Setup Environment for Building React Application

- You need a **Package Manager**
    - Package Manager is a software tool used by web developers to download and install various libraries required for project.
        - NPM [Node Package Manager]
        - Yarn
        - NuGet
        - Bower etc..
    - **Download and install "NPM"**
    - **You can get NPM from "Node.js"** https://nodejs.org/en/download/
    - **Check Version from Command Prompt**
      C:\> node -v
      C:\> npm -v
- You need an Editor
    - Download and install "**Visual Studio Code**" editor https://code.visualstudio.com/
    - Install the following extensions in Visual Studio Code
        - Live Server
        - Vscode-icons [optional]

Using React in an Existing Web Application

- Open your PC locations
- Create a new folder for project "**C:\WebApp"**
- Open "WebApp" folder in "Visual Studio Code"
- Open Terminal in VS-Code

- Run the command
  > npm init -y
- This will generate “package.json”
- Add a new folder by name **“public”**
- Add following file into “public” folder
  - Index.html
  - Home.html

Index.html

```
<!DOCTYPE html>

<html>

  <head>

    <title>Index</title>

  </head>

  <body>

    <h2>Welcome to React JS</h2>

    <p>This is an ordinary HTML page [without any
React]</p>

    <p>React is interated into Home Page - Click Below</p>

    <a href="home.html">Home</a>

  </body>

</html>
```

- **To Integrate React environment into a HTML page you need following libraries**

    - React **It is React Core Library**
    - React DOM **It is used for Virtual DOM manipulations**
    - Babel Standalone **It is a compiler used to compile react code written in “JSX”**
- You can use **CDN** [Content Distribution Network] for Libraries or you can download using NPM
- Get the CDN of all 3 libraries and Add to your Home Page.

Home.html

```
<!DOCTYPE html>
<html>
   <head>
      <title>React Page</title>
      <link rel="stylesheet" href="../node_modules/bootstrap/dist/css/bootstrap.css">
      <link rel="stylesheet" href="../node_modules/bootstrap-icons/font/bootstrap-icons.css">


      <script crossorigin src="https://unpkg.com/react@17/umd/react.development.js"></script>
      <script crossorigin src="https://unpkg.com/react-dom@17/umd/react-dom.development.js"></script>
```

```
    <script
src="https://unpkg.com/@babel/standalone/babel.min.js"><
/script>
    <script type="text/babel">
      ReactDOM.render(
        "React JS - Shopping Store",
        document.getElementById("container")
      )
    </script>
  </head>
  <body class="container-fluid">
    <h2 class="bg-primary text-white text-center p-2">
     <span class="bi bi-cart4"></span>  Amazon Shopping
    </h2>
    <div id="container"></div>
  </body>
</html>
```

Web Pack

- It is a module bundler.
- It is responsible for bundling all modules required for your application.

- So that your application can run and can be deployed on server.
- Web Pack is a module bundler used for various types of application.

Create a React application using Web Pack

- Create a new folder for project **“React-Shopping-App”**
- Open in VS-Code
- Open Terminal
- Run the command to initialize your “**React-Shopping-App**” as a web application.

  ```
  > npm init -y
  ```
- This will generate “package.json”
- Run the command to install “React core” and “Virtual-DOM” library

  ```
  > npm install react react-dom
  ```
- This will generate **“node_modules”** folder and will copy your library into folder.
- Run the following commands to install compiler, file loader and web pack

  ```
  > npm install -D @babel/core  @babel/preset-env
  @babel/preset-react  babel-loader
  > npm install file-loader  css-loader sass  sass-loader
  > npm install webpack webpack-cli
  ```

  package.json

  ```
  {
    "name": "React-Shopping-App",
  ```

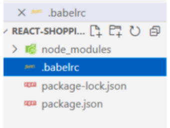
```
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "dependencies": {
    "react": "^17.0.2",
    "react-dom": "^17.0.2"
  },
  "devDependencies": {
    "@babel/core": "^7.14.6",
    "@babel/preset-env": "^7.14.7",
    "@babel/preset-react": "^7.14.5",
    "babel-loader": "^8.2.2",
    "css-loader": "^5.2.7",
    "file-loader": "^6.2.0",
    "sass": "^1.35.2",
    "sass-loader": "^12.1.0",
    "webpack": "^5.44.0",
    "webpack-cli": "^4.7.2"
  }
}
```

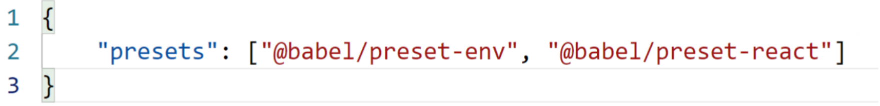
- **You have to add babel configuration file**
    - Add a new file into project by name

“.babelrc”

- ○ Add the following code into “.babelrc” file

```
{
   "presets": ["@babel/preset-env",
"@babel/preset-react"]
}
```





```
{
    "presets": ["@babel/preset-env", "@babel/preset-react"]
}
```

- **You have to add webpack configuration file**
  - ○ Add a new file into project by name **“webpack.config.js”**

```
const path = require('path');


module.exports = {

   output : {

      path: path.join(__dirname, '/dist'),

      filename: 'index.bundle.js'

   },

   devServer: {

      port : 3010,
        watchContentBase: true
    },
    module : {
        rules : [
            {
                test: /\.(js|jsx)$/,
                exclude: /node_modules/,
                use : {
                    loader: 'babel-loader'
                }
            },
            {
                test: /\.scss$/,
                use: [
                    'css-loader',
                    'sass-loader'
                ]
            }
        ]
    }
}
```

- **Go to “package.json”**

```
"scripts": {
   "serve": "webpack serve --mode development",
   "build": "webpack --mode production"
 },
```

- **Add a new folder “src”**
- **Add following files into “src” folder**

app.js

```
import React from 'react';

export function App(){
  return(
    <div>
      <h2>React Application</h2>
      <p>App Designed with Webpack</p>
    </div>
  )
}
```

Index.js

```
require('file-loader?name=[name].[ext]!./index.html');
import React from 'react';
import ReactDOM from 'react-dom';
import { App } from './app';

ReactDOM.render(
  <App/>,
  document.getElementById("container")
)
```

Index.html

```
<!DOCTYPE html>
<html>
   <head>
      <title>React App</title>
   </head>
   <body>
      <div id="container"></div>
      <script src="index.bundle.js"></script>
   </body>
</html>
```

- **Now open terminal and run the command**

  ```
  > npm run serve
  ```

  [it requires server library – choose 'yes']
- **Your Application runs on**
  http://localhost:3010
- **Open any browser and request the given URL**
  http://localhost:3010

React Application Configured with Local Libraries

- Create a new folder "React-Web-App"
- Open in Visual Studio Code
- Run the command

  ```
  > npm init -y
  ```

- Install the following libraries

  ```
  > npm install react
  > npm install react-dom
  ```

```
> npm install @babel/standalone
```

- Add following folders into project
    - public: **It comprises of static resources like images, html, text, pdf etc.**
    - src: **It comprises of dynamic resource like JS, TS, CSS, Sass etc.**

Note:

- Library comprises of modules
- Modules are compiled and processed by using “Module Systems” like
    - **UMD [Universal Module Distribution]**
    - **AMD [Asynchronous Module Distribution]**
    - **Common JS**
    - **Require JS**
- Node.js is the default library for local server on our PC as we installed “Node.js”
- Node.js uses “UMD” as module system.
- Other modules systems are not supported by default.
- You have to install the external module system.
- **If you have Node.js the library needs to by “UMD”**

- **Go to “src” folder and add a new file**
  index.js

  ```
  ReactDOM.render(
     "Welcome to React JS",
     document.getElementById("container")
  ```

```
)
```

- **Go to “public” folder and add a new file Index.html**

```
<!DOCTYPE html>
<html>
   <head>
      <title>React Application</title>
      <script
src="../node_modules/react/umd/react.development.js
"></script>
      <script src="../node_modules/react-
dom/umd/react-dom.development.js"></script>
      <script
src="../node_modules/@babel/standalone/babel.js"></
script>
      <script src="../src/index.js"
type="text/babel"></script>
   </head>
   <body>
      <h2>React Application</h2>
      <div id="container"></div>
   </body>
</html>
```

Creating a React Application by using “Create-React-App” library

- “Create-React-App” is a tool that provides commands for creating and configuring a complete react application.
- Just by using the command

  > npm install -g create-react-app

  > create-react-app   AppName
- You can also use “npx create-react-app”, which doesn’t require to install “create-react-app” tool

  > npx create-react-app **yourAppName**

  > npx create-react-app react-shopping-app

  > npm start

  http://localhost:3000