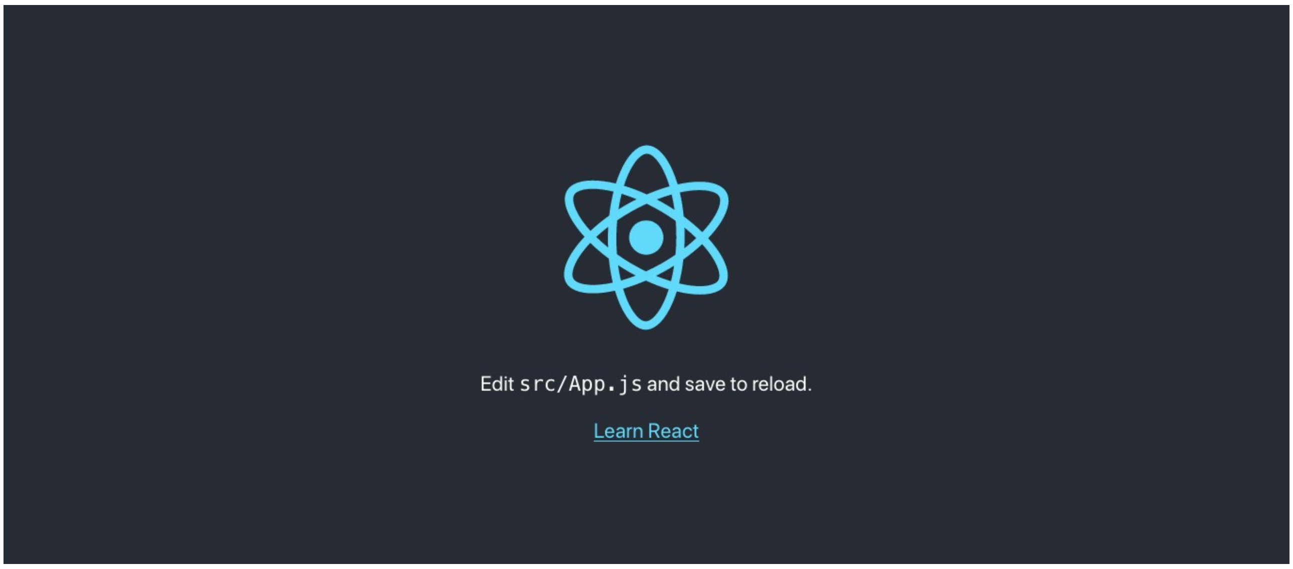
React Project Create

```
npx create-react-app first_app
```

```
cd first_app
npm start
```



Edit src/App.js and save to reload.

Learn React

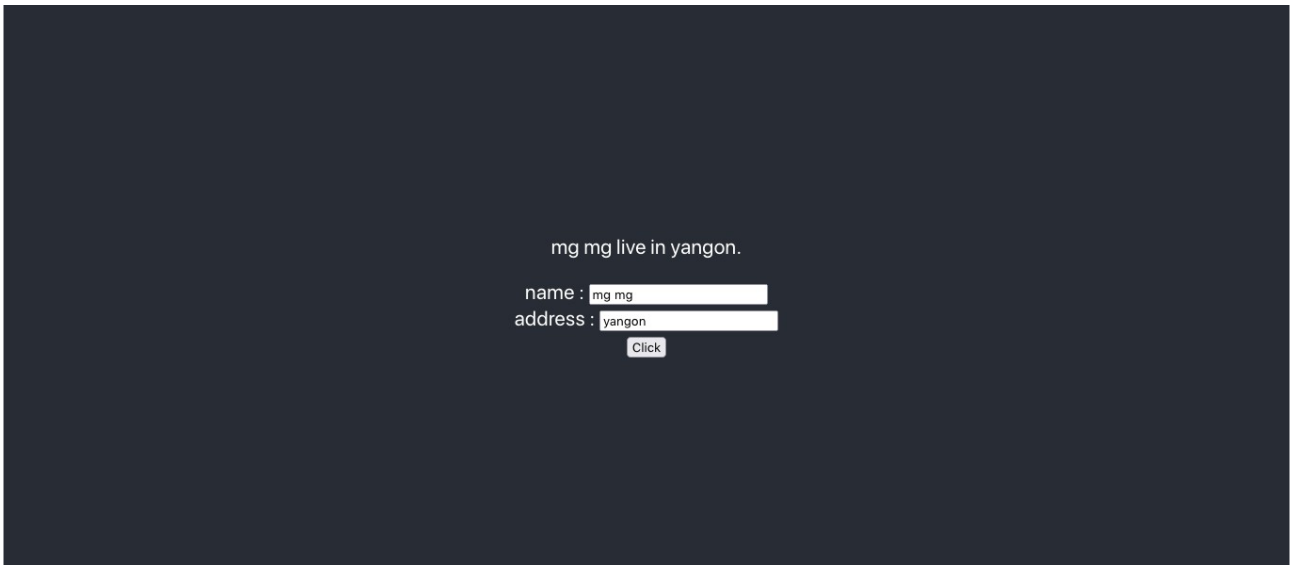
React Project Structure

0_install

```
        - first_app -
                - node_modules
                - package.json
                - package-lock.json
                - public
                - src -
                        - App.css
                        - App.js
                        - index.css
                        - index.js
                        - reportWebVitals.js
                        - components -
                                        - header.js
                                        - footer.js
```

1_hello_react_app
        - src
2_components
        - src
3_props
        - src
4_events
        - src
5_state
        - src

(5) React State Assignment


mg mg live in yangon.

name : mg mg
address : yangon

Copy 0_install/first_app/src folder to 5_state folder.
Create components/about.js file.

```
import React, {Component} from 'react';

class AboutUs extends Component {
    state = {
        name: '...'
    }
    setName = evt => {
        this.state.name = evt.target.value;
    }
    clickMe = evt => {
        this.setState({name: this.state.name});
    }

    render() {
        return (
            <div>
                <div>
                    <p> {this.state.name} </p>
                </div>
                <div>
                    name : <input onChange={this.setName} type="text" />
                </div>
                <button onClick={this.clickMe}> Click </button>
            </div>
        )
    }
}

export default AboutUs;
```

Change App.js file.

```
import './App.css';
import AboutUs from './components/about.js';

function App() {
  return (
    <div className="App">
      <header className="App-header">
        <AboutUs />
      </header>
    </div>
  );
}

export default App;
```

```
cd 0_install/first_app
```

Run react server.

```
npm start
```

Create 5_state/assignment folder.
Copy 0_install/first_app/src folder to 5_state/assignment folder.

(6) React Life Cycle

Change about.js file.

```
class AboutUs extends Component {
	state = {
	}

	constructor(props) {
		super(props);
		console.log('constructor call');
	}

	componentDidMount() {
		console.log('componentDidMount call');
	}

	componentDidUpdate() {
		console.log('componentDidUpdate call');
	}

	componentWillUpdate() {
		console.log('componentWillUpdate call');
	}

	componentWillUnmount() {
		console.log('componentWillUnmount call');
	}

	render() {
		console.log('render call');
		return (
			. . .
		)
	}
}
```

```
cd 0_install/first_app
```

Run react server.

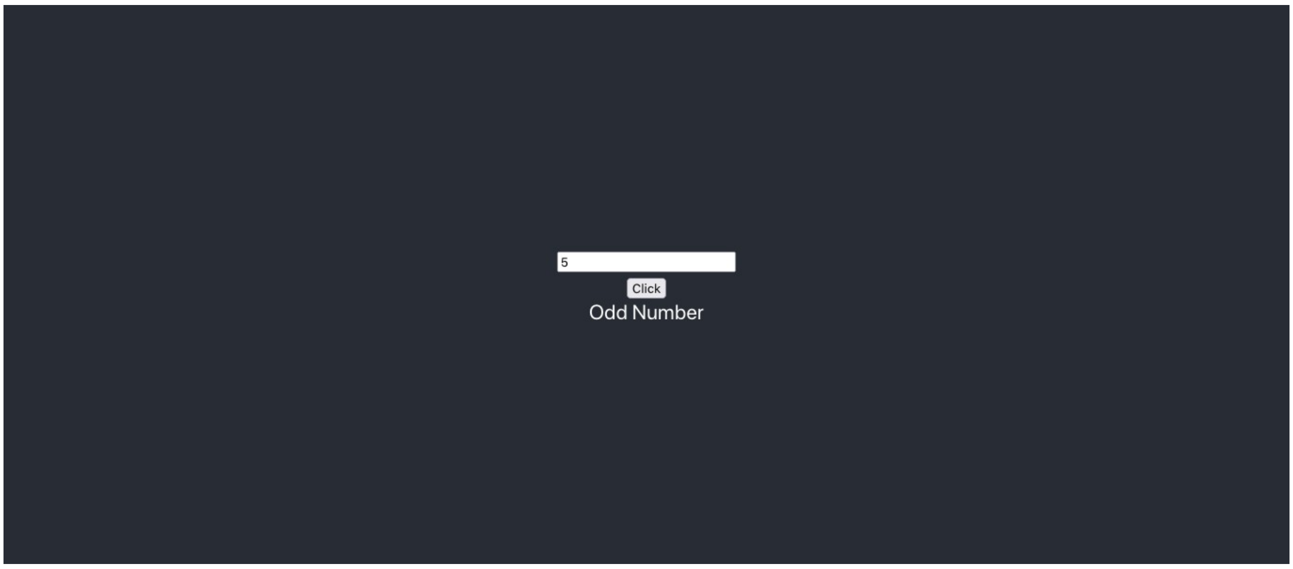
```
npm start
```

Create 6_life_cycle folder.
Copy 0_install/first_app/src folder to 6_life_cycle folder.

(7) React Conditional

Example 1

Even Odd Number using conditional.



Create component/even_odd.js file**.**

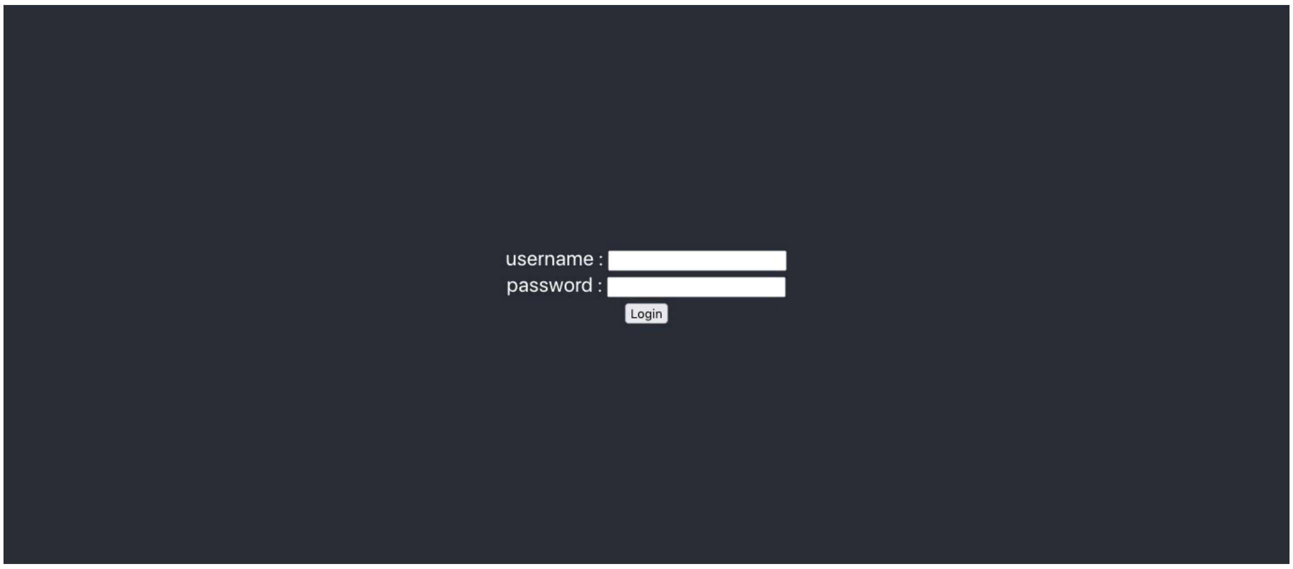
```
class EvenOdd extends Component {
	state = {
		num: 0
	}
	setNum = evt => {
		this.state.num = evt.target.value;
	}
	click  = evt =>  {
		this.setState({num: this.state.num});
	}
	render() {
		return (
			<div>
				<div>
					<input onChange={ this.setNum } type="text" />
				</div>
				<div>
					<button onClick={ this.click }> Click </button>
				</div>
				<div>
					{ this.state.num % 2 == 0 ? "Even Number" : "Odd Number"}
				</div>
			</div>
		)
	}
}
export default EvenOdd;
```

Change App.js file.

```
import './App.css';
import EvenOdd from './components/even_odd.js';

function App() {
  return (
    <div className="App">
      <header className="App-header">
          <EvenOdd />
      </header>
    </div>
  );
}

export default App;
```

Example 2

Login and Logout screen using conditional.



Copy even_odd.js and rename component/login.js file**.**

```
class Login extends Component {
        state = {
                isLogin: false,
                username: '',
        }
        setUser = evt => {
                this.state.username = evt.target.value;
        }
        clickLogin  = evt =>  {
                if (this.state.username == 'kyaw' && this.state.passwd == '123') {
                        this.setState({isLogin: true});
                }
        }
        clickLogout  = evt =>  {
                this.setState({isLogin: false});
        }
        render() {
                return (
                        <div>
                             { this.state.isLogin ? (
                                    <div>
                                        <div>
                                          Welcome home screen !
                                        </div>
                                        <div>
                                          <button onClick={ this.clickLogout }> Logout </button>
                                         </div>
                                    </div>
                                ) : (
                                    <div>
                                        <div>
                                           username: <input onChange={ this.setUser} type="text" />
                                       </div>
                                       <div>
                                           <button onClick={ this.clickLogin }> Login </button>
                                       </div>
                                      </div>
                                    )
                             }
                        </div>
                )
        }
}
export default Login;
```

Create 7_conditional folder.
Copy 0_install/first_app/src folder to 7_conditional folder.

(8) React Keys

Create component/home.js file**.**

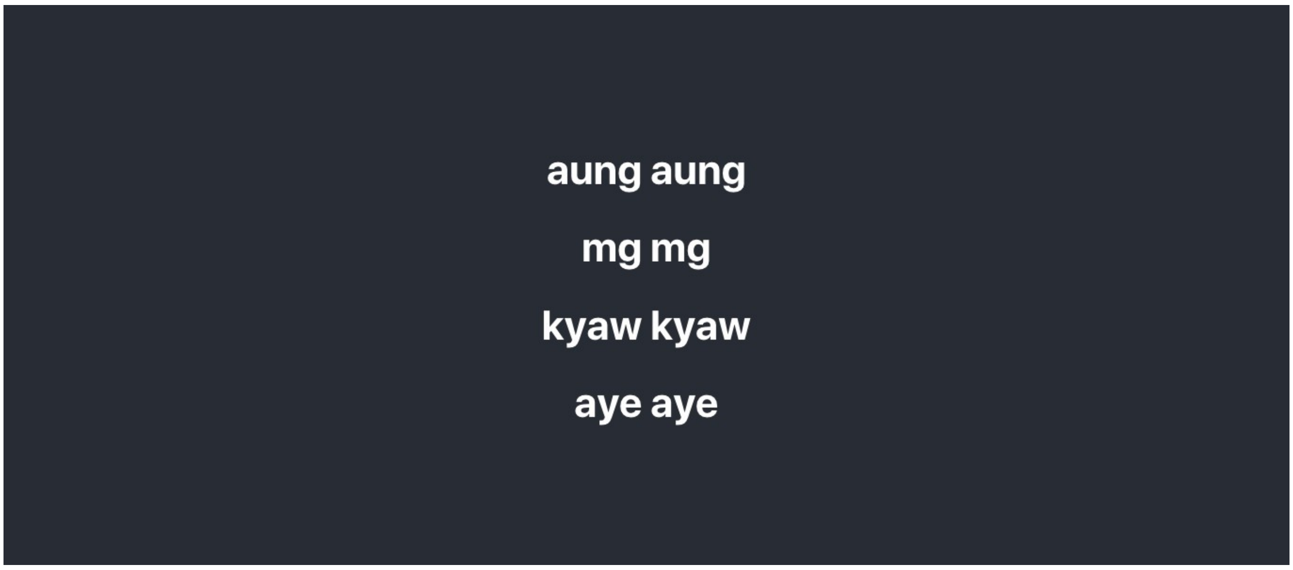
```
import React, { Component } from 'react';

class Home extends Component {

        render() {
                const employees = ['aung aung', 'mg mg', 'kyaw kyaw', 'aye aye']
                return (
                        <div>
                                { employees.map(employee => {
                                                return (
                                                        <div>
                                                                <h1> { employee } </h1>
                                                        </div>
                                                )

                                        })
                                }
                        </div>
                )
        }
}

export default Home;
```

Inspect browser console.

```
Warning: Each child in a list should have a unique "key" prop.

Check the render method of `Home`. See https://reactjs.org/link/warning-keys for
more information.
div
Home@http://localhost:3000/static/js/bundle.js:354:1
header
div
App
```

Create component/new_home.js file.

```
import React, { Component } from 'react';

class NewHome extends Component {

        render() {
                const employees = [
                        {id: 1, name: 'aung aung'},
                        {id: 2, name: 'mg mg'},
                        {id: 3, name: 'kyaw kyaw'},
                        {id: 4, name: 'aye aye'}
                ]

                return (
                        <div>
                                { employees.map(employee => {
                                                return (
                                                        <div key={employee.id}>
                                                                <h1> { employee.name } </h1>
                                                        </div>
                                                )

                                        })
                                }
                        </div>
                )
        }
}

export default NewHome;
```



```
aung aung
mg mg
kyaw kyaw
aye aye
```

Create 8_keys folder.
Copy 0_install/first_app/src folder to 8_keys folder.

(9) React Router

```
npm install react-router-dom
```

Check in package.json file.

```
npm list
```

Create component/menu.js file.

```
import { BrowserRouter, Routes, Route } from "react-router-dom";
import EvenOdd from './even_odd.js';
import Login from './login.js';
import Home from './new_home.js';

const Menu = () => {
  return (
    <BrowserRouter>
      <Routes>
        <Route path="login" element={<Login />} />
        <Route path="home" element={<Home />} />
        <Route path="evenodd" element={<EvenOdd />} />
      </Routes>
    </BrowserRouter>
  )
};

export default Menu;
```

Run in browser -

```
localhost:3000/login
localhost:3000/home
localhost:3000/evenodd
```

Create 9_router folder.
Copy 0_install/first_app/src folder to 9_router folder.

(10) React Hooks

useState

Copy component/login.js and Create component/new_login.js file.
Change class state instead function useState and remove this keyword.

```
import { useState } from 'react';

function NewLogin() {
	const [islogin, setlogin] = useState(false);
	const [username, setusername] = useState("");

	const setUsername = evt => {
		setusername(evt.target.value);
	}

	const clickLogin  = evt =>  {
		if (username == 'kyaw' && passwd == '123') {
			setlogin(true);
		} else {
			alert('sorry, invalid username and password !');
		}
	}

	const clickLogout  = evt =>  {
		setlogin(false);
	}
	. . .
}

export default NewLogin;
```

Change Menu.js file.

```
. . .
import Login from './new_login.js';
. . .
```

useEffect

Change new_login.js file.

```
import { useState, useEffect } from 'react';

function NewLogin() {
        . . .
        useEffect(() => {
            // run after every rendering
            if (islogin && username) {
                console.log(username, 'logged in.');
            }
        });

        const clickLogin  = evt =>  {
                if (username == 'kyaw' && passwd == '123') {
                        setlogin(true);
                } else {
                        alert('sorry, invalid username and password !');
                }
        }
        . . .
```

Add new users.

```
username = aung
passwd == 321

username = aye
passwd == 456
```

useContext

Copy component/menu.js and Create component/new_menu.js file.

```
import { BrowserRouter, Routes, Route } from "react-router-dom";
import EvenOdd from './even_odd.js';
import Login from './new_login.js';
import Home from './new_home.js';
import { createContext } from 'react';

export const Context = createContext();

const NewMenu = () => {

  const app_name = 'First App';

  return (
    <BrowserRouter>
      <Context.Provider value={app_name}>
        <Routes>
          . . .
        </Routes>
      </Context.Provider>
    </BrowserRouter>
  )
};

export default NewMenu;
```

Change new_login.js file.

```
. . .
import { Context } from './new_menu.js';
. . .
return (
            <div>
                <Context.Consumer>
                      { value => <span> { value } </span> }
                </Context.Consumer>
           { islogin ? (
. . .
```

Add Context Consumer in **new_home.js** and **even_odd.js** and app_name change to **Second App**.

Create 10_router folder.
Copy 0_install/first_app/src folder to 10_router folder.

(11) React Styling

CSS Stylesheet

Create src/Login.css file.

```
.Login {
  background-color: blue;
}
```

Change new_login.js file.

```
. . .
import '../Login.css';
. . .
return (
            <div className="Login">
              <Context.Consumer>
. . .
```

Style Object

Change even_odd.js file.

```
. . .
render() {
                    const myStyle = {
                       backgroundColor: "orange",
                    };

                    return (
                              <div style={myStyle}>
                                        <Context.Consumer>
. . .
```

Inline Style

Change new_home.js file.

```
. . .
return (
          <div style={{ backgroundColor: "green" }}>
                <Context.Consumer>
. . .
```

Create 11_style folder.
Copy 0_install/first_app/src folder to 11_style folder.

Django

1) Create new folder **4_django_restful** beside **3_react**.

```
mkdir 4_django_react
```

2) Check python version available 3.7.

```
py -0
```

3) Create new python virtual environment.

```
py -3.7 -m venv django2.2-venv
```

4) Activate virtual environment.

```
./django2.2-venv/Script/activate
```

5) Install django and check by pip list.

```
python -m pip install django==2.2
```

6) Create new project using django.

```
python -m django startproject hrms
```

7) Rename hrms project name as hrms-api.

```
cd hrms-api
```

8) Run server by manage.py file.

```
python manage.py runserver
```

9) Test in localhost:8000 in browser.

The install worked successfully! Congratulations!

Application Programming Interface (API)

1) Create new django application.

```
python manage.py startapp api
```

2) Register new app in setting.py

3) Database tables migrate.

```
python manage.py migrate
```

4) Check **hrms-api/db.sqlite3** database.
   Download SQL Query Browser (www.sqlitebrowser.org)

5) Create new admin user.

```
python manage.py createsuperuser
```

username: admin
email: admin@gmail.com
password: superuser

6) Login django administration at localhost:8000/admin in browser.

7) Create new employee table.

hrms-api/api/models.py

```
from django.db import models

# Create your models here.
class EmployeeModel(models.Model):
	name = models.CharField(max_length=20)
	phone = models.CharField(max_length=20)
	address = models.CharField(max_length=20)
```

8) makemigrations and migrate for new change.

```
python manage.py makemigrations api
python manage.py migrate api
```

9) Register for django administration.

```
from django.contrib import admin
from .models import EmployeeModel

# Register your models here.
admin.site.register(EmployeeModel)
```

Django Restful Framework

1) Install django restful framework. (www.django-rest-framework.org)

```
python -m pip install djangorestframework==3.9.2
```

2) Register in setting.py

```
INSTALLED_APPS = [
    . . .
    'django.contrib.staticfiles',
    'rest_framework',
    'api',
]
```

3) Create new serializers.py

hrms-api/api/serializers.py

```
from django.db import models

# Create your models here.
class Employee(models.Model):
        name = models.CharField(max_length=20)
        phone = models.CharField(max_length=20)
        address = models.CharField(max_length=20)
```

4) Edit views.py.

hrms-api/api/views.py

```
from django.shortcuts import render

# Create your views here.
from rest_framework import viewsets
from .models import EmployeeModel
from .serializers import EmployeeSerializer

class EmployeeViewSet(viewsets.ModelViewSet):
        serializer_class = EmployeeSerializer
        queryset = EmployeeModel.objects.all()
```

5) Creat new urls.py

hrms-api/api/urls.py

```
from rest_framework import routers
from django.urls import path, include
from .views import EmployeeViewSet

router = routers.DefaultRouter()
router.register('employees', EmployeeViewSet)

urlpatterns = [
	path('', include(router.urls))
]
```

6) Edit root urls.py

hrms-api/hrms/urls.py

```
from django.contrib import admin
from django.urls import path, include

urlpatterns = [
    path('admin/', admin.site.urls),
    path('api/', include('api.urls'))
]
```

7) Run **localhost:8000/api/employees** in browser.

Test API Method

POST (Create new employee)

```
HTTP 201 Created
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

{
    "id": 2,
    "name": "Mg Mg",
    "phone": "09787897878",
    "address": "Mandalay"
}
```

GET (Read employee)

```
HTTP 200 OK
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

[
    {
        "id": 1,
        "name": "Kyaw Kyaw",
        "phone": "09383838",
        "address": "Yangon"
    }
]
```

PUT (Update employee)

Change url => **http://localhost:8000/api/employees/2**

```
HTTP 200 OK
Allow: GET, PUT, PATCH, DELETE, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

{
    "id": 2,
    "name": "Maung Maung",
    "phone": "09787897878",
    "address": "Mandalay"
}
```

DELETE (Delete employee)

Change url => **http://localhost:8000/api/employees/2**

```
HTTP 204 No Content
Allow: GET, PUT, PATCH, DELETE, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
```

Are you sure you want to delete this Employee Instance?

Auth Token

1) Register in setting.py

```
INSTALLED_APPS = [
    . . .
    'rest_framework',
    'rest_framework.authtoken',
    'api',
]
```

2) Migrate auth token table.

```
Python manage.py migrate
```

3) Create token for admin user at django administration.

```
5bfc020cdc3bbe1f3e399fe2c5727c6c7e85c28a
```

Postman API Platform

Download postman (www.postman.com)

1) Edit root urls.py

hrms-api/hrms/urls.py

```
from django.contrib import admin
from django.urls import path, include
from rest_framework.authtoken.views import obtain_auth_token

urlpatterns = [
    path('admin/', admin.site.urls),
    path('api/', include('api.urls')),
    path('auth/', obtain_auth_token)
]
```

2) In postman api platform.

POST => **localhost:8000/auth/**.

Body Form Data

username = admin
password = superuser

Return Result

```
{"token":"5bfc020cdc3bbe1f3e399fe2c5727c6c7e85c28a"}
```

Permission IsAuthenticated

1) Edit setting.py

```
. . .
WSGI_APPLICATION = 'hrms.wsgi.application'

REST_FRAMEWORK = {
    'DEFAULT_PERMISSION_CLASSES': (
        'rest_framework.permissions.IsAuthenticated',
    )
}
. . .
```

2) Edit views.py

```
from django.shortcuts import render

# Create your views here.
from rest_framework import viewsets
from .models import EmployeeModel
from .serializers import EmployeeSerializer
from rest_framework.authentication import TokenAuthentication

class EmployeeViewSet(viewsets.ModelViewSet):
            serializer_class = EmployeeSerializer
            queryset = EmployeeModel.objects.all()
            authentication_classes = (TokenAuthentication,)
```

3) In postman api platform.

GET => **localhost:8000/employees**.

Body Form Data

username = admin
password = superuser

Return Result

```
{
  "detail": "Authentication credentials were not provided."
}
```

4) Include headers.

GET => **localhost:8000/employees**.

Body Form Data

username = admin
password = superuser

Headers

Authorization = Token 5bfc020cdc3bbe1f3e399fe2c5727c6c7e85c28a

Return Result

```
[
   {
      "id": 1,
      "name": "Kyaw Kyaw Kwa",
      "phone": "09383838",
      "address": "Yangon"
   }
]
```

Django React

1) Inside **4_django_restful** folder.

```
npx create-react-app hrms-web
```

2) Run react server.

```
npm start
```