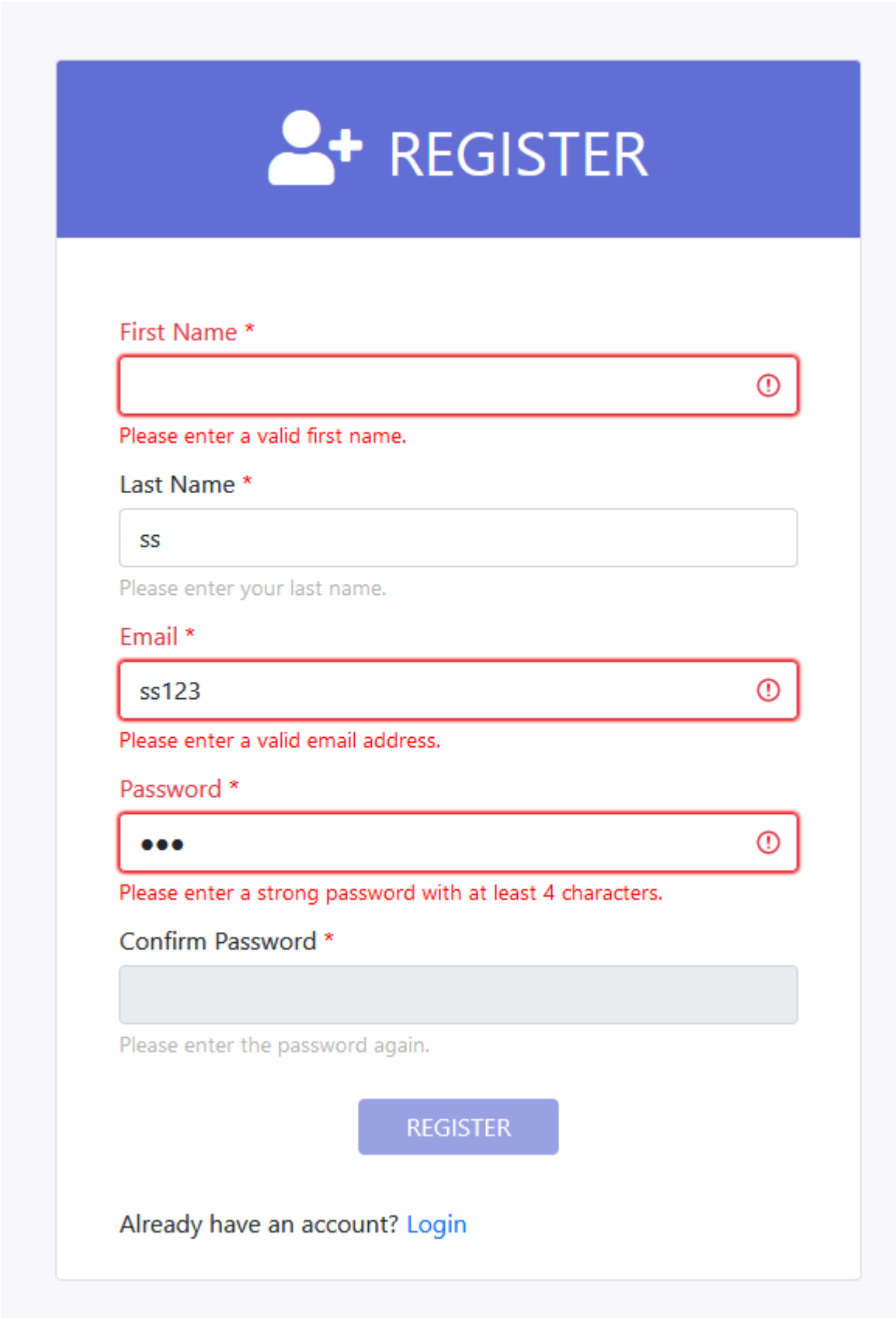




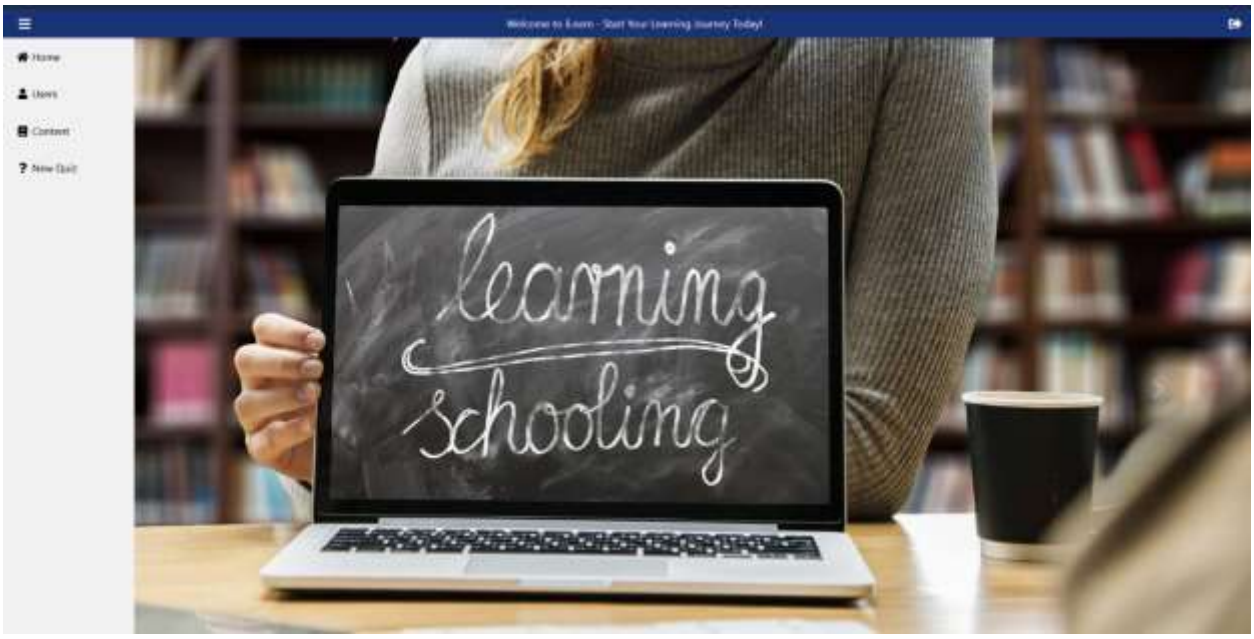
- Student Login:
    - Method 1: Create a student account with 'Register' page to login to the system as a student.
    - Method 2: Use the following login credentials of an already created student account to login to the system as a student.
        - Email : student@gmail.com
        - Password : student

- Teacher Login:
    - Use the following login credentials of an already created teacher account to login to the system as a teacher.
        - Email : teacher@gmail.com
        - Password : teacher

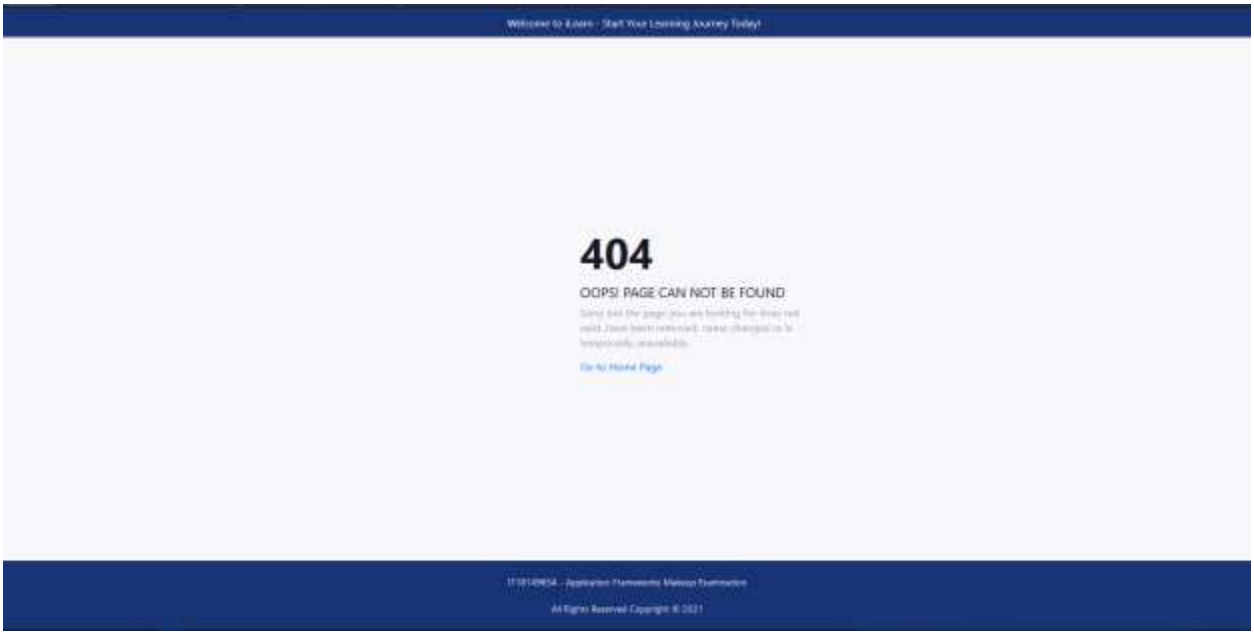
All the forms and input actions in this web application are properly validated so that no invalid data will be saved in the database. Proper validation error messages which are user friendly are also displayed in case of scenarios such as input pattern errors or unique primary key violations etc.


REGISTER
First Name *
Please enter a valid first name.
Last Name *
ss
Please enter your last name.
Email *
ss123
Please enter a valid email address.
Password *
Please enter a strong password with at least 4 characters.
Confirm Password *
Please enter the password again.
REGISTER
Already have an account? Login

When logged in as the teacher, only the functionalities allowed for that user type is allowed.

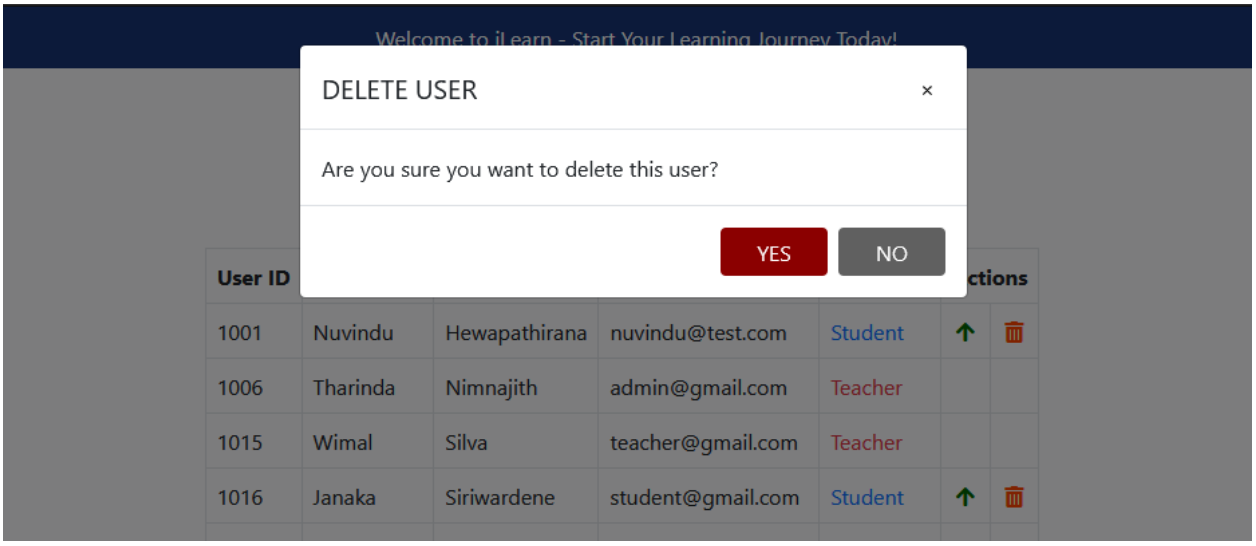


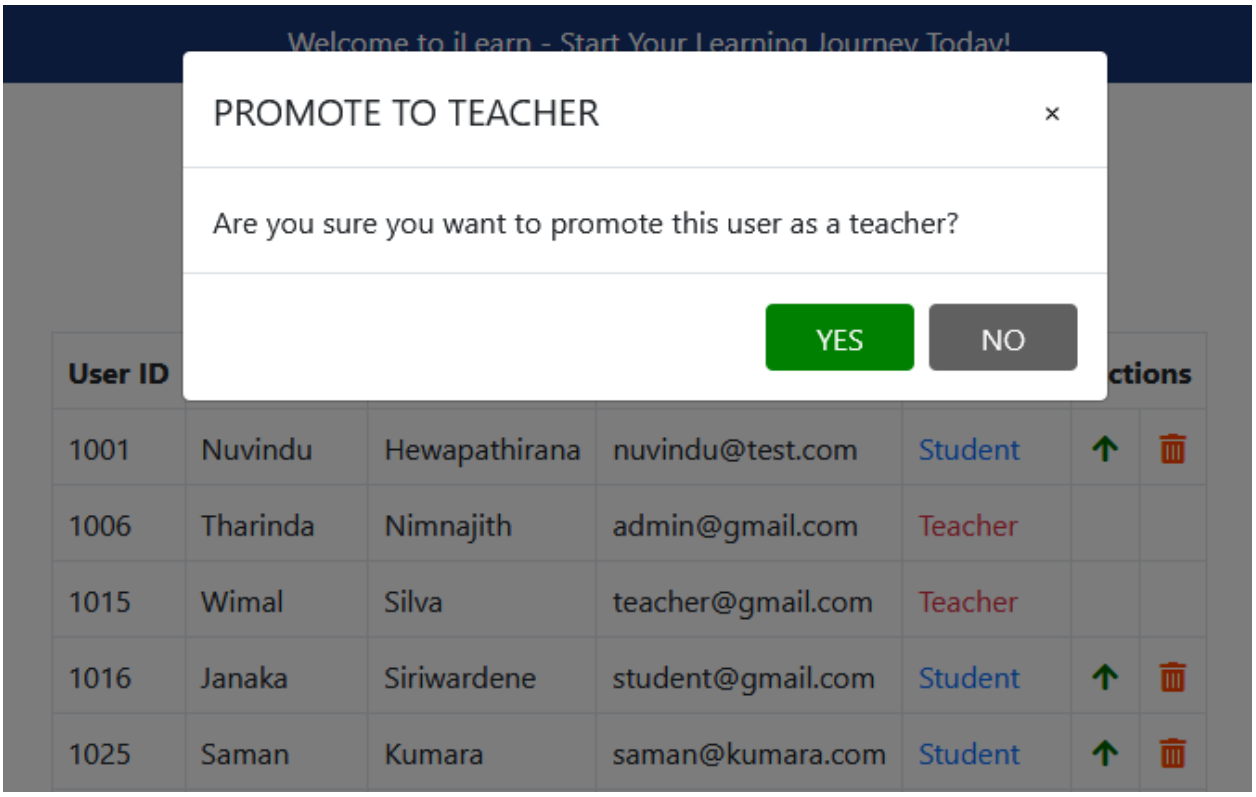
If the user tries to access an undefined route a user friendly 404 error message page is displayed.



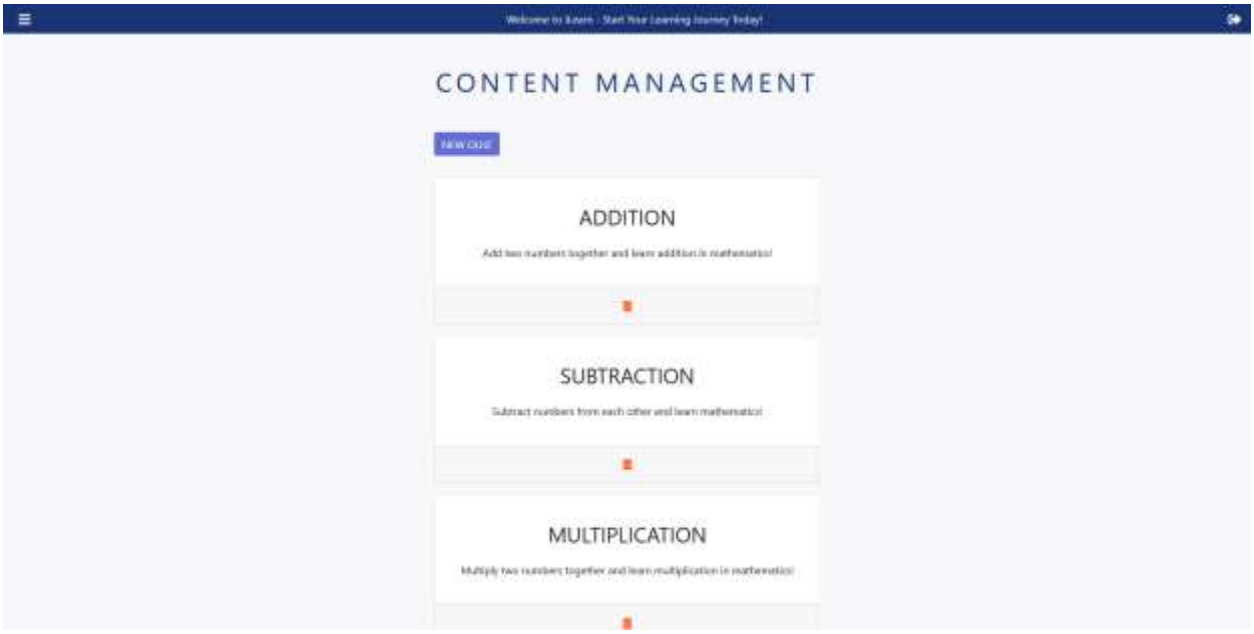
If the user tries to access an existing but not authorized page, the user will be redirected to login page or the relevant home page based on their user type and login status. Further, the logout functionality also works properly.

The teacher can view all users of the system. Teacher is allowed to delete any student account from the system as well as promote a student user as a teacher. As these are some critical actions, the system will ask to confirm the action prior to performing it.


Welcome to iLearn - Start Your Learning Journey Today!
DELETE USER
Are you sure you want to delete this user?
YES
NO
User ID
ctions
1001 Nuvindu Hewapathirana nuvindu@test.com Student
1006 Tharinda Nimnajith admin@gmail.com Teacher
1015 Wimal Silva teacher@gmail.com Teacher
1016 Janaka Siriwardene student@gmail.com Student


Welcome to iLearn - Start Your Learning Journey Today!
PROMOTE TO TEACHER
Are you sure you want to promote this user as a teacher?
YES
NO
User ID
ctions
1001 Nuvindu Hewapathirana nuvindu@test.com Student
1006 Tharinda Nimnajith admin@gmail.com Teacher
1015 Wimal Silva teacher@gmail.com Teacher
1016 Janaka Siriwardene student@gmail.com Student
1025 Saman Kumara saman@kumara.com Student

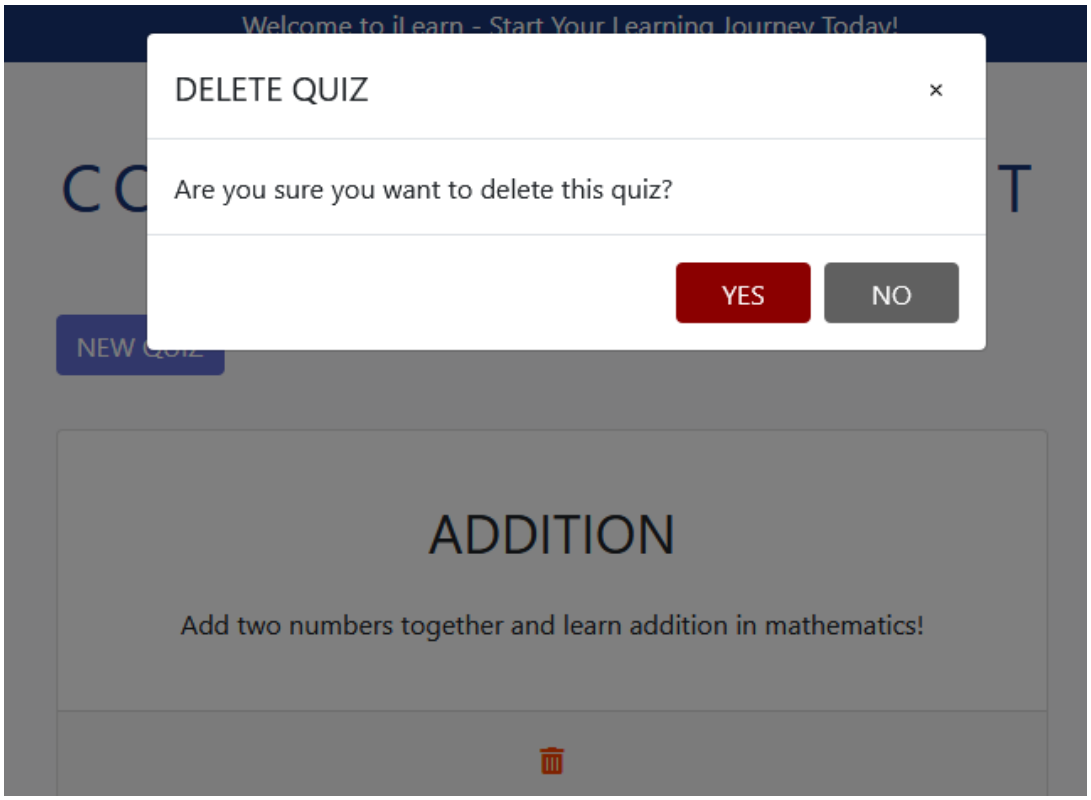
The teacher can view the content / quizzes currently in the system under content management.

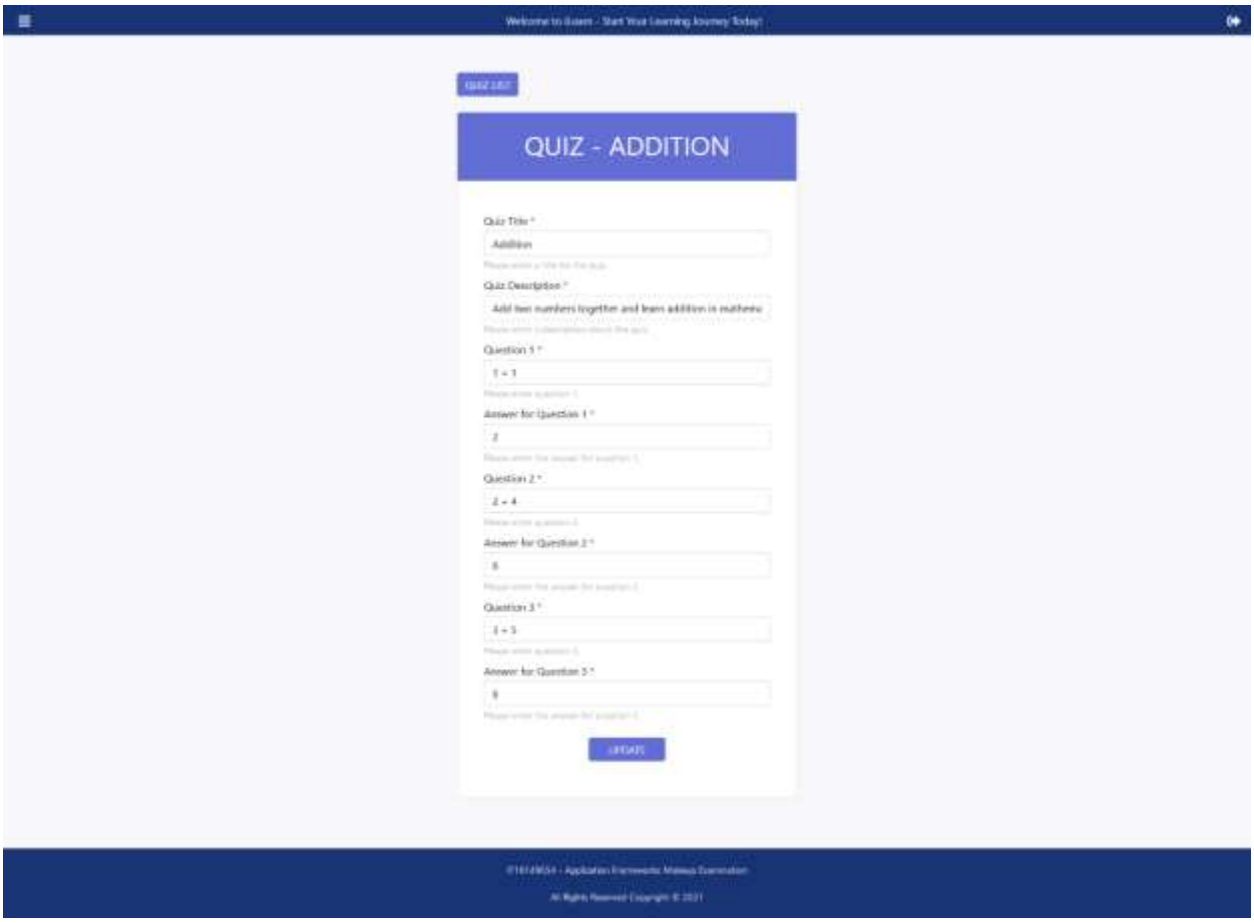


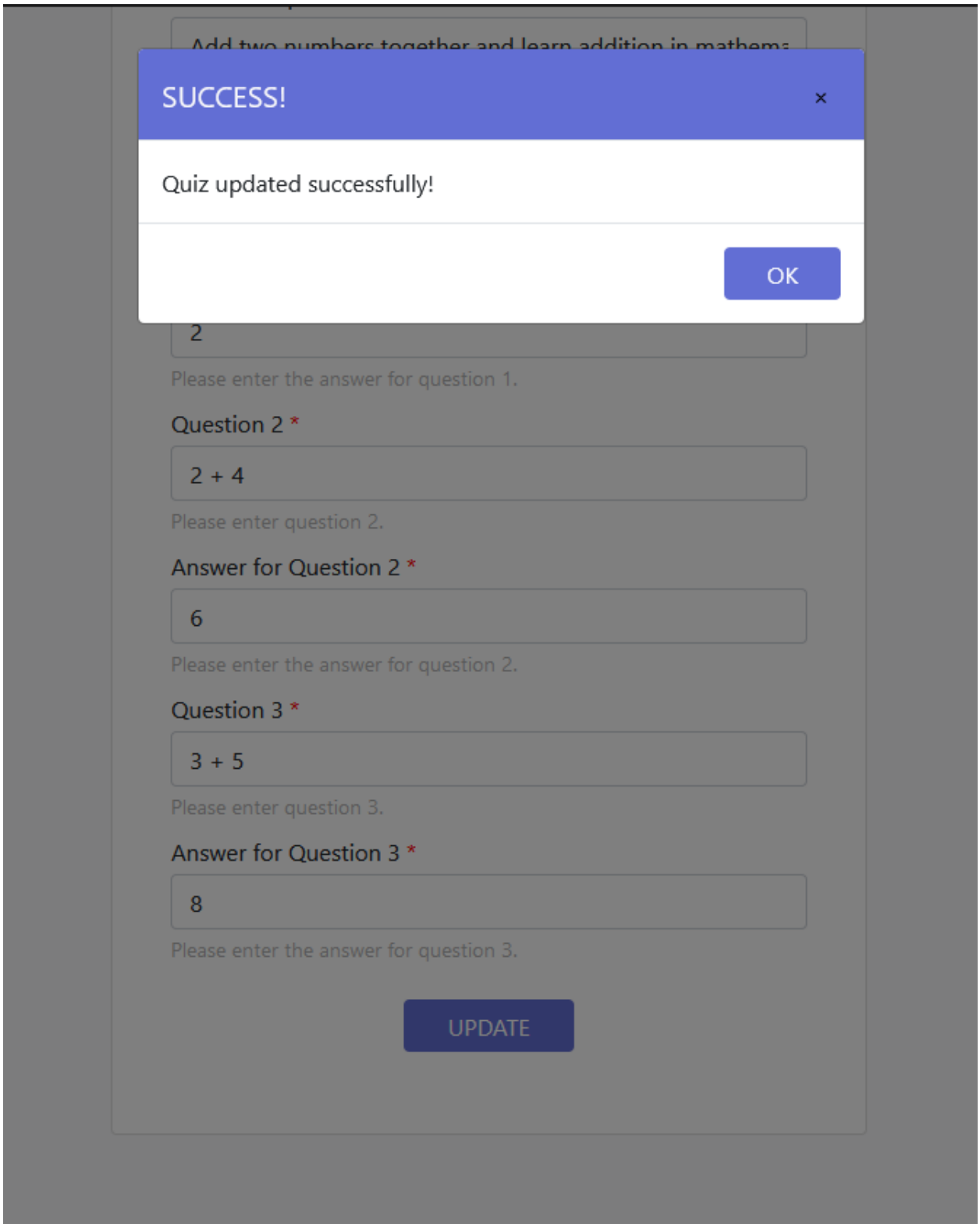
The teacher can delete the quizzes in the list if necessary. The teacher can add new quizzes as well as view a single quiz and update it.

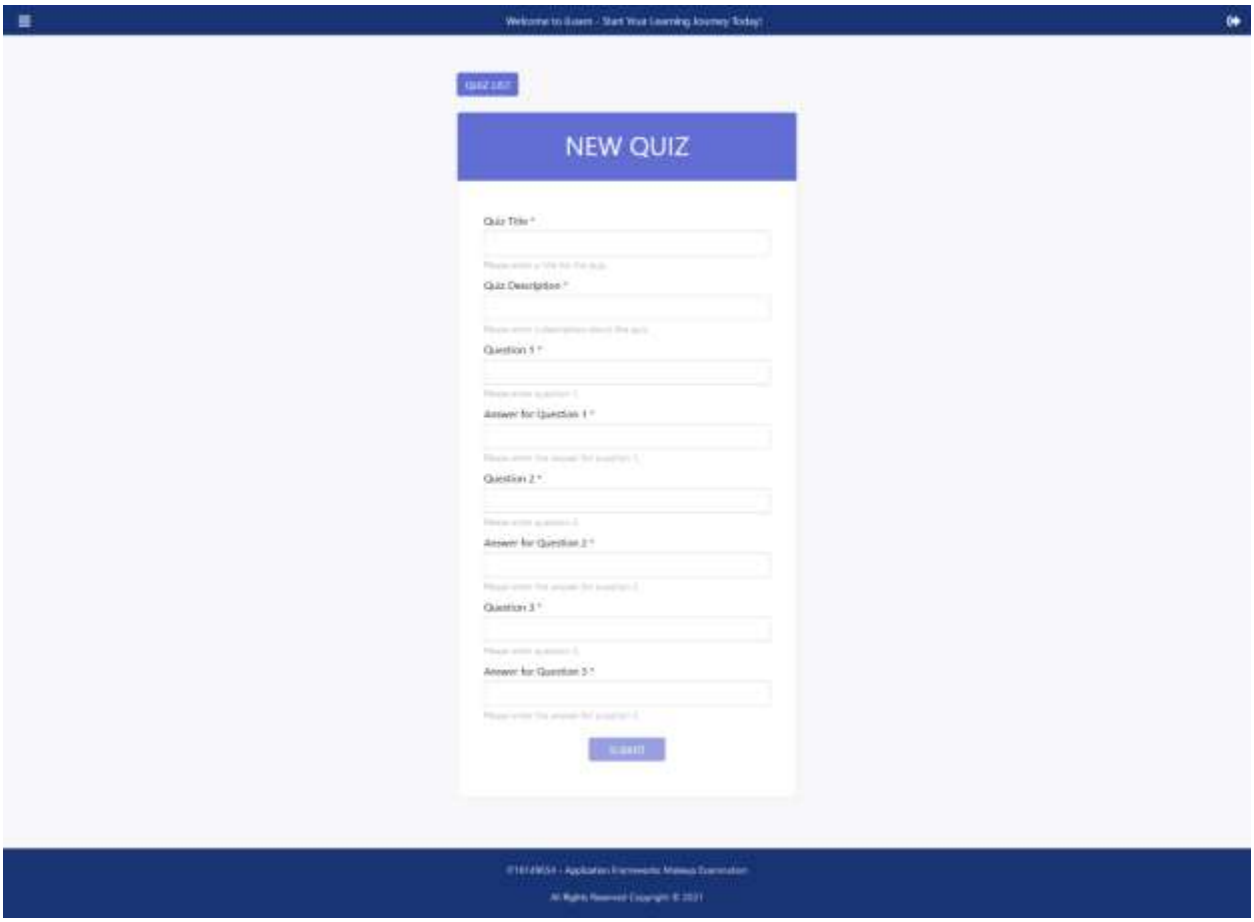
For the simplicity purpose, a quiz contains of three questions and their answers. Clicking on a list item will navigate the teacher to see more details of that specific quiz.

The navigation to new quiz and quiz list can be done in multiple ways to increase the usability of the application.


Welcome to iLearn - Start Your Learning Journey Today!
DELETE QUIZ
×
Are you sure you want to delete this quiz?
YES
NO
ADDITION
Add two numbers together and learn addition in mathematics!

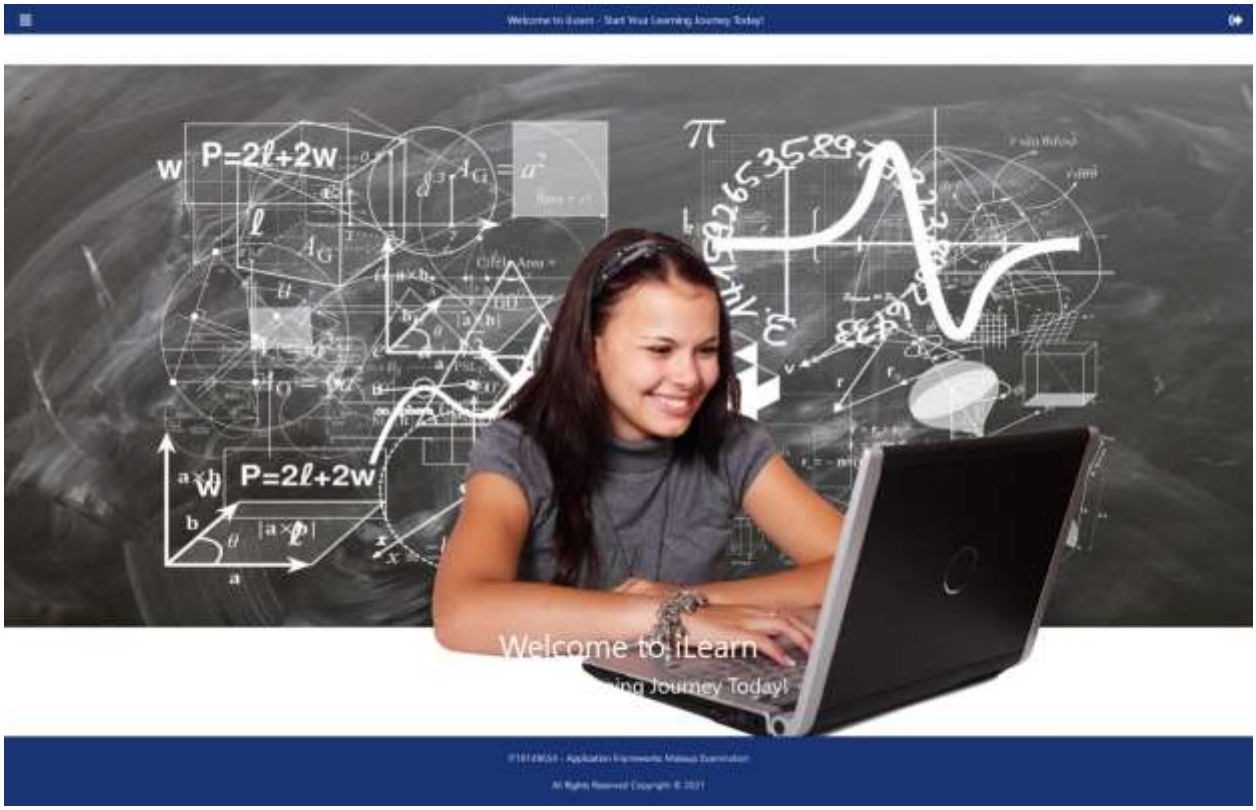

QUIZ - ADDITION

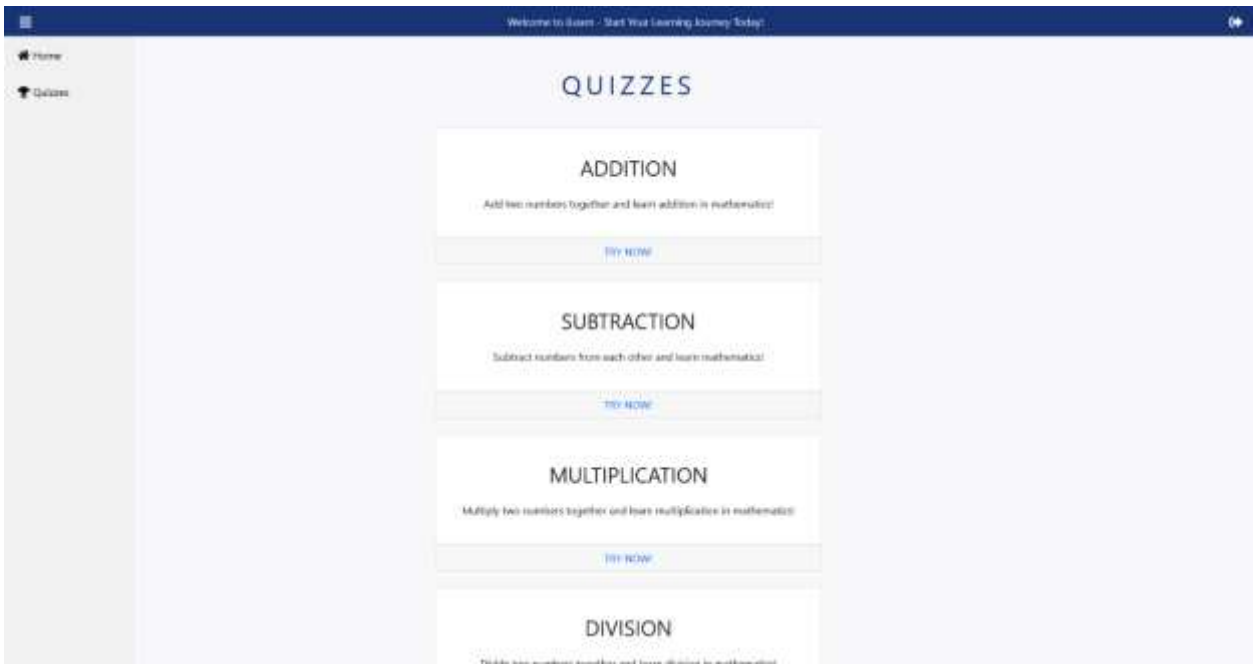

SUCCESS!
×
Quiz updated successfully!
OK
2
Please enter the answer for question 1.
Question 2 *
2 + 4
Please enter question 2.
Answer for Question 2 *
6
Please enter the answer for question 2.
Question 3 *
3 + 5
Please enter question 3.
Answer for Question 3 *
8
Please enter the answer for question 3.
UPDATE

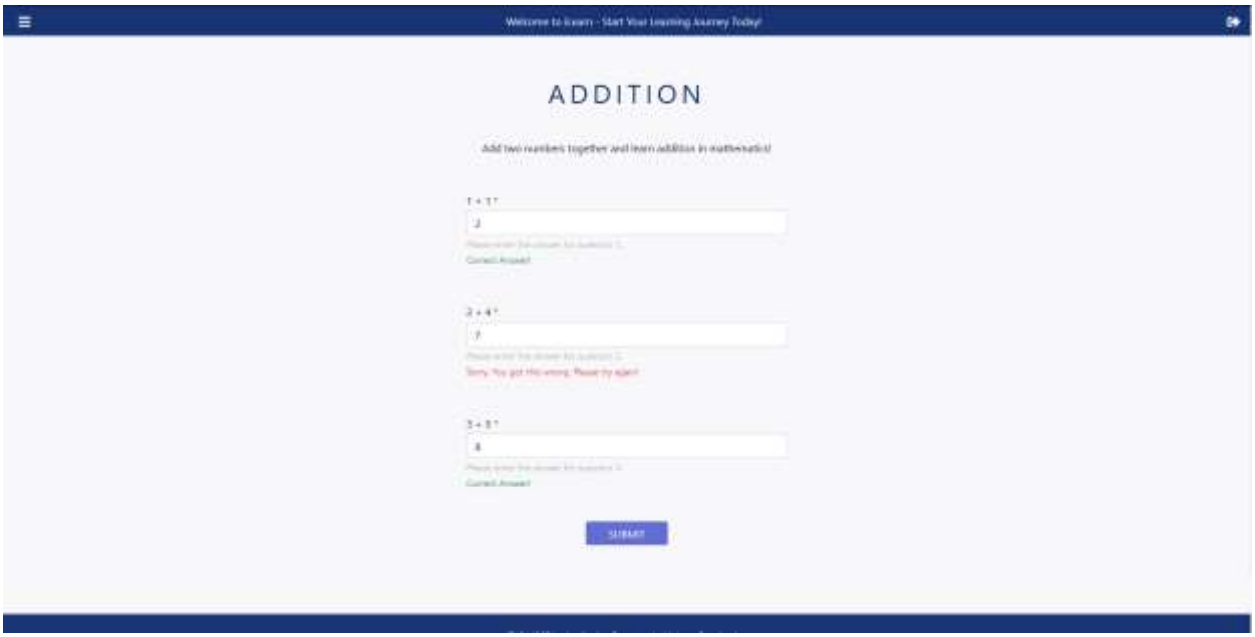


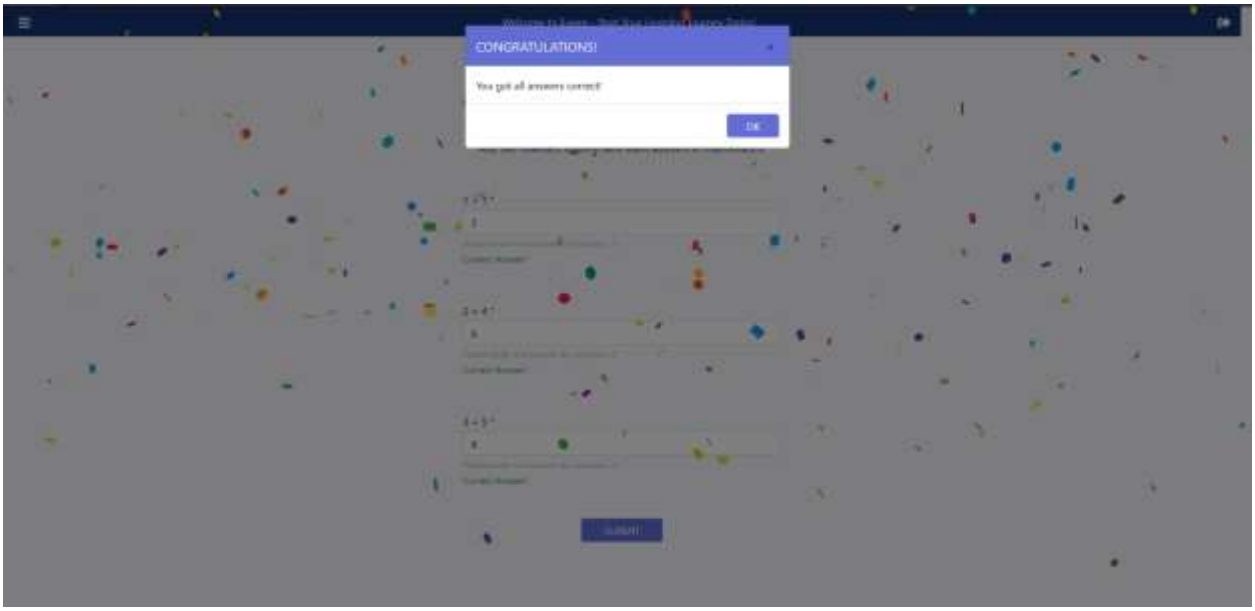
When logged in as the student, only the functionalities allowed for that user type is allowed.

The student can view the quizzes added by teachers and practice them. Immediately after the answers are submitted the results are displayed.


P=2ℓ+2w
P=2ℓ+2w
Welcome to iLearn


QUIZZES
ADDITION
SUBTRACTION
MULTIPLICATION
DIVISION


ADDITION


CONGRATULATIONS!
You got all answers correct!
OK

Implementation main functionalities (both frontend and backend)

1. Login, Logout and Register (Student & Teacher)

2. User Management (Teacher)

3. Quiz Management (Teacher)

4. Playing Quizzes (Student)

1. 1. Login, Logout and Register – Backend

users.model.js

```
const mongoose = require('mongoose')
const autoIncrement = require('mongoose-auto-increment')
const uniqueValidator = require('mongoose-unique-validator')

const Schema = mongoose.Schema

const userTypes = [
  'Admin',
  'User'
]

const UsersSchema = new Schema({
  userId: {
    type: Number,
    required: false,
    unique: true,
    trim: true
  },
  firstName: {
    type: String,
    required: false,
    unique: false,
    trim: true
  },
  lastName: {
    type: String,
    required: false,
```

```
    unique: false,
    trim: true
  },
  email: {
    type: String,
    required: true,
    unique: true,
    trim: true
  },
  password: {
    type: String,
    required: true,
    unique: false,
    trim: true
  },
  userType: {
    type: String,
    enum: userTypes,
    required: false,
    unique: false,
    trim: true,
    default: 'User'
  }
}, {
  timestamps: true,
  collection: 'Users'
})

UsersSchema.plugin(uniqueValidator)

autoIncrement.initialize(mongoose.connection)

UsersSchema.plugin(autoIncrement.plugin, {
  model: 'Users',
  field: 'userId',
  startAt: 1000,
  incrementBy: 1
})

module.exports = mongoose.model('Users', UsersSchema)
```

auth.routes.js

```
const express = require('express')
const AuthController = require('../controllers/auth-controller')

const router = express.Router()

router.post('/login', AuthController.login)

module.exports = router
```

users-controller.js

```
const bcrypt = require('bcrypt')
const nodemailer = require('nodemailer')
const UserModel = require('../models/users.model')

require('dotenv').config()

const addUser = async (req, res) => {
  let existingUser

  let {
    firstName,
    lastName,
    email,
    password
  } = req.body

  try {
    existingUser = await UserModel.findOne({
      email: email
    })
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  if (existingUser) {
    res.send({
      status: 409,
      message: 'A user with the same email already exists.'
    })
  }

  const newUser = new UserModel({
    firstName,
    lastName,
    email,
    password: bcrypt.hashSync(password, 10)
  })

  try {
    await newUser.save()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  await sendEmail(email)

  res.send({
    status: 201,
    message: 'Congratulations! You have successfully registered as a student
in iLearn. ' +
      'Now please login to iLearn and start your learning journey right now!'
  })
```

```
}

const addAdmin = async (req, res) => {
  let existingUser

  let {
    firstName,
    lastName,
    email,
    password
  } = req.body

  try {
    existingUser = await UserModel.findOne({
      email: email
    })
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  if (existingUser) {
    res.send({
      status: 409,
      message: 'A user with the same email already exists.'
    })
  }

  const newUser = new UserModel({
    firstName,
    lastName,
    email,
    password: bcrypt.hashSync(password, 10),
    userType: 'Admin'
  })

  try {
    await newUser.save()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 201,
    message: 'Administrator added successfully!'
  })
}

let transporter = nodemailer.createTransport({
  service: 'gmail',
  auth: {
    user: 'it18149654@gmail.com',
    pass: process.env.PASSWORD
  }
})
```

```
const sendEmail = async email => {
  let info = {
    from: 'it18149654@gmail.com',
    to: email,
    subject: 'Welcome to iLearn!',
    text:
      `Congratulations!
      You have successfully registered as a student.
      Start your learning journey today!
      Thank you!
      This is an auto-generated email.
      If this has been sent by mistake, please delete this without sharing
this.
      All rights reserved.`,
    html:
      `<div style="margin: 0; padding: 0; background-color: #f2f2f2; font-
family: arial, serif;">
      <table style="margin: 0 auto; background: white; max-width: 500px;
padding-bottom: 0; border-top: 5px solid #588dde; border-bottom: 5px solid
#588dde; width: 100%;">
      <tr style="background: rgb(237, 243, 255); padding-left: 20px; padding-
right: 20px;">
      <td>
      <table align="left" style="width: 100%;">
      <tr>
      <td style="padding: 10px;">
      <h1 style="text-align: center; color: #1a1a72;">Congratulations!</h1>
      <h2 style="margin-top:25px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">You have successfully registered as a
student.</h2>
      <h2 style="margin-top:20px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">Start your learning journey today!</h2>
      </td>
      </tr>
      <tr style="background: rgb(237, 243, 255); padding-left: 20px; padding-
right: 20px;">
      <td>
      <table align="left" style="width: 100%;">
      <tr>
      <td style="padding: 10px;">
      <h2 style="margin-top:25px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">Thank you!</h2>
      <h4 style="margin-top:20px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">This is an auto-generated email.</h4>
      <h4 style="margin-top:20px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">If this has been sent by mistake, please
delete this without sharing this.</h4>
      <h4 style="margin-top:20px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">All rights reserved.</h4>
      </td>
      </tr>
      </table>
      </td>
      </tr>
      </table>
      </div>`
  }
```

```
  transporter.sendMail(info, (error, data) => {
    if (error) {
      console.error(error)
      console.error('Email sending failed! Please try again.')
    } else {
      console.error(data)
      console.error('An email is sent successfully to ' + email + '.')
    }
  })
}
```

1.2 Login, Logout and Register – Frontend

route-filter.jsx

```
import React, {useContext, useEffect, useState} from 'react'
import {Redirect, Route} from 'react-router-dom'
import {admin, all, user} from '../constants/enumerations/user-types'
import {AppContext} from '../global/app-context'
import {checkUserInLocalStorage} from '../helpers/local-storage.helpers'
import Loader from '../components/loader/loader'
import './route-filter.css'

const RouteFilter = (
  {
    component: Component,
    needAuthentication,
    userType,
    ...rest
  }
) => {
  const appContext = useContext(AppContext)

  const [authenticated, setAuthenticated] = useState(null)

  useEffect(() => {
    const localeStorageData = checkUserInLocalStorage()
    if (localeStorageData.status === true) {
      appContext.login(localeStorageData.result).then(() => {
      })
      setAuthenticated(true)
    } else {
      setAuthenticated(false)
    }
  }, [Component])

  return (
    <div>
      <Route {...rest}
```

```
              render={
                props => {
                  if (needAuthentication && authenticated === null) {
                    return (
                      <Loader/>
                    )
                  } else if (needAuthentication && !authenticated) {
                    return (
                      <Redirect to={'/login'}/>
                    )
                  } else if (!needAuthentication && authenticated) {
                    if (appContext.loginData && appContext.loginData.userType
=== admin) {
                      return (
                        <Redirect to={'/dashboard'}/>
                      )
                    } else if (appContext.loginData &&
appContext.loginData.userType === user) {
                      return (
                        <Redirect to={'/home'}/>
                      )
                    }
                  } else if (!needAuthentication) {
                    return (
                      <Component {...props} />
                    )
                  } else if (authenticated) {
                    if (userType === all || (appContext.loginData &&
appContext.loginData.userType === userType)) {
                      return (
                        <Component {...props} />
                      )
                    } else {
                      if (appContext.loginData &&
appContext.loginData.userType === admin) {
                        return (
                          <Redirect to={'/dashboard'}/>
                        )
                      } else if (appContext.loginData &&
appContext.loginData.userType === user) {
                        return (
                          <Redirect to={'/home'}/>
                        )
                      }
                    }
                  } else {
                    return (
                      <Loader/>
                    )
                  }
                }}/>
    </div>
  )
}

export default RouteFilter
```

local-storage.helpers.js

```
import {authStoreKey} from '../config/main.config'

const setLocalStorageItem = async (key, obj) => {
  try {
    await localStorage.setItem(key, JSON.stringify(obj))
    return true
  } catch (error) {
    console.error(error)
    return false
  }
}

const removeFromLocalStorage = async key => {
  try {
    await localStorage.removeItem(key)
    return true
  } catch (error) {
    console.error(error)
    return false
  }
}

const checkUserInLocalStorage = () => {
  try {
    const data = getFromLocalStorage(authStoreKey)
    if (data) {
      return {
        status: true,
        result: data
      }
    } else {
      return {
        status: false
      }
    }
  } catch (error) {
    console.error(error)
    return {
      status: false
    }
  }
}

const getFromLocalStorage = key => {
  try {
    return JSON.parse(localStorage.getItem(key))
  } catch (error) {
    console.error(error)
    return false
  }
}

export {
  setLocalStorageItem,
```

```
  removeFromLocalStorage,
  checkUserInLocalStorage
}
```

common.helpers.js

```
const isEmpty = async value => {
  return value === '' || value === null || value === undefined || value ===
'null' || value === 'undefined'
}

const dateToString = async (value, format = 'dd-mm-YY') => {
  const dateObj = new Date(value)
  switch (format) {
    case 'dd-mm-YY':
      return `${dateObj.getDate().toString().padStart(2, '0')}-
${(dateObj.getMonth() + 1)
        .toString().padStart(2, '0')}-${dateObj.getFullYear().toString()}`
    default:
      return value
  }
}

export {
  isEmpty,
  dateToString
}
```

app-context.js

```
import {createContext} from 'react'

export const AppContext = createContext({
  loginData: null,
  login: async () => {
  },
  logout: async () => {
  }
})
```

global-state.jsx

```
import React, {useState} from 'react'
import {AppContext} from '../app-context'
import './global-state.css'

export const GlobalState = props => {
  const [loginData, setLoginData] = useState(null)

  const login = async data => {
```

```
    setLoginData(data)
  }

  const logout = async () => {
    setLoginData(null)
  }

  return (
    <AppContext.Provider value={{
      loginData: loginData,
      login: login,
      logout: logout
    }}>
      {props.children}
    </AppContext.Provider>
  )
}
```

user-types.js

```
export const all = 'All'
export const admin = 'Admin'
export const user = 'User'
```

header.jsx

```
import React, {Fragment, useContext, useState} from 'react'
import {withRouter} from 'react-router-dom'
import {Navbar, NavbarBrand} from 'reactstrap'
import {removeFromLocalStorage} from '../../helpers/local-storage.helpers'
import {authStoreKey} from '../../config/main.config'
import {AppContext} from '../../global/app-context'
import NavigationBar from '../navigation-bar/navigation-bar'
import './header.css'

const Header = props => {
  const appContext = useContext(AppContext)

  const [display, setDisplay] = useState(false)

  const onLogout = async () => {
    await removeFromLocalStorage(authStoreKey)
    await appContext.logout()
    props.history.push('/login')
  }

  const onNavBarDisplay = async () => {
    setDisplay(!display)
  }

  return (
    <div>
```

```
      <div>
        <Fragment>
          <Navbar className='header d-flex justify-content-between w-100'
                  expand='md'>
            <div className={appContext.loginData === null ? 'invisible' :
''}>
              <NavbarBrand>
                <i className='icon fas fa-bars ms-4'
                   onClick={onNavBarDisplay}/>
              </NavbarBrand>
            </div>
            <div>
              <label className='logo mb-0'>
                Welcome to iLearn - Start Your Learning Journey Today!
              </label>
            </div>
            <div className={appContext.loginData === null ? 'invisible' :
''}>
              <NavbarBrand>
                <i className='icon fas fa-sign-out-alt'
                   title='Logout'
                   onClick={onLogout}/>
              </NavbarBrand>
            </div>
          </Navbar>
        </Fragment>
      </div>
      <div>
        {
          display ? (
            <NavigationBar/>
          ) : null
        }
      </div>
    </div>
  )
}

export default withRouter(Header)
```

navigation-bar.jsx

```
import React, {useContext} from 'react'
import {Nav} from 'reactstrap'
import {AppContext} from '../../global/app-context'
import UserNavigationEntries from './user-navigation-entries/user-navigation-
entries'
import AdminNavigationEntries from './admin-navigation-entries/admin-
navigation-entries'
import './navigation-bar.css'

const NavigationBar = () => {
  const appContext = useContext(AppContext)
```

```
  return (
    <div className='sidebar'>
      {
        appContext.loginData && appContext.loginData.userType === 'User' ? (
          <div>
            <UserNavigationEntries/>
          </div>
        ) : appContext.loginData && appContext.loginData.userType === 'Admin'
? (
          <div>
            <AdminNavigationEntries/>
          </div>
        ) : (
          <div>
            <Nav vertical>
            </Nav>
          </div>
        )
      }
    </div>
  )
}

export default NavigationBar
```

login.jsx

```
import React from 'react'
import Header from '../../../components/header/header'
import Footer from '../../../components/footer/footer'
import LoginForm from './login-form/login-form'
import './login.css'

const Login = props => {
  return (
    <div>
      <div>
        <Header/>
      </div>
      <div className='container login-form'>
        <LoginForm history={props.history}/>
      </div>
      <div>
        <Footer/>
      </div>
    </div>
  )
}

export default Login
```

login-form.jsx

```
import React, {useContext, useState} from 'react'
import {Link} from 'react-router-dom'
import {Card, CardBody} from 'reactstrap'
import axios from 'axios'
import {authStoreKey} from '../../../../config/main.config'
import {authApi} from '../../../../config/api.config'
import {setLocalStorageItem} from '../../../../helpers/local-storage.helpers'
import {isEmpty} from '../../../../helpers/common.helpers'
import {AppContext} from '../../../../global/app-context'
import Loader from '../../../../components/loader/loader'
import TextField from '../../../../components/text-field/text-field'
import ButtonComponent from '../../../../components/button/button'
import './login-form.css'

const LoginForm = props => {
  const appContext = useContext(AppContext)

  const helperEmail = 'Please enter your email address.'
  const helperPassword = 'Please enter your password.'

  const [loader, setLoader] = useState(false)

  const [email, setEmail] = useState('')
  const [password, setPassword] = useState('')

  const [errorEmail, setErrorEmail] = useState('')
  const [errorPassword, setErrorPassword] = useState('')

  const [emailValid, setEmailValid] = useState(false)
  const [passwordValid, setPasswordValid] = useState(false)

  const [error, setError] = useState('')

  const onChangeEmail = async event => {
    setEmail(event.value)
    setEmailValid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorEmail('')
    setError('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorEmail('Please enter a valid email address.')
    }
  }

  const onChangePassword = async event => {
    setPassword(event.value)
    setPasswordValid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorPassword('')
    setError('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorPassword('Please enter a valid password.')
    }
  }
```

```
function isDisabled() {
  return !emailValid || !passwordValid
}

const onSubmit = async () => {
  setError('')
  const data = {
    'email': email.trim(),
    'password': password
  }
  setLoader(true)
  axios.post(`${authApi}login`, data).then(res => {
    if (res.data.status === 200) {
      setLocalStorageItem(authStoreKey, res.data.user)
      appContext.login(res.data.user)
      props.history.push('/home')
    } else if (res.data.status === 401) {
      setError(res.data.message)
    }
    setLoader(false)
  }).catch(error => {
    setError('An unexpected error occurred. Please try again later.')
    setLoader(false)
    console.error(error)
  })
}

return (
  <div className='login-wrapper'>
    {
      loader ? (
        <Loader/>
      ) : null
    }
    <Card className='overflow-hidden'>
      <div className='login-header'>
        <div className='text-primary text-center p-4'>
          <h1 className='text-white font-size-20 text-uppercase'>
            <i className='login-icon fas fa-users mt-2'/>
            <span className='ms-3'>
                Login
              </span>
          </h1>
        </div>
      </div>
      <CardBody className='p-4'>
        <div>
          <small>
            {
              error ? (
                <span className='p-3 error'>
                  {error}
                </span>
              ) : null
            }
          </small>
```

```
          </div>
          <div className='p-3'>
            <div>
              <TextField isRequired={true}
                         labelText={'Email'}
                         type={'email'}
                         name={'email'}
                         value={email}
                         errorText={errorEmail}
                         helperText={helperEmail}
                         minLength={6}
                         maxLength={100}
                         onChangeFn={event => onChangeEmail(event)}/>
            </div>
            <div>
              <TextField isRequired={true}
                         labelText={'Password'}
                         type={'password'}
                         name={'password'}
                         value={password}
                         errorText={errorPassword}
                         helperText={helperPassword}
                         minLength={4}
                         maxLength={50}
                         onChangeFn={event => onChangePassword(event)}/>
            </div>
            <div className='text-center mt-4 mb-3'>
              <ButtonComponent btnText={'Login'}
                               isFullWidth={false}
                               elementStyle={'login-btn'}
                               disabled={isDisabled()}
                               onClickFn={onSubmit}/>
            </div>
          </div>
          <div className='ms-3'>
            <label>Don't have an account? </label>
            <Link to={'/register'}>
              <label className='register-link'>
                Register
              </label>
            </Link>
          </div>
        </CardBody>
      </Card>
    </div>
  )
}

export default LoginForm
```

register.jsx

```
import React from 'react'
import Header from '../../../components/header/header'
import Footer from '../../../components/footer/footer'
import RegisterForm from './register-form/register-form'
import './register.css'

const Register = props => {
  return (
    <div>
      <div>
        <Header/>
      </div>
      <div className='container register-form'>
        <RegisterForm history={props.history}/>
      </div>
      <div>
        <Footer/>
      </div>
    </div>
  )
}

export default Register
```

register-form.jsx

```
import React, {useState} from 'react'
import {Link} from 'react-router-dom'
import {Card, CardBody, Modal, ModalBody, ModalFooter, ModalHeader} from
'reactstrap'
import axios from 'axios'
import {isEmpty} from '../../../../helpers/common.helpers'
import {usersApi} from '../../../../config/api.config'
import Loader from '../../../../components/loader/loader'
import TextField from '../../../../components/text-field/text-field'
import ButtonComponent from '../../../../components/button/button'
import './register-form.css'

const RegisterForm = props => {
  const [successModal, setSuccessModal] = useState(false)
  const [message, setMessage] = useState('')

  const helperFirstName = 'Please enter your first name.'
  const helperLastName = 'Please enter your last name.'
  const helperEmail = 'Please enter your email address.'
  const helperPassword = 'Please enter a password.'
  const helperConfirmPassword = 'Please enter the password again.'

  const [loader, setLoader] = useState(false)

  const [firstName, setFirstName] = useState('')
```

```
  const [lastName, setLastName] = useState('')
  const [email, setEmail] = useState('')
  const [password, setPassword] = useState('')
  const [confirmPassword, setConfirmPassword] = useState('')

  const [errorFirstName, setErrorFirstName] = useState('')
  const [errorLastName, setErrorLastName] = useState('')
  const [errorEmail, setErrorEmail] = useState('')
  const [errorPassword, setErrorPassword] = useState('')
  const [errorConfirmPassword, setErrorConfirmPassword] = useState('')

  const [firstNameValid, setFirstNameValid] = useState(false)
  const [lastNameValid, setLastNameValid] = useState(false)
  const [emailValid, setEmailValid] = useState(false)
  const [passwordValid, setPasswordValid] = useState(false)
  const [confirmPasswordValid, setConfirmPasswordValid] = useState(false)

  const [error, setError] = useState('')

  const onChangeFirstName = async event => {
    setFirstName(event.value)
    setFirstNameValid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorFirstName('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorFirstName('Please enter a valid first name.')
    }
  }

  const onChangeLastName = async event => {
    setLastName(event.value)
    setLastNameValid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorLastName('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorLastName('Please enter a valid last name.')
    }
  }

  const onChangeEmail = async event => {
    setEmail(event.value)
    setEmailValid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorEmail('')
    setError('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorEmail('Please enter a valid email address.')
    }
  }

  const onChangePassword = async event => {
    setPassword(event.value)
    setPasswordValid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorPassword('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorPassword('Please enter a strong password with at least 4
```

```
characters.')
    }
  }

  const onChangeConfirmPassword = async event => {
    setConfirmPassword(event.value)
    setConfirmPasswordValid(event.value === password)
    setErrorConfirmPassword('')
    if (event.value !== password) {
      setErrorConfirmPassword('Please make sure your passwords match.')
    }
  }

  function isDisabled() {
    return !firstNameValid || !lastNameValid || !emailValid || !passwordValid
|| !confirmPasswordValid
  }

  const toggleSuccessModal = async () => {
    setSuccessModal(!successModal)
  }

  const onClick = async () => {
    props.history.push('/login')
  }

  const onSubmit = async () => {
    setError('')
    const data = {
      'firstName': firstName.trim(),
      'lastName': lastName.trim(),
      'email': email.trim(),
      'password': password
    }
    setLoader(true)
    axios.post(`${usersApi}users`, data).then(res => {
      if (res.data.status === 201) {
        setLoader(false)
        setMessage(res.data.message)
        toggleSuccessModal()
      } else if (res.data.status === 409) {
        setError(res.data.message)
      }
      setLoader(false)
    }).catch(error => {
      setError('An unexpected error occurred. Please try again later.')
      setLoader(false)
      console.error(error)
    })
  }

  return (
    <div className='register-wrapper'>
      {
        loader ? (
          <Loader/>
        ) : null
```

```
    }
    <div>
      <Modal isOpen={successModal}
             toggle={toggleSuccessModal}
             className='modal-close'>
        <ModalHeader toggle={toggleSuccessModal}
                     className='text-uppercase title'>
          Success!
        </ModalHeader>
        <ModalBody>
          {message}
        </ModalBody>
        <ModalFooter>
          <ButtonComponent btnText={'Ok'}
                           isFullWidth={false}
                           elementStyle={'ok-button'}
                           disabled={false}
                           onClickFn={onClick}/>
        </ModalFooter>
      </Modal>
    </div>
    <div>
      <Card className='overflow-hidden'>
        <div className='register-header'>
          <div className='text-primary text-center p-4'>
            <h1 className='text-white font-size-20 text-uppercase'>
              <i className='register-icon fas fa-user-plus mt-2'/>
              <span className='ms-3'>
                Register
              </span>
            </h1>
          </div>
        </div>
        <CardBody className='p-4'>
          <div>
            <small>
              {
                error ? (
                  <span className='p-3 error'>
                  {error}
                </span>
                ) : null
              }
            </small>
          </div>
          <div className='p-3'>
            <div>
              <TextField isRequired={true}
                         labelText={'First Name'}
                         name={'firstName'}
                         value={firstName}
                         errorText={errorFirstName}
                         helperText={helperFirstName}
                         maxLength={50}
                         onChangeFn={event => onChangeFirstName(event)}/>
            </div>
            <div>
```

```
                <TextField isRequired={true}
                           labelText={'Last Name'}
                           name={'lastName'}
                           value={lastName}
                           errorText={errorLastName}
                           helperText={helperLastName}
                           maxLength={50}
                           onChangeFn={event => onChangeLastName(event)}/>
              </div>
              <div>
                <TextField isRequired={true}
                           labelText={'Email'}
                           type={'email'}
                           name={'email'}
                           value={email}
                           errorText={errorEmail}
                           helperText={helperEmail}
                           minLength={6}
                           maxLength={100}
                           onChangeFn={event => onChangeEmail(event)}/>
              </div>
              <div>
                <TextField isRequired={true}
                           labelText={'Password'}
                           type={'password'}
                           name={'password'}
                           value={password}
                           errorText={errorPassword}
                           helperText={helperPassword}
                           minLength={4}
                           maxLength={50}
                           onChangeFn={event => onChangePassword(event)}/>
              </div>
              <div>
                <TextField isRequired={true}
                           labelText={'Confirm Password'}
                           type={'password'}
                           name={'confirmPassword'}
                           value={confirmPassword}
                           errorText={errorConfirmPassword}
                           helperText={helperConfirmPassword}
                           disabled={!passwordValid}
                           minLength={4}
                           maxLength={50}
                           onChangeFn={event =>
onChangeConfirmPassword(event)}/>
              </div>
              <div className='text-center mt-4 mb-3'>
                <ButtonComponent btnText={'Register'}
                                 isFullWidth={false}
                                 elementStyle={'register-btn'}
                                 disabled={isDisabled()}
                                 onClickFn={onSubmit}/>
              </div>
            </div>
            <div className='ms-3'>
              <label>Already have an account? </label>
```

```
              <Link to={'/login'}>
                <label className='login-link'>
                  Login
                </label>
              </Link>
            </div>
          </CardBody>
        </Card>
      </div>
    </div>
  )
}

export default RegisterForm
```

2.1 User Management – Backend

user-controller.js

```
const updateUser = async (req, res) => {
  let user
  let existingUser

  const {
    id
  } = req.params

  const {
    firstName,
    lastName,
    email,
    password,
    userType
  } = req.body

  try {
    user = await UserModel.findById(id)
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  try {
    existingUser = await UserModel.findOne({
      email: email
    })
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }
```

```
  if (existingUser && email !== user.email) {
    res.send({
      status: 409,
      message: 'A user with the same email already exists.'
    })
  }

  user.firstName = firstName
  user.lastName = lastName
  user.email = email
  user.password = bcrypt.hashSync(password, 10)
  user.userType = userType

  try {
    await user.save()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    message: 'User updated successfully!'
  })
}

const promoteUser = async (req, res) => {
  let user

  const {
    id
  } = req.params

  try {
    user = await UserModel.findById(id)
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  user.userType = 'Admin'

  try {
    await user.save()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    message: 'The user has been successfully promoted as a teacher!'
  })
}

const deleteUser = async (req, res) => {
```

```
  let user

  const {
    id
  } = req.params

  try {
    user = await UserModel.findById(id)
    await user.remove()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    message: 'User deleted successfully!'
  })
}

const getUser = async (req, res) => {
  let user

  const {
    id
  } = req.params

  try {
    user = await UserModel.findById(id)
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    user: user
  })
}

const getUserList = async (req, res) => {
  let userList

  try {
    userList = await UserModel.find()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    userList: userList
  })
}

exports.addUser = addUser
```

```
exports.addAdmin = addAdmin
exports.updateUser = updateUser
exports.promoteUser = promoteUser
exports.deleteUser = deleteUser
exports.getUser = getUser
exports.getUserList = getUserList
```

user.routes.js

```
const express = require('express')
const UsersController = require('../controllers/users-controller')

const router = express.Router()

router.post('/users', UsersController.addUser)
router.post('/admin', UsersController.addAdmin)
router.put('/users/:id', UsersController.updateUser)
router.put('/users/promote/:id', UsersController.promoteUser)
router.delete('/users/:id', UsersController.deleteUser)
router.get('/users/:id', UsersController.getUser)
router.get('/users', UsersController.getUserList)

module.exports = router
```

2.2 User Management – Frontend

user-management.jsx

```
import React from 'react'
import Header from '../../../components/header/header'
import Footer from '../../../components/footer/footer'
import UserManagementComponent from './user-management-component/user-
management-component'
import './user-management.css'

const UserManagement = () => {
  return (
    <div>
      <div>
        <Header/>
      </div>
      <h1 className='text-center text-uppercase mt-5 page-title'>
        User Management
      </h1>
      <div className='container user-management-page'>
        <UserManagementComponent/>
      </div>
      <div>
```

```
        <Footer/>
      </div>
    </div>
  )
}

export default UserManagement
```

user-management-component.jsx

```
import React, {useEffect, useState} from 'react'
import {Modal, ModalBody, ModalFooter, ModalHeader, Table} from 'reactstrap'
import axios from 'axios'
import {usersApi} from '../../../../config/api.config'
import Loader from '../../../../components/loader/loader'
import ButtonComponent from '../../../../components/button/button'
import './user-management-component.css'

const UserManagementComponent = () => {
  const [loader, setLoader] = useState(false)
  const [successModal, setSuccessModal] = useState(false)
  const [successModalEdit, setSuccessModalEdit] = useState(false)
  const [modal, setModal] = useState(false)
  const [modalEdit, setModalEdit] = useState(false)
  const [message, setMessage] = useState('')
  const [deleteId, setDeleteId] = useState('')
  const [editId, setEditId] = useState('')
  const [data, setData] = useState(null)
  const [error, setError] = useState('')

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

  const loadData = async () => {
    setLoader(true)
    axios.get(`${usersApi}users`).then(res => {
      setData(res.data.userList)
      setLoader(false)
    }).catch(error => {
      setError('An unexpected error occurred. Please try again later.')
      setLoader(false)
      console.error(error)
    })
  }

  const onEdit = async id => {
    setEditId(id)
    await toggleEdit()
  }

  const toggleEdit = async () => {
    setModalEdit(!modalEdit)
```

```
}

const toggleSuccessModalEdit = async () => {
  setSuccessModalEdit(!successModalEdit)
}

const confirmEdit = async () => {
  setError('')
  setLoader(true)
  axios.put(`${usersApi}users/promote/${editId}`).then(res => {
    if (res.data.status === 200) {
      setMessage(res.data.message)
      toggleEdit()
      toggleSuccessModalEdit()
      loadData()
    } else {
      toggleEdit()
      setError('An unexpected error occurred. Please try again later.')
      console.error(error)
    }
    setLoader(false)
  }).catch(error => {
    toggleEdit()
    setError('An unexpected error occurred. Please try again later.')
    setLoader(false)
    console.error(error)
  })
}

const onDelete = async id => {
  setDeleteId(id)
  await toggle()
}

const toggle = async () => {
  setModal(!modal)
}

const toggleSuccessModal = async () => {
  setSuccessModal(!successModal)
}

const confirmDelete = async () => {
  setError('')
  setLoader(true)
  axios.delete(`${usersApi}users/${deleteId}`).then(res => {
    if (res.data.status === 200) {
      setData(data.filter(item => item._id !== deleteId))
      setMessage(res.data.message)
      toggle()
      toggleSuccessModal()
    } else {
      toggle()
      setError('An unexpected error occurred. Please try again later.')
      console.error(error)
    }
    setLoader(false)
```

```
    }).catch(error => {
      toggle()
      setError('An unexpected error occurred. Please try again later.')
      setLoader(false)
      console.error(error)
    })
  }

  return (
    <div>
      {
        loader ? (
          <Loader/>
        ) : null
      }
      <div>
        <Modal isOpen={successModalEdit}
               toggle={toggleSuccessModalEdit}
               className='modal-close'>
          <ModalHeader toggle={toggleSuccessModalEdit}
                       className='text-uppercase title'>
            Success!
          </ModalHeader>
          <ModalBody>
            {message}
          </ModalBody>
          <ModalFooter>
            <ButtonComponent btnText={'Ok'}
                             isFullWidth={false}
                             elementStyle={'ok-button'}
                             disabled={false}
                             onClickFn={toggleSuccessModalEdit}/>
          </ModalFooter>
        </Modal>
      </div>
      <div>
        <Modal isOpen={modalEdit}
               toggle={toggleEdit}
               className='modal-close'>
          <ModalHeader toggle={toggleEdit}
                       className='text-uppercase'>
            Promote to Teacher
          </ModalHeader>
          <ModalBody>
            Are you sure you want to promote this user as a teacher?
          </ModalBody>
          <ModalFooter>
            <ButtonComponent btnText={'Yes'}
                             isFullWidth={false}
                             elementStyle={'yes-button-edit'}
                             disabled={false}
                             onClickFn={confirmEdit}/>
            <ButtonComponent btnText={'No'}
                             isFullWidth={false}
                             elementStyle={'no-button'}
                             disabled={false}
                             onClickFn={toggleEdit}/>
```

```
        </ModalFooter>
      </Modal>
    </div>
    <div>
      <Modal isOpen={successModal}
             toggle={toggleSuccessModal}
             className='modal-close'>
        <ModalHeader toggle={toggleSuccessModal}
                     className='text-uppercase title'>
          Success!
        </ModalHeader>
        <ModalBody>
          {message}
        </ModalBody>
        <ModalFooter>
          <ButtonComponent btnText={'Ok'}
                           isFullWidth={false}
                           elementStyle={'ok-button'}
                           disabled={false}
                           onClickFn={toggleSuccessModal}/>
        </ModalFooter>
      </Modal>
    </div>
    <div>
      <Modal isOpen={modal}
             toggle={toggle}
             className='modal-close'>
        <ModalHeader toggle={toggle}
                     className='text-uppercase'>
          Delete User
        </ModalHeader>
        <ModalBody>
          Are you sure you want to delete this user?
        </ModalBody>
        <ModalFooter>
          <ButtonComponent btnText={'Yes'}
                           isFullWidth={false}
                           elementStyle={'yes-button'}
                           disabled={false}
                           onClickFn={confirmDelete}/>
          <ButtonComponent btnText={'No'}
                           isFullWidth={false}
                           elementStyle={'no-button'}
                           disabled={false}
                           onClickFn={toggle}/>
        </ModalFooter>
      </Modal>
    </div>
    <div>
      <small>
        {
          error ? (
            <span className='error'>
              {error}
            </span>
          ) : null
        }
```

```
        </small>
      </div>
      <div>
        <Table bordered>
          <thead>
          <tr className='text-center'>
            <th>User ID</th>
            <th>First Name</th>
            <th>Last Name</th>
            <th>Email</th>
            <th>User Type</th>
            <th colSpan={2}>
              Actions
            </th>
          </tr>
          </thead>
          <tbody>
          {
            data && data.map((item) => {
              return (
                <tr key={item._id}>
                  <td>
                    {item.userId}
                  </td>
                  <td>
                    {item.firstName}
                  </td>
                  <td>
                    {item.lastName}
                  </td>
                  <td>
                    {item.email}
                  </td>
                  <td>
                    {
                      item.userType === 'Admin' ? (
                        <span className='text-danger'>
                          Teacher
                        </span>
                      ) : (
                        <span className='text-primary'>
                          Student
                        </span>
                      )
                    }
                  </td>
                  <td className='text-center'>
                    {
                      item.userType === 'User' ? (
                        <i className='fas fa-arrow-up edit'
                           title='Promote to Teacher'
                           onClick={() => onEdit(item._id)}/>
                      ) : null
                    }
                  </td>
                  <td className='text-center'>
                    {
```

```
                        item.userType === 'User' ? (
                          <i className='fas fa-trash-alt delete'
                             title='Delete Student'
                             onClick={() => onDelete(item._id)}/>
                        ) : null
                      }
                    </td>
                  </tr>
                )
              })
            }
            </tbody>
          </Table>
        </div>
      </div>
    )
}

export default UserManagementComponent
```

3.1 Quiz Management - Backend

quizzes.model.js

```
const mongoose = require('mongoose')
const autoIncrement = require('mongoose-auto-increment')
const uniqueValidator = require('mongoose-unique-validator')

const Schema = mongoose.Schema

const QuizzesSchema = new Schema({
  quizId: {
    type: Number,
    required: false,
    unique: true,
    trim: true
  },
  quizTitle: {
    type: String,
    required: true,
    unique: true,
    trim: true
  },
  quizDescription: {
    type: String,
    required: true,
    unique: false,
    trim: true
  },
  questions: [{
```

```
    question: {
      type: String,
      required: true,
      unique: false,
      trim: true
    },
    answer: {
      type: String,
      required: true,
      unique: false,
      trim: true
    }
  }]
}, {
  timestamps: true,
  collection: 'Quizzes'
})

QuizzesSchema.plugin(uniqueValidator)

autoIncrement.initialize(mongoose.connection)

QuizzesSchema.plugin(autoIncrement.plugin, {
  model: 'Quizzes',
  field: 'quizId',
  startAt: 1000,
  incrementBy: 1
})

module.exports = mongoose.model('Quizzes', QuizzesSchema)
```

quizzes.routes.js

```
const express = require('express')
const QuizController = require('../controllers/quizzes-controller')

const router = express.Router()

router.post('/quizzes', QuizController.addQuiz)
router.put('/quizzes/:id', QuizController.updateQuiz)
router.delete('/quizzes/:id', QuizController.deleteQuiz)
router.get('/quizzes/:id', QuizController.getQuiz)
router.get('/quizzes', QuizController.getQuizList)

module.exports = router
```

3.2 Quiz Management – Frontend

quiz-list.jsx

```
import React from 'react'
import Header from '../../../../components/header/header'
import Footer from '../../../../components/footer/footer'
import QuizListComponent from './quiz-list-component/quiz-list-component'
import './quiz-list.css'

const QuizList = props => {
  return (
    <div>
      <div>
        <Header/>
      </div>
      <h1 className='text-center text-uppercase mt-5 page-title'>
        Content Management
      </h1>
      <div className='container quiz-list-page'>
        <QuizListComponent history={props.history}/>
      </div>
      <div>
        <Footer/>
      </div>
    </div>
  )
}

export default QuizList
```

quiz-list-component.jsx

```
import React, {useEffect, useState} from 'react'
import {
  Card,
  CardBody,
  CardDeck,
  CardFooter,
  CardText,
  CardTitle,
  Modal,
  ModalBody,
  ModalFooter,
  ModalHeader
} from 'reactstrap'
import axios from 'axios'
import {quizzesApi} from '../../../../../../config/api.config'
import Loader from '../../../../../../components/loader/loader'
import ButtonComponent from '../../../../../../components/button/button'
import './quiz-list-component.css'
```

```
const QuizListComponent = props => {
  const [loader, setLoader] = useState(false)
  const [successModal, setSuccessModal] = useState(false)
  const [modal, setModal] = useState(false)
  const [message, setMessage] = useState('')
  const [data, setData] = useState(null)
  const [deleteId, setDeleteId] = useState('')
  const [error, setError] = useState('')

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

  const loadData = async () => {
    setLoader(true)
    axios.get(`${quizzesApi}quizzes`).then(res => {
      setData(res.data.quizList)
      setLoader(false)
    }).catch(error => {
      setError('An unexpected error occurred. Please try again later.')
      setLoader(false)
      console.error(error)
    })
  }

  const onDelete = async id => {
    setDeleteId(id)
    await toggle()
  }

  const onView = async id => {
    props.history.push('/single-quiz/' + id)
  }

  const onNewQuiz = async () => {
    props.history.push('/add-quiz')
  }

  const toggle = async () => {
    setModal(!modal)
  }

  const toggleSuccessModal = async () => {
    setSuccessModal(!successModal)
  }

  const confirmDelete = async () => {
    setError('')
    setLoader(true)
    axios.delete(`${quizzesApi}quizzes/${deleteId}`).then(res => {
      if (res.data.status === 200) {
        setData(data.filter(item => item._id !== deleteId))
        setMessage(res.data.message)
        toggle()
        toggleSuccessModal()
      } else {
```

```
        toggle()
        setError('An unexpected error occurred. Please try again later.')
        console.error(error)
      }
      setLoader(false)
    }).catch(error => {
      toggle()
      setError('An unexpected error occurred. Please try again later.')
      setLoader(false)
      console.error(error)
    })
  }

  return (
    <div>
      {
        loader ? (
          <Loader/>
        ) : null
      }
      <div>
        <Modal isOpen={successModal}
               toggle={toggleSuccessModal}
               className='modal-close'>
          <ModalHeader toggle={toggleSuccessModal}
                       className='text-uppercase title'>
            Success!
          </ModalHeader>
          <ModalBody>
            {message}
          </ModalBody>
          <ModalFooter>
            <ButtonComponent btnText={'Ok'}
                             isFullWidth={false}
                             elementStyle={'ok-button'}
                             disabled={false}
                             onClickFn={toggleSuccessModal}/>
          </ModalFooter>
        </Modal>
      </div>
      <div>
        <Modal isOpen={modal}
               toggle={toggle}
               className='modal-close'>
          <ModalHeader toggle={toggle}
                       className='text-uppercase'>
            Delete Quiz
          </ModalHeader>
          <ModalBody>
            Are you sure you want to delete this quiz?
          </ModalBody>
          <ModalFooter>
            <ButtonComponent btnText={'Yes'}
                             isFullWidth={false}
                             elementStyle={'yes-button'}
                             disabled={false}
                             onClickFn={confirmDelete}/>
```

```
            <ButtonComponent btnText={'No'}
                             isFullWidth={false}
                             elementStyle={'no-button'}
                             disabled={false}
                             onClickFn={toggle}/>
        </ModalFooter>
      </Modal>
    </div>
    <div>
      <small>
        {
          error ? (
            <span className='error'>
              {error}
            </span>
          ) : null
        }
      </small>
    </div>
    <div>
      <div className='m-3'>
        <ButtonComponent btnText={'New Quiz'}
                         isFullWidth={false}
                         disabled={false}
                         onClickFn={onNewQuiz}/>
      </div>
      <CardDeck className='card-deck'>
        <div>
          {
            data && data.map(item => {
              return (
                <div>
                  <Card key={item._id}
                        title='View Quiz'
                        className='m-3 card-item justify-content-center'>
                    <CardBody onClick={() => onView(item._id)}>
                      <CardTitle className='text-uppercase text-center m-4'
                                 tag='h2'>
                        <label>
                          {item.quizTitle}
                        </label>
                      </CardTitle>
                      <CardText className='m-4 text-center'>
                        <label>
                          {item.quizDescription}
                        </label>
                      </CardText>
                    </CardBody>
                    <CardFooter>
                      <div className='text-center m-2'>
                        <i className='fas fa-trash-alt delete'
                           title='Delete Quiz'
                           onClick={() => onDelete(item._id)}/>
                      </div>
                    </CardFooter>
                  </Card>
                </div>
```

```
                )
              })
            }
          </div>
        </CardDeck>
      </div>
    </div>
  )
}

export default QuizListComponent
```

add-quiz.jsx

```
import React from 'react'
import Header from '../../../../components/header/header'
import Footer from '../../../../components/footer/footer'
import AddQuizComponent from './add-quiz-component/add-quiz-component'
import './add-quiz.css'

const AddQuiz = props => {
  return (
    <div>
      <div>
        <Header/>
      </div>
      <div className='container add-quiz-page'>
        <AddQuizComponent history={props.history}/>
      </div>
      <div>
        <Footer/>
      </div>
    </div>
  )
}

export default AddQuiz
```

add-quiz-component.jsx

```
import React, {useState} from 'react'
import axios from 'axios'
import {Card, CardBody, Modal, ModalBody, ModalFooter, ModalHeader} from
'reactstrap'
import {isEmpty} from '../../../../../helpers/common.helpers'
import {quizzesApi} from '../../../../../config/api.config'
import Loader from '../../../../../components/loader/loader'
import ButtonComponent from '../../../../../components/button/button'
import TextField from '../../../../../components/text-field/text-field'
import './add-quiz-component.css'
```

```
const AddQuizComponent = props => {
  const [successModal, setSuccessModal] = useState(false)
  const [message, setMessage] = useState('')

  const helperQuizTitle = 'Please enter a title for the quiz.'
  const helperQuizDescription = 'Please enter a description about the quiz.'
  const helperAnswer1 = 'Please enter the answer for question 1.'
  const helperAnswer2 = 'Please enter the answer for question 2.'
  const helperAnswer3 = 'Please enter the answer for question 3.'
  const helperQuestion1 = 'Please enter question 1.'
  const helperQuestion2 = 'Please enter question 2.'
  const helperQuestion3 = 'Please enter question 3.'

  const [loader, setLoader] = useState(false)

  const [quizTitle, setQuizTitle] = useState('')
  const [quizDescription, setQuizDescription] = useState('')
  const [question1, setQuestion1] = useState('')
  const [answer1, setAnswer1] = useState('')
  const [question2, setQuestion2] = useState('')
  const [answer2, setAnswer2] = useState('')
  const [question3, setQuestion3] = useState('')
  const [answer3, setAnswer3] = useState('')

  const [errorQuizTitle, setErrorQuizTitle] = useState('')
  const [errorQuizDescription, setErrorQuizDescription] = useState('')
  const [errorQuestion1, setErrorQuestion1] = useState('')
  const [errorAnswer1, setErrorAnswer1] = useState('')
  const [errorQuestion2, setErrorQuestion2] = useState('')
  const [errorAnswer2, setErrorAnswer2] = useState('')
  const [errorQuestion3, setErrorQuestion3] = useState('')
  const [errorAnswer3, setErrorAnswer3] = useState('')

  const [quizTitleValid, setQuizTitleValid] = useState(false)
  const [quizDescriptionValid, setQuizDescriptionValid] = useState(false)
  const [question1Valid, setQuestion1Valid] = useState(false)
  const [answer1Valid, setAnswer1Valid] = useState(false)
  const [question2Valid, setQuestion2Valid] = useState(false)
  const [answer2Valid, setAnswer2Valid] = useState(false)
  const [question3Valid, setQuestion3Valid] = useState(false)
  const [answer3Valid, setAnswer3Valid] = useState(false)

  const [error, setError] = useState('')

  const onChangeQuizTitle = async event => {
    setQuizTitle(event.value)
    setQuizTitleValid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorQuizTitle('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorQuizTitle('Please enter a valid quiz title.')
    }
  }

  const onChangeQuizDescription = async event => {
    setQuizDescription(event.value)
    setQuizDescriptionValid(event.eventInfo.target.validity.valid && !await
```

```
isEmpty(event.value))
    setErrorQuizDescription('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorQuizDescription('Please enter a valid quiz description.')
    }
  }

  const onChangeQuestion1 = async event => {
    setQuestion1(event.value)
    setQuestion1Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorQuestion1('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorQuestion1('Please enter a valid question.')
    }
  }

  const onChangeQuestion2 = async event => {
    setQuestion2(event.value)
    setQuestion2Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorQuestion2('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorQuestion2('Please enter a valid question.')
    }
  }

  const onChangeQuestion3 = async event => {
    setQuestion3(event.value)
    setQuestion3Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorQuestion3('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorQuestion3('Please enter a valid question.')
    }
  }

  const onChangeAnswer1 = async event => {
    setAnswer1(event.value)
    setAnswer1Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorAnswer1('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorAnswer1('Please enter a valid answer.')
    }
  }

  const onChangeAnswer2 = async event => {
    setAnswer2(event.value)
    setAnswer2Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorAnswer2('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorAnswer2('Please enter a valid answer.')
    }
  }
```

```
  const onChangeAnswer3 = async event => {
    setAnswer3(event.value)
    setAnswer3Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorAnswer3('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorAnswer3('Please enter a valid answer.')
    }
  }

  function isDisabled() {
    return !quizTitleValid || !quizDescriptionValid || !question1Valid ||
!question2Valid || !question3Valid ||
      !answer1Valid || !answer2Valid || !answer3Valid
  }

  const toggleSuccessModal = async () => {
    setSuccessModal(!successModal)
  }

  const onClick = async () => {
    props.history.push('/content-management')
  }

  const onSubmit = async () => {
    setError('')
    const data = {
      'quizTitle': quizTitle.trim(),
      'quizDescription': quizDescription.trim(),
      'questions': [
        {
          question: question1.trim(),
          answer: answer1.trim()
        },
        {
          question: question2.trim(),
          answer: answer2.trim()
        },
        {
          question: question3.trim(),
          answer: answer3.trim()
        }
      ]
    }
    setLoader(true)
    axios.post(`${quizzesApi}quizzes`, data).then(res => {
      if (res.data.status === 201) {
        setLoader(false)
        setMessage(res.data.message)
        toggleSuccessModal()
      } else if (res.data.status === 409) {
        setError(res.data.message)
      }
      setLoader(false)
    }).catch(error => {
      setError('An unexpected error occurred. Please try again later.')
      setLoader(false)
```

```
      console.error(error)
    })
  }

  return (
    <div className='quiz-wrapper'>
      {
        loader ? (
          <Loader/>
        ) : null
      }
      <div>
        <Modal isOpen={successModal}
               toggle={toggleSuccessModal}
               className='modal-close'>
          <ModalHeader toggle={toggleSuccessModal}
                       className='text-uppercase title'>
            Success!
          </ModalHeader>
          <ModalBody>
            {message}
          </ModalBody>
          <ModalFooter>
            <ButtonComponent btnText={'Ok'}
                             isFullWidth={false}
                             elementStyle={'ok-button'}
                             disabled={false}
                             onClickFn={onClick}/>
          </ModalFooter>
        </Modal>
      </div>
      <div>
        <div className='mb-4'>
          <ButtonComponent btnText={'Quiz List'}
                           isFullWidth={false}
                           disabled={false}
                           onClickFn={onClick}/>
        </div>
        <div>
          <Card className='overflow-hidden'>
            <div className='quiz-header'>
              <div className='text-primary text-center p-4'>
                <h1 className='text-white font-size-20 text-uppercase'>
                  New Quiz
                </h1>
              </div>
            </div>
            <CardBody className='p-4'>
              <div>
                <small>
                  {
                    error ? (
                      <span className='p-3 error'>
                    {error}
                  </span>
                    ) : null
                  }
```

```
                </small>
              </div>
              <div className='p-3'>
                <div>
                  <TextField isRequired={true}
                             labelText={'Quiz Title'}
                             name={'quizTitle'}
                             value={quizTitle}
                             errorText={errorQuizTitle}
                             helperText={helperQuizTitle}
                             maxLength={50}
                             onChangeFn={event => onChangeQuizTitle(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                             labelText={'Quiz Description'}
                             name={'quizDescription'}
                             value={quizDescription}
                             errorText={errorQuizDescription}
                             helperText={helperQuizDescription}
                             maxLength={200}
                             onChangeFn={event =>
onChangeQuizDescription(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                             labelText={'Question 1'}
                             name={'question1'}
                             value={question1}
                             errorText={errorQuestion1}
                             helperText={helperQuestion1}
                             maxLength={200}
                             onChangeFn={event => onChangeQuestion1(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                             labelText={'Answer for Question 1'}
                             name={'answer1'}
                             value={answer1}
                             errorText={errorAnswer1}
                             helperText={helperAnswer1}
                             maxLength={50}
                             onChangeFn={event => onChangeAnswer1(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                             labelText={'Question 2'}
                             name={'question2'}
                             value={question2}
                             errorText={errorQuestion2}
                             helperText={helperQuestion2}
                             maxLength={200}
                             onChangeFn={event => onChangeQuestion2(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                             labelText={'Answer for Question 2'}
```

```
                              name={'answer2'}
                              value={answer2}
                              errorText={errorAnswer2}
                              helperText={helperAnswer2}
                              maxLength={50}
                              onChangeFn={event => onChangeAnswer2(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                              labelText={'Question 3'}
                              name={'question3'}
                              value={question3}
                              errorText={errorQuestion3}
                              helperText={helperQuestion3}
                              maxLength={200}
                              onChangeFn={event => onChangeQuestion3(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                              labelText={'Answer for Question 3'}
                              name={'answer3'}
                              value={answer3}
                              errorText={errorAnswer3}
                              helperText={helperAnswer3}
                              maxLength={50}
                              onChangeFn={event => onChangeAnswer3(event)}/>
                </div>
                <div className='text-center mt-4 mb-3'>
                  <ButtonComponent btnText={'Submit'}
                                   isFullWidth={false}
                                   elementStyle={'submit-btn'}
                                   disabled={isDisabled()}
                                   onClickFn={onSubmit}/>
                </div>
              </div>
            </CardBody>
          </Card>
        </div>
      </div>
    </div>
  )
}

export default AddQuizComponent
```

single-quiz.jsx

```
import React from 'react'
import Header from '../../../../components/header/header'
import Footer from '../../../../components/footer/footer'
import SingleQuizPage from './single-quiz-component/single-quiz-component'
import './single-quiz.css'

const SingleQuiz = props => {
```

```
  return (
    <div>
      <div>
        <Header/>
      </div>
      <div class='container single-quiz-page'>
        <SingleQuizPage history={props.history}/>
      </div>
      <div>
        <Footer/>
      </div>
    </div>
  )
}

export default SingleQuiz
```

single-quiz-component.jsx

```
import React, {useEffect, useState} from 'react'
import {useParams} from 'react-router'
import {Card, CardBody, Modal, ModalBody, ModalFooter, ModalHeader} from
'reactstrap'
import axios from 'axios'
import {isEmpty} from '../../../../../helpers/common.helpers'
import {quizzesApi} from '../../../../../config/api.config'
import Loader from '../../../../../components/loader/loader'
import ButtonComponent from '../../../../../components/button/button'
import TextField from '../../../../../components/text-field/text-field'
import './single-quiz-component.css'

const SingleQuizComponent = props => {
  const [successModal, setSuccessModal] = useState(false)
  const [message, setMessage] = useState('')

  const helperQuizTitle = 'Please enter a title for the quiz.'
  const helperQuizDescription = 'Please enter a description about the quiz.'
  const helperAnswer1 = 'Please enter the answer for question 1.'
  const helperAnswer2 = 'Please enter the answer for question 2.'
  const helperAnswer3 = 'Please enter the answer for question 3.'
  const helperQuestion1 = 'Please enter question 1.'
  const helperQuestion2 = 'Please enter question 2.'
  const helperQuestion3 = 'Please enter question 3.'

  const [loader, setLoader] = useState(false)

  const [quizTitle, setQuizTitle] = useState('')
  const [quizDescription, setQuizDescription] = useState('')
  const [question1, setQuestion1] = useState('')
  const [answer1, setAnswer1] = useState('')
  const [question2, setQuestion2] = useState('')
  const [answer2, setAnswer2] = useState('')
  const [question3, setQuestion3] = useState('')
  const [answer3, setAnswer3] = useState('')
```

```
  const [errorQuizTitle, setErrorQuizTitle] = useState('')
  const [errorQuizDescription, setErrorQuizDescription] = useState('')
  const [errorQuestion1, setErrorQuestion1] = useState('')
  const [errorAnswer1, setErrorAnswer1] = useState('')
  const [errorQuestion2, setErrorQuestion2] = useState('')
  const [errorAnswer2, setErrorAnswer2] = useState('')
  const [errorQuestion3, setErrorQuestion3] = useState('')
  const [errorAnswer3, setErrorAnswer3] = useState('')

  const [quizTitleValid, setQuizTitleValid] = useState(true)
  const [quizDescriptionValid, setQuizDescriptionValid] = useState(true)
  const [question1Valid, setQuestion1Valid] = useState(true)
  const [answer1Valid, setAnswer1Valid] = useState(true)
  const [question2Valid, setQuestion2Valid] = useState(true)
  const [answer2Valid, setAnswer2Valid] = useState(true)
  const [question3Valid, setQuestion3Valid] = useState(true)
  const [answer3Valid, setAnswer3Valid] = useState(true)

  const [error, setError] = useState('')

  const {
    id
  } = useParams()

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

  const loadData = async () => {
    setLoader(true)
    axios.get(`${quizzesApi}quizzes/${id}`).then(res => {
      let data = res.data.quiz
      setQuizTitle(data.quizTitle)
      setQuizDescription(data.quizDescription)
      setQuestion1(data.questions[0].question)
      setAnswer1(data.questions[0].answer)
      setQuestion2(data.questions[1].question)
      setAnswer2(data.questions[1].answer)
      setQuestion3(data.questions[2].question)
      setAnswer3(data.questions[2].answer)
      setLoader(false)
    }).catch(error => {
      setError('An unexpected error occurred. Please try again later.')
      setLoader(false)
      console.error(error)
    })
  }

  const onChangeQuizTitle = async event => {
    setQuizTitle(event.value)
    setQuizTitleValid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorQuizTitle('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorQuizTitle('Please enter a valid quiz title.')
```

```
    }
  }

  const onChangeQuizDescription = async event => {
    setQuizDescription(event.value)
    setQuizDescriptionValid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorQuizDescription('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorQuizDescription('Please enter a valid quiz description.')
    }
  }

  const onChangeQuestion1 = async event => {
    setQuestion1(event.value)
    setQuestion1Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorQuestion1('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorQuestion1('Please enter a valid question.')
    }
  }

  const onChangeQuestion2 = async event => {
    setQuestion2(event.value)
    setQuestion2Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorQuestion2('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorQuestion2('Please enter a valid question.')
    }
  }

  const onChangeQuestion3 = async event => {
    setQuestion3(event.value)
    setQuestion3Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorQuestion3('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorQuestion3('Please enter a valid question.')
    }
  }

  const onChangeAnswer1 = async event => {
    setAnswer1(event.value)
    setAnswer1Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorAnswer1('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorAnswer1('Please enter a valid answer.')
    }
  }

  const onChangeAnswer2 = async event => {
    setAnswer2(event.value)
    setAnswer2Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
```

```
    setErrorAnswer2('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorAnswer2('Please enter a valid answer.')
    }
  }

  const onChangeAnswer3 = async event => {
    setAnswer3(event.value)
    setAnswer3Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorAnswer3('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorAnswer3('Please enter a valid answer.')
    }
  }

  function isDisabled() {
    return !quizTitleValid || !quizDescriptionValid || !question1Valid ||
!question2Valid || !question3Valid ||
      !answer1Valid || !answer2Valid || !answer3Valid
  }

  const toggleSuccessModal = async () => {
    setSuccessModal(!successModal)
  }

  const onClick = async () => {
    props.history.push('/content-management')
  }

  const onSubmit = async () => {
    setError('')
    const data = {
      'quizTitle': quizTitle.trim(),
      'quizDescription': quizDescription.trim(),
      'questions': [
        {
          question: question1.trim(),
          answer: answer1.trim()
        },
        {
          question: question2.trim(),
          answer: answer2.trim()
        },
        {
          question: question3.trim(),
          answer: answer3.trim()
        }
      ]
    }
    setLoader(true)
    axios.put(`${quizzesApi}quizzes/${id}`, data).then(res => {
      if (res.data.status === 200) {
        setLoader(false)
        setMessage(res.data.message)
        toggleSuccessModal()
      } else if (res.data.status === 409) {
```

```
        setError(res.data.message)
      }
      setLoader(false)
    }).catch(error => {
      setError('An unexpected error occurred. Please try again later.')
      setLoader(false)
      console.error(error)
    })
  }

  return (
    <div className='quiz-wrapper'>
      {
        loader ? (
          <Loader/>
        ) : null
      }
      <div>
        <Modal isOpen={successModal}
               toggle={toggleSuccessModal}
               className='modal-close'>
          <ModalHeader toggle={toggleSuccessModal}
                       className='text-uppercase title'>
            Success!
          </ModalHeader>
          <ModalBody>
            {message}
          </ModalBody>
          <ModalFooter>
            <ButtonComponent btnText={'Ok'}
                             isFullWidth={false}
                             elementStyle={'ok-button'}
                             disabled={false}
                             onClickFn={onClick}/>
          </ModalFooter>
        </Modal>
      </div>
      <div>
        <div className='mb-4'>
          <ButtonComponent btnText={'Quiz List'}
                           isFullWidth={false}
                           disabled={false}
                           onClickFn={onClick}/>
        </div>
        <div>
          <Card className='overflow-hidden'>
            <div className='quiz-header'>
              <div className='text-primary text-center p-4'>
                <h1 className='text-white font-size-20 text-uppercase'>
                  QUIZ - {quizTitle}
                </h1>
              </div>
            </div>
            <CardBody className='p-4'>
              <div>
                <small>
                  {
```

```
                    error ? (
                      <span className='p-3 error'>
                    {error}
                  </span>
                    ) : null
                  }
                </small>
              </div>
              <div className='p-3'>
                <div>
                  <TextField isRequired={true}
                             labelText={'Quiz Title'}
                             name={'quizTitle'}
                             value={quizTitle}
                             errorText={errorQuizTitle}
                             helperText={helperQuizTitle}
                             maxLength={50}
                             onChangeFn={event => onChangeQuizTitle(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                             labelText={'Quiz Description'}
                             name={'quizDescription'}
                             value={quizDescription}
                             errorText={errorQuizDescription}
                             helperText={helperQuizDescription}
                             maxLength={200}
                             onChangeFn={event =>
onChangeQuizDescription(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                             labelText={'Question 1'}
                             name={'question1'}
                             value={question1}
                             errorText={errorQuestion1}
                             helperText={helperQuestion1}
                             maxLength={200}
                             onChangeFn={event => onChangeQuestion1(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                             labelText={'Answer for Question 1'}
                             name={'answer1'}
                             value={answer1}
                             errorText={errorAnswer1}
                             helperText={helperAnswer1}
                             maxLength={50}
                             onChangeFn={event => onChangeAnswer1(event)}/>
                </div>
                <div>
                  <TextField isRequired={true}
                             labelText={'Question 2'}
                             name={'question2'}
                             value={question2}
                             errorText={errorQuestion2}
                             helperText={helperQuestion2}
```

```
                                maxLength={200}
                                onChangeFn={event => onChangeQuestion2(event)}/>
                    </div>
                    <div>
                      <TextField isRequired={true}
                                labelText={'Answer for Question 2'}
                                name={'answer2'}
                                value={answer2}
                                errorText={errorAnswer2}
                                helperText={helperAnswer2}
                                maxLength={50}
                                onChangeFn={event => onChangeAnswer2(event)}/>
                    </div>
                    <div>
                      <TextField isRequired={true}
                                labelText={'Question 3'}
                                name={'question3'}
                                value={question3}
                                errorText={errorQuestion3}
                                helperText={helperQuestion3}
                                maxLength={200}
                                onChangeFn={event => onChangeQuestion3(event)}/>
                    </div>
                    <div>
                      <TextField isRequired={true}
                                labelText={'Answer for Question 3'}
                                name={'answer3'}
                                value={answer3}
                                errorText={errorAnswer3}
                                helperText={helperAnswer3}
                                maxLength={50}
                                onChangeFn={event => onChangeAnswer3(event)}/>
                    </div>
                    <div className='text-center mt-4 mb-3'>
                      <ButtonComponent btnText={'Update'}
                                       isFullWidth={false}
                                       elementStyle={'submit-btn'}
                                       disabled={isDisabled()}
                                       onClickFn={onSubmit}/>
                    </div>
                  </div>
                </CardBody>
              </Card>
            </div>
          </div>
        </div>
      )
}

export default SingleQuizComponent
```

4. Playing Quizzes - Frontend

quizzes.jsx

```
import React from 'react'
import Header from '../../../../components/header/header'
import Footer from '../../../../components/footer/footer'
import QuizzesComponent from './quizzes-component/quizzes-component'
import './quizzes.css'

const Quizzes = props => {
  return (
    <div>
      <div>
        <Header/>
      </div>
      <h1 className='text-center text-uppercase mt-5 page-title'>
        Quizzes
      </h1>
      <div className='container quizzes-page'>
        <QuizzesComponent history={props.history}/>
      </div>
      <div>
        <Footer/>
      </div>
    </div>
  )
}

export default Quizzes
```

quizzes-component.jsx

```
import React, {useEffect, useState} from 'react'
import {Card, CardBody, CardDeck, CardFooter, CardText, CardTitle} from
'reactstrap'
import axios from 'axios'
import {quizzesApi} from '../../../../../config/api.config'
import Loader from '../../../../../components/loader/loader'
import './quizzes-component.css'

const QuizzesComponent = props => {
  const [loader, setLoader] = useState(false)
  const [data, setData] = useState(null)
  const [error, setError] = useState('')

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

  const loadData = async () => {
    setLoader(true)
```

```
  axios.get(`${quizzesApi}quizzes`).then(res => {
    setData(res.data.quizList)
    setLoader(false)
  }).catch(error => {
    setError('An unexpected error occurred. Please try again later.')
    setLoader(false)
    console.error(error)
  })
}

const onView = async id => {
  props.history.push('/play/' + id)
}

return (
  <div>
    {
      loader ? (
        <Loader/>
      ) : null
    }
    <div>
      <small>
        {
          error ? (
            <span className='error'>
              {error}
            </span>
          ) : null
        }
      </small>
    </div>
    <div>
      <CardDeck className='card-deck'>
        <div>
          {
            data && data.map(item => {
              return (
                <div>
                  <Card key={item._id}
                        title='Try Now!'
                        className='m-4 card-item justify-content-center'
                        onClick={() => onView(item._id)}>
                    <CardBody>
                      <CardTitle className='text-uppercase text-center m-4'
                                 tag='h2'>
                        <label>
                          {item.quizTitle}
                        </label>
                      </CardTitle>
                      <CardText className='m-4 text-center'>
                        <label>
                          {item.quizDescription}
                        </label>
                      </CardText>
                    </CardBody>
                    <CardFooter className='text-center text-uppercase text-
```

```
primary'>
                        <label>Try Now!</label>
                      </CardFooter>
                    </Card>
                  </div>
                )
              })
            }
          </div>
        </CardDeck>
      </div>
    </div>
  )
}

export default QuizzesComponent
```

play.jsx

```
import React from 'react'
import Header from '../../../../components/header/header'
import Footer from '../../../../components/footer/footer'
import PlayComponent from './play-component/play-component'
import './play.css'

const Play = props => {
  return (
    <div>
      <div>
        <Header/>
      </div>
      <div className='container play-page'>
        <PlayComponent history={props.history}/>
      </div>
      <div>
        <Footer/>
      </div>
    </div>
  )
}

export default Play
```

play-component.jsx

```
import React, {useEffect, useState} from 'react'
import {useParams} from 'react-router'
import useWindowSize from 'react-use/lib/useWindowSize'
import {Modal, ModalBody, ModalFooter, ModalHeader} from 'reactstrap'
import Confetti from 'react-confetti'
import axios from 'axios'
import {isEmpty} from '../../../../../helpers/common.helpers'
import {quizzesApi} from '../../../../../config/api.config'
```

```
import Loader from '../../../../../components/loader/loader'
import ButtonComponent from '../../../../../components/button/button'
import TextField from '../../../../../components/text-field/text-field'
import './play-component.css'

const PlayComponent = props => {
  const {width, height} = useWindowSize()

  const [successModal, setSuccessModal] = useState(false)

  const helperAnswer1 = 'Please enter the answer for question 1.'
  const helperAnswer2 = 'Please enter the answer for question 2.'
  const helperAnswer3 = 'Please enter the answer for question 3.'

  const [loader, setLoader] = useState(false)

  const [userAnswer1, setUserAnswer1] = useState('')
  const [userAnswer2, setUserAnswer2] = useState('')
  const [userAnswer3, setUserAnswer3] = useState('')

  const [data, setData] = useState(null)

  const [errorAnswer1, setErrorAnswer1] = useState('')
  const [errorAnswer2, setErrorAnswer2] = useState('')
  const [errorAnswer3, setErrorAnswer3] = useState('')

  const [answer1Valid, setAnswer1Valid] = useState(false)
  const [answer2Valid, setAnswer2Valid] = useState(false)
  const [answer3Valid, setAnswer3Valid] = useState(false)

  const [markResults, setMarkResults] = useState(false)

  const [answer1Correct, setAnswer1Correct] = useState(false)
  const [answer2Correct, setAnswer2Correct] = useState(false)
  const [answer3Correct, setAnswer3Correct] = useState(false)

  const [error, setError] = useState('')

  const {
    id
  } = useParams()

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

  const loadData = async () => {
    setLoader(true)
    axios.get(`${quizzesApi}quizzes/${id}`).then(res => {
      setData(res.data.quiz)
      setLoader(false)
    }).catch(error => {
      setError('An unexpected error occurred. Please try again later.')
      setLoader(false)
      console.error(error)
    })
```

```
  }

  const onChangeAnswer1 = async event => {
    setMarkResults(false)
    setUserAnswer1(event.value)
    setAnswer1Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorAnswer1('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorAnswer1('Please enter a valid answer.')
    }
    if (event.value.trim() === data.questions[0].answer) {
      setAnswer1Correct(true)
    } else {
      setAnswer1Correct(false)
    }
  }

  const onChangeAnswer2 = async event => {
    setMarkResults(false)
    setUserAnswer2(event.value)
    setAnswer2Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorAnswer2('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorAnswer2('Please enter a valid answer.')
    }
    if (event.value.trim() === data.questions[1].answer) {
      setAnswer2Correct(true)
    } else {
      setAnswer2Correct(false)
    }
  }

  const onChangeAnswer3 = async event => {
    setMarkResults(false)
    setUserAnswer3(event.value)
    setAnswer3Valid(event.eventInfo.target.validity.valid && !await
isEmpty(event.value))
    setErrorAnswer3('')
    if (!event.eventInfo.target.validity.valid) {
      setErrorAnswer3('Please enter a valid answer.')
    }
    if (event.value.trim() === data.questions[2].answer) {
      setAnswer3Correct(true)
    } else {
      setAnswer3Correct(false)
    }
  }

  function isDisabled() {
    return !answer1Valid || !answer2Valid || !answer3Valid
  }

  const toggleSuccessModal = async () => {
    setSuccessModal(!successModal)
  }
```

```
  const onClick = async () => {
    props.history.push('/quizzes')
  }

  const onSubmit = async () => {
    setMarkResults(true)
    if (answer1Correct && answer2Correct && answer3Correct) {
      await toggleSuccessModal()
    }
  }

  return (
    <div>
      {
        loader ? (
          <Loader/>
        ) : null
      }
      <div>
        {
          markResults && answer1Correct && answer2Correct && answer3Correct ?
(
            <Confetti width={width}
                      height={height}/>
          ) : null
        }
      </div>
      <div>
        <Modal isOpen={successModal}
               toggle={toggleSuccessModal}
               className='modal-close'>
          <ModalHeader toggle={toggleSuccessModal}
                       className='text-uppercase title'>
            Congratulations!
          </ModalHeader>
          <ModalBody>
            You got all answers correct!
          </ModalBody>
          <ModalFooter>
            <ButtonComponent btnText={'Ok'}
                             isFullWidth={false}
                             elementStyle={'ok-button'}
                             disabled={false}
                             onClickFn={onClick}/>
          </ModalFooter>
        </Modal>
      </div>
      <div>
        <div>
          <small>
            {
              error ? (
                <span className='p-3 error'>
                    {error}
                  </span>
              ) : null
```

```
            }
          </small>
        </div>
        {
          data ? (
            <div>
              <div>
                <h1 className='text-center text-uppercase m-4 page-title'>
                  {data.quizTitle}
                </h1>
                <label className='m-4 mb-5'>
                  {data.quizDescription}
                </label>
              </div>
              <div>
                <div className='mb-5'>
                  <TextField isRequired={true}
                             labelText={data.questions[0].question}
                             name={'answer1'}
                             value={userAnswer1}
                             errorText={errorAnswer1}
                             helperText={helperAnswer1}
                             maxLength={50}
                             onChangeFn={event => onChangeAnswer1(event)}/>
                  {
                    markResults && answer1Correct ? (
                      <span>
                        <small className='text-success'>
                          Correct Answer!
                        </small>
                      </span>
                    ) : markResults && !answer1Correct ? (
                      <span>
                        <small className='text-danger'>
                          Sorry, You got this wrong. Please try again!
                        </small>
                    </span>
                    ) : null
                  }
                </div>
                <div className='mb-5'>
                  <TextField isRequired={true}
                             labelText={data.questions[1].question}
                             name={'answer2'}
                             value={userAnswer2}
                             errorText={errorAnswer2}
                             helperText={helperAnswer2}
                             maxLength={50}
                             onChangeFn={event => onChangeAnswer2(event)}/>
                  {
                    markResults && answer2Correct ? (
                      <span>
                        <small className='text-success'>
                          Correct Answer!
                        </small>
                      </span>
                    ) : markResults && !answer2Correct ? (
```

```
                    <span>
                      <small className='text-danger'>
                        Sorry, You got this wrong. Please try again!
                      </small>
                  </span>
                  ) : null
                }
              </div>
              <div className='mb-5'>
                <TextField isRequired={true}
                           labelText={data.questions[2].question}
                           name={'answer3'}
                           value={userAnswer3}
                           errorText={errorAnswer3}
                           helperText={helperAnswer3}
                           maxLength={50}
                           onChangeFn={event => onChangeAnswer3(event)}/>
                {
                  markResults && answer3Correct ? (
                    <span>
                      <small className='text-success'>
                        Correct Answer!
                      </small>
                    </span>
                  ) : markResults && !answer3Correct ? (
                    <span>
                      <small className='text-danger'>
                        Sorry, You got this wrong. Please try again!
                      </small>
                  </span>
                  ) : null
                }
              </div>
              <div className='text-center mt-5 mb-5'>
                <ButtonComponent btnText={'Submit'}
                                 isFullWidth={false}
                                 elementStyle={'submit-btn'}
                                 disabled={isDisabled()}
                                 onClickFn={onSubmit}/>
              </div>
            </div>
          </div>
        ) : null
      }
    </div>
  </div>
)
}

export default PlayComponent
```

RESTful web service (implemented code)

auth-controller.js

```
const bcrypt = require('bcrypt')
const UserModel = require('../models/users.model')

const login = async (req, res) => {
  let user

  const {
    email,
    password
  } = req.body

  try {
    user = await UserModel.findOne({
      email: email
    })
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  if (user && bcrypt.compareSync(password, user.password)) {
    res.send({
      status: 200,
      user: user
    })
  } else {
    res.send({
      status: 401,
      message: 'Incorrect email or password! Please double check and try
again.'
    })
  }
}

module.exports = {
  login
}
```

auth.routes.js

```
const express = require('express')
const AuthController = require('../controllers/auth-controller')

const router = express.Router()

router.post('/login', AuthController.login)

module.exports = router
```

users-controller.js

```
const bcrypt = require('bcrypt')
const nodemailer = require('nodemailer')
const UserModel = require('../models/users.model')

require('dotenv').config()

const addUser = async (req, res) => {
  let existingUser

  let {
    firstName,
    lastName,
    email,
    password
  } = req.body

  try {
    existingUser = await UserModel.findOne({
      email: email
    })
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  if (existingUser) {
    res.send({
      status: 409,
      message: 'A user with the same email already exists.'
    })
  }

  const newUser = new UserModel({
    firstName,
    lastName,
    email,
    password: bcrypt.hashSync(password, 10)
  })

  try {
    await newUser.save()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  await sendEmail(email)

  res.send({
    status: 201,
    message: 'Congratulations! You have successfully registered as a student
in iLearn. ' +
      'Now please login to iLearn and start your learning journey right now!'
  })
```

```
}

const addAdmin = async (req, res) => {
  let existingUser

  let {
    firstName,
    lastName,
    email,
    password
  } = req.body

  try {
    existingUser = await UserModel.findOne({
      email: email
    })
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  if (existingUser) {
    res.send({
      status: 409,
      message: 'A user with the same email already exists.'
    })
  }

  const newUser = new UserModel({
    firstName,
    lastName,
    email,
    password: bcrypt.hashSync(password, 10),
    userType: 'Admin'
  })

  try {
    await newUser.save()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 201,
    message: 'Administrator added successfully!'
  })
}

let transporter = nodemailer.createTransport({
  service: 'gmail',
  auth: {
    user: 'it18149654@gmail.com',
    pass: process.env.PASSWORD
  }
})
```

```
const sendEmail = async email => {
  let info = {
    from: 'it18149654@gmail.com',
    to: email,
    subject: 'Welcome to iLearn!',
    text:
      `Congratulations!
      You have successfully registered as a student.
      Start your learning journey today!
      Thank you!
      This is an auto-generated email.
      If this has been sent by mistake, please delete this without sharing
this.
      All rights reserved.`,
    html:
      `<div style="margin: 0; padding: 0; background-color: #f2f2f2; font-
family: arial, serif;">
      <table style="margin: 0 auto; background: white; max-width: 500px;
padding-bottom: 0; border-top: 5px solid #588dde; border-bottom: 5px solid
#588dde; width: 100%;">
      <tr style="background: rgb(237, 243, 255); padding-left: 20px; padding-
right: 20px;">
      <td>
      <table align="left" style="width: 100%;">
      <tr>
      <td style="padding: 10px;">
      <h1 style="text-align: center; color: #1a1a72;">Congratulations!</h1>
      <h2 style="margin-top:25px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">You have successfully registered as a
student.</h2>
      <h2 style="margin-top:20px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">Start your learning journey today!</h2>
      </td>
      </tr>
      <tr style="background: rgb(237, 243, 255); padding-left: 20px; padding-
right: 20px;">
      <td>
      <table align="left" style="width: 100%;">
      <tr>
      <td style="padding: 10px;">
      <h2 style="margin-top:25px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">Thank you!</h2>
      <h4 style="margin-top:20px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">This is an auto-generated email.</h4>
      <h4 style="margin-top:20px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">If this has been sent by mistake, please
delete this without sharing this.</h4>
      <h4 style="margin-top:20px; margin-bottom: 0; color: #4db0c4; font-
weight: 400; font-size: medium;">All rights reserved.</h4>
      </td>
      </tr>
      </table>
      </td>
      </tr>
      </table>
      </div>`
  }
```

```
  transporter.sendMail(info, (error, data) => {
    if (error) {
      console.error(error)
      console.error('Email sending failed! Please try again.')
    } else {
      console.error(data)
      console.error('An email is sent successfully to ' + email + '.')
    }
  })
}

const updateUser = async (req, res) => {
  let user
  let existingUser

  const {
    id
  } = req.params

  const {
    firstName,
    lastName,
    email,
    password,
    userType
  } = req.body

  try {
    user = await UserModel.findById(id)
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  try {
    existingUser = await UserModel.findOne({
      email: email
    })
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  if (existingUser && email !== user.email) {
    res.send({
      status: 409,
      message: 'A user with the same email already exists.'
    })
  }

  user.firstName = firstName
  user.lastName = lastName
  user.email = email
  user.password = bcrypt.hashSync(password, 10)
  user.userType = userType
```

```
  try {
    await user.save()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    message: 'User updated successfully!'
  })
}

const promoteUser = async (req, res) => {
  let user

  const {
    id
  } = req.params

  try {
    user = await UserModel.findById(id)
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  user.userType = 'Admin'

  try {
    await user.save()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    message: 'The user has been successfully promoted as a teacher!'
  })
}

const deleteUser = async (req, res) => {
  let user

  const {
    id
  } = req.params

  try {
    user = await UserModel.findById(id)
    await user.remove()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }
```

```
  res.send({
    status: 200,
    message: 'User deleted successfully!'
  })
}

const getUser = async (req, res) => {
  let user

  const {
    id
  } = req.params

  try {
    user = await UserModel.findById(id)
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    user: user
  })
}

const getUserList = async (req, res) => {
  let userList

  try {
    userList = await UserModel.find()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    userList: userList
  })
}

exports.addUser = addUser
exports.addAdmin = addAdmin
exports.updateUser = updateUser
exports.promoteUser = promoteUser
exports.deleteUser = deleteUser
exports.getUser = getUser
exports.getUserList = getUserList
```

users.routes.js

```
const express = require('express')
const UsersController = require('../controllers/users-controller')

const router = express.Router()

router.post('/users', UsersController.addUser)
router.post('/admin', UsersController.addAdmin)
router.put('/users/:id', UsersController.updateUser)
router.put('/users/promote/:id', UsersController.promoteUser)
router.delete('/users/:id', UsersController.deleteUser)
router.get('/users/:id', UsersController.getUser)
router.get('/users', UsersController.getUserList)

module.exports = router
```

quizzes-controller.js

```
const QuizModel = require('../models/quizzes.model')

const addQuiz = async (req, res) => {
  let existingQuiz

  let {
    quizTitle,
    quizDescription,
    questions
  } = req.body

  try {
    existingQuiz = await QuizModel.findOne({
      quizTitle: quizTitle
    })
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  if (existingQuiz) {
    res.send({
      status: 409,
      message: 'A quiz with the same title already exists.'
    })
  }

  const newQuiz = new QuizModel({
    quizTitle,
    quizDescription,
    questions
  })

  try {
    await newQuiz.save()
```

```
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 201,
    message: 'New quiz added successfully!'
  })
}

const updateQuiz = async (req, res) => {
  let quiz
  let existingQuiz

  const {
    id
  } = req.params

  const {
    quizTitle,
    quizDescription,
    questions
  } = req.body

  try {
    quiz = await QuizModel.findById(id)
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  try {
    existingQuiz = await QuizModel.findOne({
      quizTitle: quizTitle
    })
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  if (existingQuiz && quizTitle !== quiz.quizTitle) {
    res.send({
      status: 409,
      message: 'A quiz with the same title already exists.'
    })
  }

  quiz.quizTitle = quizTitle
  quiz.quizDescription = quizDescription
  quiz.questions = questions

  try {
    await quiz.save()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
```

```
  }

  res.send({
    status: 200,
    message: 'Quiz updated successfully!'
  })
}

const deleteQuiz = async (req, res) => {
  let quiz

  const {
    id
  } = req.params

  try {
    quiz = await QuizModel.findById(id)
    await quiz.remove()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    message: 'Quiz deleted successfully!'
  })
}

const getQuiz = async (req, res) => {
  let quiz

  const {
    id
  } = req.params

  try {
    quiz = await QuizModel.findById(id)
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
  }

  res.send({
    status: 200,
    quiz: quiz
  })
}

const getQuizList = async (req, res) => {
  let quizList

  try {
    quizList = await QuizModel.find()
  } catch (error) {
    console.error(error)
    res.status(500).send(error)
```

```
  }

  res.send({
    status: 200,
    quizList: quizList
  })
}

exports.addQuiz = addQuiz
exports.updateQuiz = updateQuiz
exports.deleteQuiz = deleteQuiz
exports.getQuiz = getQuiz
exports.getQuizList = getQuizList
```

quizzes.routes.js

```
const express = require('express')
const QuizController = require('../controllers/quizzes-controller')

const router = express.Router()

router.post('/quizzes', QuizController.addQuiz)
router.put('/quizzes/:id', QuizController.updateQuiz)
router.delete('/quizzes/:id', QuizController.deleteQuiz)
router.get('/quizzes/:id', QuizController.getQuiz)
router.get('/quizzes', QuizController.getQuizList)

module.exports = router
```

main.config.js

```
export const authStoreKey = '@af2021'
export const baseApi = 'http://localhost:5000/'
```

api.config.js

```
import {baseApi} from './main.config'

export const authApi = `${baseApi}auth/`
export const uploadsApi = `${baseApi}uploads/`
export const usersApi = `${baseApi}users/`
export const quizzesApi = `${baseApi}quizzes/`
```

quizzes.component.jsx

```
const loadData = async () => {
  setLoader(true)
  axios.get(`${quizzesApi}quizzes`).then(res => {
    setData(res.data.quizList)
    setLoader(false)
  }).catch(error => {
    setError('An unexpected error occurred. Please try again later.')
    setLoader(false)
    console.error(error)
  })
}
```

login-form.jsx

```
axios.post(`${authApi}login`, data).then(res => {
  if (res.data.status === 200) {
    setLocalStorageItem(authStoreKey, res.data.user)
    appContext.login(res.data.user)
    props.history.push('/home')
  } else if (res.data.status === 401) {
    setError(res.data.message)
  }
  setLoader(false)
}).catch(error => {
  setError('An unexpected error occurred. Please try again later.')
  setLoader(false)
  console.error(error)
})
```

register-form.jsx

```
axios.post(`${usersApi}users`, data).then(res => {
  if (res.data.status === 201) {
    setLoader(false)
    setMessage(res.data.message)
    toggleSuccessModal()
  } else if (res.data.status === 409) {
    setError(res.data.message)
  }
  setLoader(false)
}).catch(error => {
  setError('An unexpected error occurred. Please try again later.')
  setLoader(false)
  console.error(error)
})
```

user-management-component.jsx

```
axios.get(`${usersApi}users`).then(res => {
  setData(res.data.userList)
  setLoader(false)
}).catch(error => {
  setError('An unexpected error occurred. Please try again later.')
  setLoader(false)
  console.error(error)
})
```

```
axios.put(`${usersApi}users/promote/${editId}`).then(res => {
  if (res.data.status === 200) {
    setMessage(res.data.message)
    toggleEdit()
    toggleSuccessModalEdit()
    loadData()
  } else {
    toggleEdit()
    setError('An unexpected error occurred. Please try again later.')
    console.error(error)
  }
  setLoader(false)
}).catch(error => {
  toggleEdit()
  setError('An unexpected error occurred. Please try again later.')
  setLoader(false)
  console.error(error)
})
```

```
axios.delete(`${usersApi}users/${deleteId}`).then(res => {
  if (res.data.status === 200) {
    setData(data.filter(item => item._id !== deleteId))
    setMessage(res.data.message)
    toggle()
    toggleSuccessModal()
  } else {
    toggle()
    setError('An unexpected error occurred. Please try again later.')
    console.error(error)
  }
  setLoader(false)
}).catch(error => {
  toggle()
  setError('An unexpected error occurred. Please try again later.')
  setLoader(false)
  console.error(error)
})
```

quiz-list-component.jsx

```
axios.get(`${quizzesApi}quizzes`).then(res => {
  setData(res.data.quizList)
  setLoader(false)
}).catch(error => {
  setError('An unexpected error occurred. Please try again later.')
  setLoader(false)
  console.error(error)
})
```

```
axios.delete(`${quizzesApi}quizzes/${deleteId}`).then(res => {
  if (res.data.status === 200) {
    setData(data.filter(item => item._id !== deleteId))
    setMessage(res.data.message)
    toggle()
    toggleSuccessModal()
  } else {
    toggle()
    setError('An unexpected error occurred. Please try again later.')
    console.error(error)
  }
  setLoader(false)
}).catch(error => {
  toggle()
  setError('An unexpected error occurred. Please try again later.')
  setLoader(false)
  console.error(error)
})
```

add-quiz-component.jsx

```
axios.post(`${quizzesApi}quizzes`, data).then(res => {
  if (res.data.status === 201) {
    setLoader(false)
    setMessage(res.data.message)
    toggleSuccessModal()
  } else if (res.data.status === 409) {
    setError(res.data.message)
  }
  setLoader(false)
}).catch(error => {
  setError('An unexpected error occurred. Please try again later.')
  setLoader(false)
  console.error(error)
})
```

single-quiz-component.jsx

```
axios.get(`${quizzesApi}quizzes/${id}`).then(res => {
  let data = res.data.quiz
  setQuizTitle(data.quizTitle)
  setQuizDescription(data.quizDescription)
  setQuestion1(data.questions[0].question)
  setAnswer1(data.questions[0].answer)
  setQuestion2(data.questions[1].question)
  setAnswer2(data.questions[1].answer)
  setQuestion3(data.questions[2].question)
  setAnswer3(data.questions[2].answer)
  setLoader(false)
}).catch(error => {
  setError('An unexpected error occurred. Please try again later.')
  setLoader(false)
  console.error(error)
})
```

```
axios.put(`${quizzesApi}quizzes/${id}`, data).then(res => {
  if (res.data.status === 200) {
    setLoader(false)
    setMessage(res.data.message)
    toggleSuccessModal()
  } else if (res.data.status === 409) {
    setError(res.data.message)
  }
  setLoader(false)
}).catch(error => {
  setError('An unexpected error occurred. Please try again later.')
  setLoader(false)
  console.error(error)
})
```

app.js

```
const express = require('express')
const mongoose = require('mongoose')
const bodyParser = require('body-parser')
const helmet = require('helmet')
const path = require('path')
const cors = require('cors')
const compression = require('compression')
const HttpErrors = require('./config/errors.config')
const UsersRoutes = require('./routes/users.routes')
const AuthRoutes = require('./routes/auth.routes')
const UploadsRoutes = require('./routes/uploads.routes')
const QuizzesRoutes = require('./routes/quizzes.routes')

require('dotenv').config()

const app = express()
```

```
app.use(bodyParser.urlencoded({
  extended: true
}))

app.use(bodyParser.json())
app.use(compression())
app.use(cors())
app.use(helmet())

app.use('/public', express.static(path.join(__dirname, 'public')))

app.use('/users', UsersRoutes)
app.use('/auth', AuthRoutes)
app.use('/uploads', UploadsRoutes)
app.use('/quizzes', QuizzesRoutes)

app.get('*', (req, res) => {
  res.status(200).send('Server is running');
})

app.use(() => {
  throw new HttpErrors('Could not find this route.', 404)
})
```

Mongo query for a specific Mongo collection (implemented code)

app.js

```
const uri = process.env.ATLAS_URI
const port = process.env.PORT
const dbName = process.env.DATABASE

const options = {
  useNewUrlParser: true,
  useUnifiedTopology: true,
  useCreateIndex: true,
  dbName: dbName
}

mongoose.connect(uri, options).then(() => {
  app.listen(port)
  console.log(`Server is running on port: ${port}`)
}).catch((error) => {
  console.error(error)
})
```

quizzes.model.js

```
const mongoose = require('mongoose')
const autoIncrement = require('mongoose-auto-increment')
const uniqueValidator = require('mongoose-unique-validator')

const Schema = mongoose.Schema

const QuizzesSchema = new Schema({
  quizId: {
    type: Number,
    required: false,
    unique: true,
    trim: true
  },
  quizTitle: {
    type: String,
    required: true,
    unique: true,
    trim: true
  },
  quizDescription: {
    type: String,
```

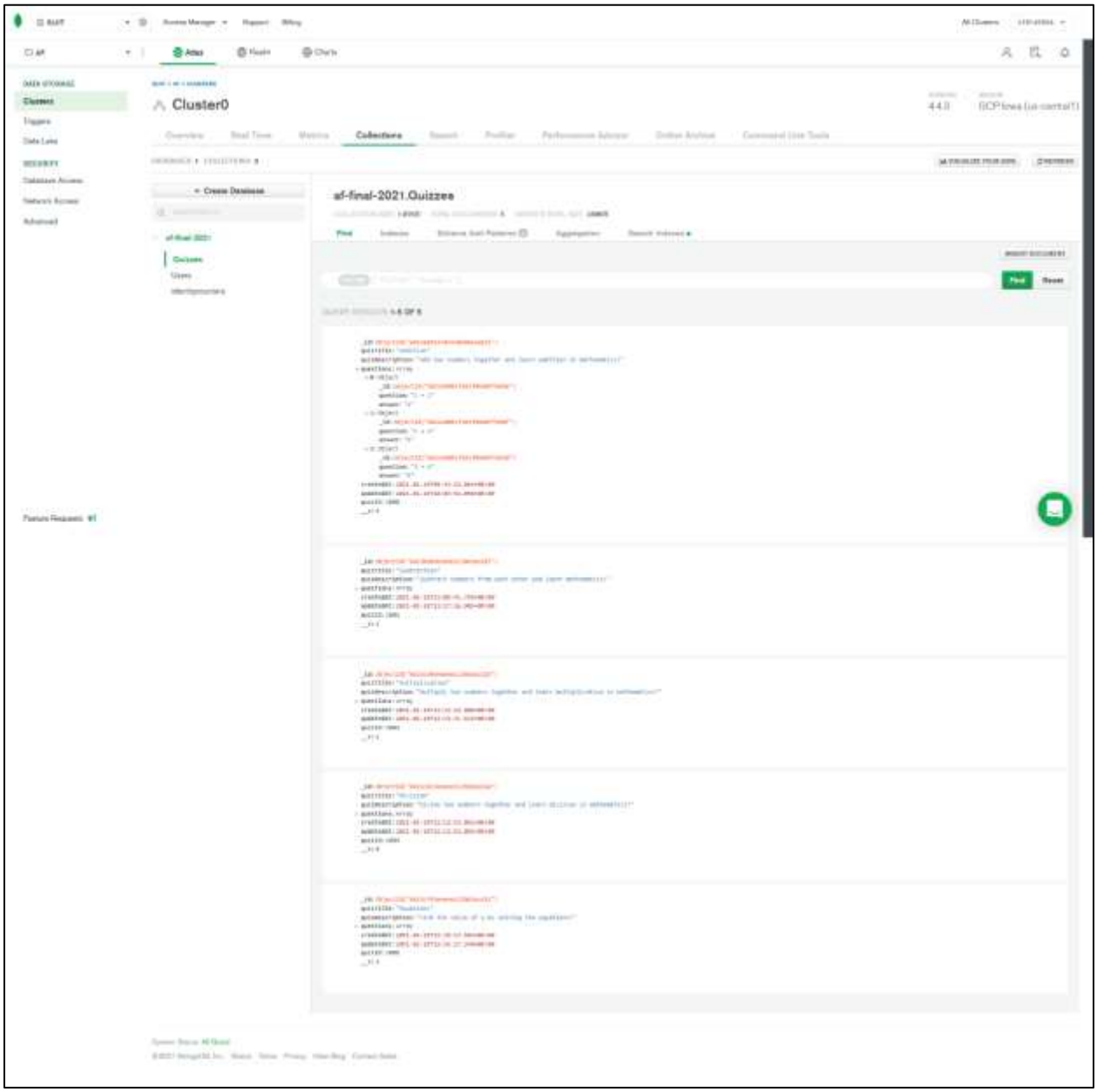
```
    required: true,
    unique: false,
    trim: true
  },
  questions: [{
    question: {
      type: String,
      required: true,
      unique: false,
      trim: true
    },
    answer: {
      type: String,
      required: true,
      unique: false,
      trim: true
    }
  }]
}, {
  timestamps: true,
  collection: 'Quizzes'
})

QuizzesSchema.plugin(uniqueValidator)

autoIncrement.initialize(mongoose.connection)

QuizzesSchema.plugin(autoIncrement.plugin, {
  model: 'Quizzes',
  field: 'quizId',
  startAt: 1000,
  incrementBy: 1
})

module.exports = mongoose.model('Quizzes', QuizzesSchema)
```

users.model.js

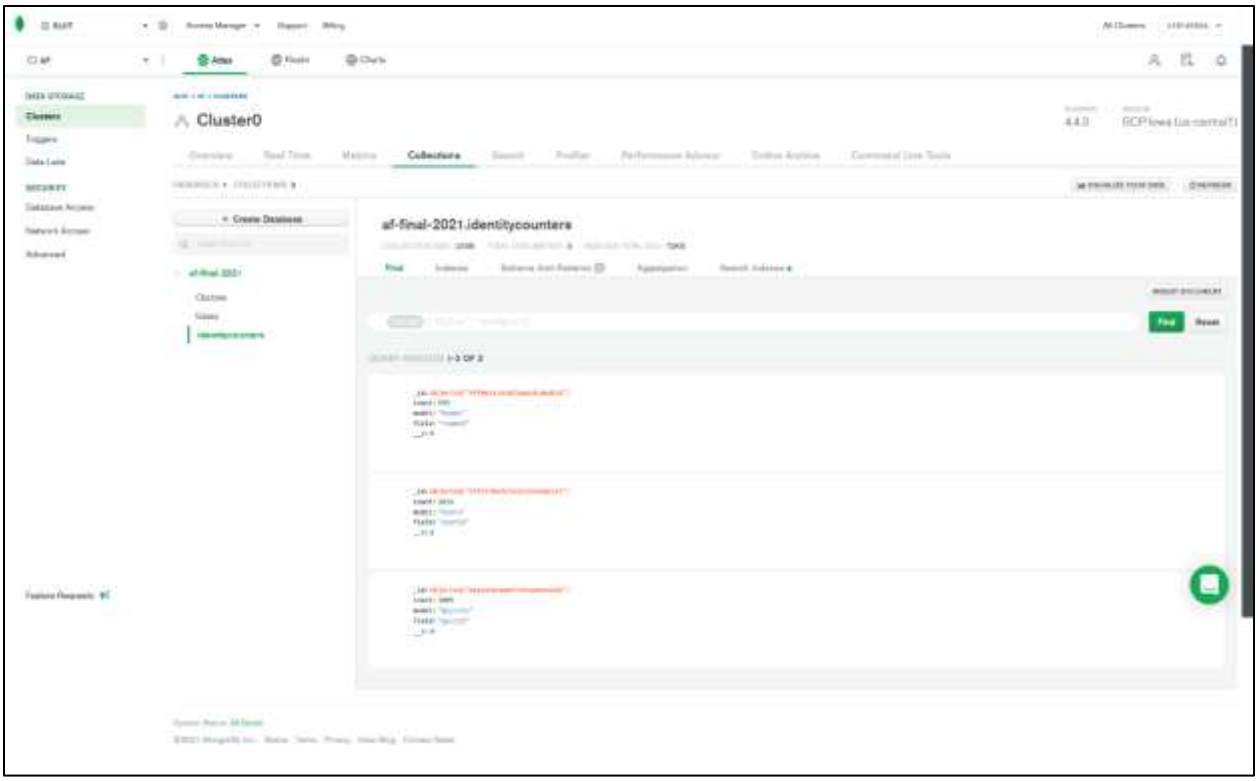
```
const mongoose = require('mongoose')
const autoIncrement = require('mongoose-auto-increment')
const uniqueValidator = require('mongoose-unique-validator')

const Schema = mongoose.Schema

const userTypes = [
  'Admin',
  'User'
]

const UsersSchema = new Schema({
  userId: {
    type: Number,
    required: false,
    unique: true,
    trim: true
```

```
  },
  firstName: {
    type: String,
    required: false,
    unique: false,
    trim: true
  },
  lastName: {
    type: String,
    required: false,
    unique: false,
    trim: true
  },
  email: {
    type: String,
    required: true,
    unique: true,
    trim: true
  },
  password: {
    type: String,
    required: true,
    unique: false,
    trim: true
  },
  userType: {
    type: String,
    enum: userTypes,
    required: false,
    unique: false,
    trim: true,
    default: 'User'
  }
}, {
  timestamps: true,
  collection: 'Users'
})

UsersSchema.plugin(uniqueValidator)

autoIncrement.initialize(mongoose.connection)

UsersSchema.plugin(autoIncrement.plugin, {
  model: 'Users',
  field: 'userId',
  startAt: 1000,
  incrementBy: 1
})

module.exports = mongoose.model('Users', UsersSchema)
```

MongoDB Atlas




Cluster0
ai-final-2021.Users



Mongo queries in quizzes controller

```
try {
  quizList = await QuizModel.find()
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

```
try {
  quiz = await QuizModel.findById(id)
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

```
try {
  quiz = await QuizModel.findById(id)
  await quiz.remove()
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

```
try {
  existingQuiz = await QuizModel.findOne({
    quizTitle: quizTitle
  })
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

```
try {
  await quiz.save()
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

Mongo queries in users and auth controllers

```
try {
  user = await UserModel.findOne({
    email: email
  })
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

```
try {
  await newUser.save()
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

```
try {
  user = await UserModel.findById(id)
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

```
try {
  quiz = await QuizModel.findById(id)
  await quiz.remove()
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

```
try {
  quiz = await QuizModel.findById(id)
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

```
try {
  quizList = await QuizModel.find()
} catch (error) {
  console.error(error)
  res.status(500).send(error)
}
```

Unit test using JEST to evaluate a core logic or a service (implemented code)

Unit testing using jest and supertest to evaluate user login functionality:

- **First unit test is a positive test case where the correct login credentials are provided, and user login should be successful.**
- **Second unit test is a negative test case where the incorrect login credentials are provided, and user login should be unsuccessful.**

login.test.js

```
const request = require('supertest')
const app = require('../app')

test('Should login the user', async () => {
  await request(app).post('/auth/login').send({
    email: 'student@gmail.com',
    password: 'student'
  }).expect({
    status: 200,
    user: {
      userType: 'User',
      _id: '60235ba2d6b67714a4b0f772',
      firstName: 'Janaka',
      lastName: 'Siriwardene',
      email: 'student@gmail.com',
      password:
'$2b$10$mDEb7PnOMNmKIu1E7dAs.eTRdpqXq7p7kCnw77JhZRiVSvq31.vj2',
      createdAt: '2021-02-10T04:05:54.579Z',
      updatedAt: '2021-02-10T06:26:48.724Z',
      userId: 1016,
      __v: 0
    }
  })
})
```

```
test('Should not login the user', async () => {
  await request(app).post('/auth/login').send({
    email: 'student@gmail.com',
    password: 'student1'
  }).expect({
    status: 401,
    message: 'Incorrect email or password! Please double check and try
again.'
  })
})
```

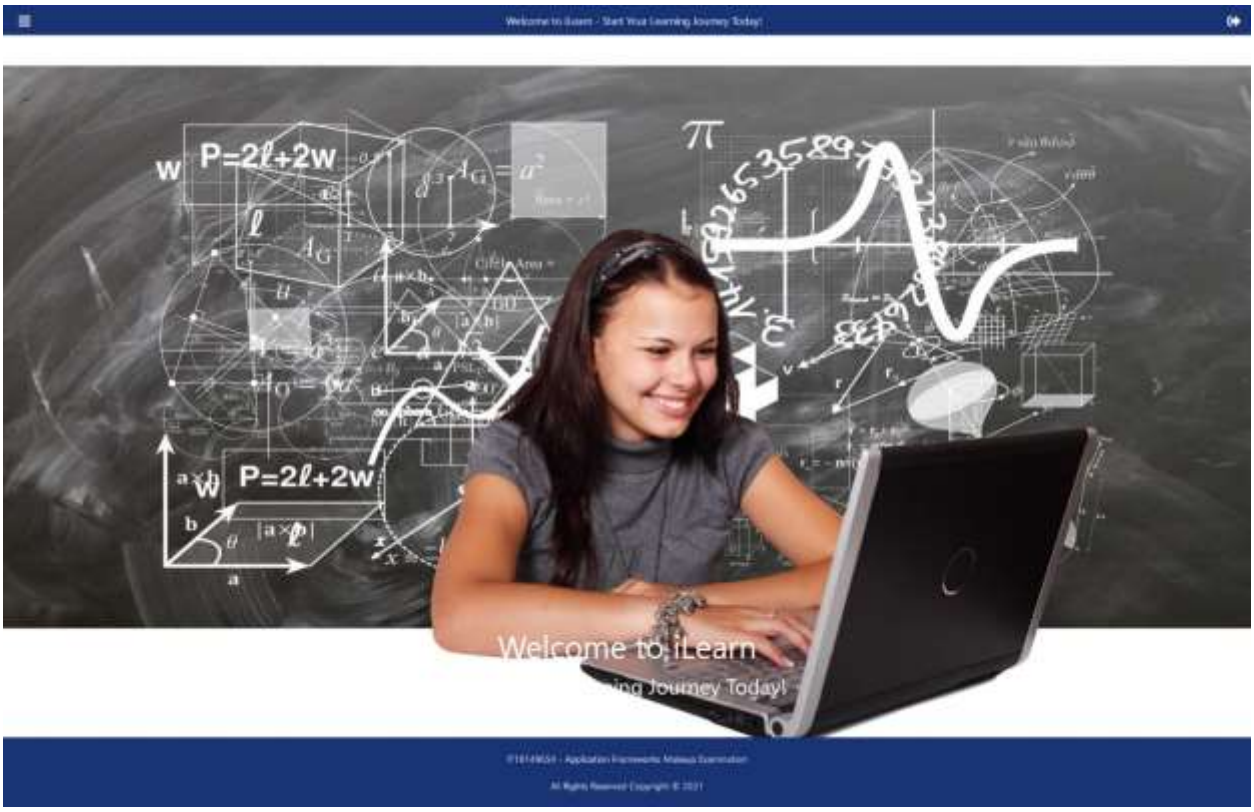
Test Results

package.json

```
{
  "name": "express-rest-api",
  "version": "1.0.0",
  "description": "express-rest-api",
  "main": "index.js",
  "scripts": {
    "start": "node app.js",
    "test": "jest --watch"
  },
  "jest": {
    "testEnvironment": "node"
  },
  "repository": {
    "type": "git",
    "url": "git://github.com/TharindaNimnajith/af-final-2021"
  },
  "keywords": [
    "IT18149654",
```

```
    "AF",
    "SLIIT",
    "Express",
    "Node",
    "MongoDB",
    "REST"
  ],
  "author": "IT18149654 - Tharinda Nimnajith Rajapaksha",
  "license": "ISC",
  "dependencies": {
    "bcrypt": "^5.0.0",
    "body-parser": "^1.19.0",
    "compression": "^1.7.4",
    "cors": "^2.8.5",
    "dotenv": "^8.2.0",
    "express": "^4.17.1",
    "helmet": "^4.3.1",
    "mongoose": "^5.11.12",
    "mongoose-auto-increment": "^5.0.1",
    "mongoose-unique-validator": "^2.0.3",
    "multer": "^1.4.2",
    "node": "^15.4.0",
    "nodemon": "^2.0.7",
    "react-router": "^5.2.0"
  },
  "devDependencies": {
    "env-cmd": "^10.1.0",
    "jest": "^26.6.3",
    "nodemailer": "^6.4.17",
    "supertest": "^6.1.3"
  }
}
```

Screenshot of the home page of the running application on localhost



Thank You!