



**本科毕业设计（论文）**

**外文参考文献译文及原文**

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# 一、外文文献译文

**2为什么学习react**

两年前React被带入到世界，从那以后它在Facebook公司内部和其他地方的使用人数都得到了令人惊讶的增长。 Facebook的新网站项目往往使用React以各种形式构建。React正在被整个行业广泛采用。开发人员和工程师选择React是因为它可以让我们花更多的时间专注于产品开发和而花更少的时间在业务逻辑和学习框架上。

React应用程序是一个个组件的集合，每个组件代表单个视图。单独视图组件的概念使得迭代产品开发变得容易，因为当我们要对单个视图或组件进行更改时，我们不需要考虑整个系统。当使用React构建应用程序时，代码通常是可预测的，这是因为React将声明式API改写为包含DOM变化的强制性API，这提高了抽象级别并简化了编程模型。除此之外，使用React构建的应用程序更容易扩展。 React和网络快速迭代周期的结合，使得包括许多Facebook组件在内的一些优秀产品的出现成为可能。一个叫做Relay的令人惊叹的优秀JavaScript框架就是在React之上制作的，它有助于大规模地简化数据获取。

2.1顺滑的学习曲线

与其他需要花费大量时间钻研框架的JavaScript库不同，在React中，开始构建应用程序并不需要太多努力。React包含许多强大的功能。 可读性是React最大的优势之一。 即使对React不熟悉的人也能够轻松读懂。其他框架往往需要学习关于框架本身的许多概念，而弱化了JavaScript语言基础，但React完全相反。

2.2 React是快速敏捷的

ReactJS具有应用程序中状态和图层之间单向的数据流动的特性。这意味着数据在应用程序状态和层之间单向流动。 在像Angular这样的双向数据绑定中，如果模型改变了，视图也会改变，反之亦然。 React在DOM中更新比替代框架更快，它是一个更小的库。 DOM意味着文档对象模型。 因此，选择React作为工具来完成工作会很容易。

2.3 React引入了JSX

JSX是一种语言，可让您在JavaScript文件内部的组件之前指定DOM元素。 这意味着组件背后的逻辑和视觉效果都在一个地方。当其他框架采用队列的方式来处理它们时，这是一个好主意。

2.4 众多使用者和社区

像纽约时报，Airbnb，Facebook和Netflix这样的大公司正在使用React制作他们的产品。 他们总是致力于开发、优化React核心，并构建出可与任何React应用程序一起使用的惊人第三方库。

**3 环境配置**

3.1 安装文本编辑器

有很多文本编辑器可以适合react使用。他们大多数是开源的，免费的。 Atom就是其中之一。这是一个非常有用的文本编辑器。它有一个非常棒的开发者社区，不断有大量有用的插件可供更新。它可用于各种平台，包括Windows，Mac和Linux。

对于Windows用户，需要安装Git-bash，而mac和Linux用户可以从终端完成这项工作。在Windows中使用Git bash的原因是，您可以访问与Ubuntu发行版或Mac笔记本电脑上Linux环境中可用的命令相同的命令。

3.2 安装Nodejs Bundle

要安装Nodejs，需要到名为nodejs.org的网站，并且有几个下载工具可用于不同的操作系统。Nodejs可以从那里下载。此下载将安装几件事情。首先它会安装nodejs。 Nodejs允许创建一个Web服务器，以便React组件可以在本地使用，并且可以直接部署到Web上。它还安装了名为npm的包管理器，它可以让我们将React等各种第三方模块安装到我们的应用程序中。图4安装Nodejs和npm包管理器的屏幕截图。Nodejs和npm包管理器都是ReactJS开发设置的主要要求。节点和npm在从节点网站下载时都会捆绑在一起。

3.3 创建Web服务器

要开始使用React，必须先创建一个简单的Web服务器。没有网络服务器，则无法在浏览器中查看文件。打开终端后，我们可以使用npm-init创建一个新的node项目。 首先，我们在桌面上创建一个文件夹来存储名为HelloReact的项目。 我们从终端运行npm-init命令，并在项目中创建一个文件。 它略微将介绍了它究竟在做什么，然后提出了一些基本问题。

**4 React核心架构**

4.1 React虚拟DOM

DOM代表文档对象模型。 DOM处理对现代交互式Web技术非常重要。 它通常被称为现代网络的核心。 它是结构化文本的抽象，但是它比其他JavaScript操作更慢。但是大多数JavaScript框架往往会需要更新DOM，即使实际上并不需要这样做。 这意味着这些更新不一定需要执行这些操作，但它们仍然被默认执行。 例如，让我们假设9件商品已放入在线网上商店的购物篮中。 现在让我们说只有第一个项目需要购买并继续结帐。 在这里，大多数技术都会重建已放入篮子的整个列表。 这意味着框架必须不必要地工作十倍以上。虽然只有一次更改，但系统仍会完全重建清单。

虚拟DOM并不是react发明的，但他将此免费地提供给开发者社区。 虚拟Dom只是HTML DOM的抽象。 React为每个DOM对象都构建一个相应的虚拟DOM对象，像一个轻量级副本。 虚拟DOM也具有与真实DOM相似的特性。 但是，它不能直接对视图进行任何更改。 DOM操作是一个相当缓慢的过程。 但是操作虚拟DOM的速度更快，因为它与视图部分无关，并且不会对屏幕进行任何更改。 内存中的React虚拟DOM是真实DOM的轻量级副本。

React使用一种名为“diffing”的方法，这意味着渲染一个JSX元素可以更新每一个虚拟DOM。 这听起来可能效率很低，但事实上，它并不需要任何成本，因为虚拟DOM在更新过程中速度非常快，并且不会在此过程中产生任何影响。 DOM得到更新后，React将更新的DOM与DOM的预更新状态进行比较，并确定哪个虚拟DOM已更改。 一旦React检测到需要更改的DOM，React便只会将这些对象更新为真实的DOM。 因此，React能够通过虚拟DOM更快地完成更新。这在更新应用程序中的页面时有所不同，而React只能更改DOM的必要部分。 这个虚拟DOM操作过程是React在开发人员社区中获得很高声望的主要原因之一。

ReactJS库的诸多优点中，有一些关键优势，如： 一、使用React编写的diffing算法非常快速和高效；二、React包含JSX和hyperscript让我们能够为同一个应用程序构建多个前端；三、它非常轻巧，可以在每个移动设备上运行；四、社区中大量的思路共享和相互激发；五、它也可以在没有React的情况下用作独立引擎

React的一些缺点如：一、它在DOM的内存副本中占据了相当多的内存；二、静态和动态元素不会带来太大的区别。。

4.2 单向数据流

像Angular和Ember这样的框架，是使用双向数据绑定的。例如，在Angular中的双向数据绑定中，如果更改模型，视图也会自动更改，反之亦然。模型中的输入字段也可以改变模型。它在大多数应用程序中表现良好，但有时可能导致级联更新，并且更改为一个模型可能会导致其他模型中的更新。同样，由于视图和控制器都可以改变状态，所以在某些情况下数据流可能是不可预知的。 Flux或Redux与React可以成为更好的解决方案，以避免这些不确定因素，因为两种架构均遵循单向数据流。单向数据流不会级联更新和级联更改视图。

单向数据流的这种方式可确保数据只在单个方向上向整个应用程序流动，从而我们可以在应用程序中的状态和模型中做更多的控制。而双向数据流这方式使得架构变得更加复杂和难于理解。通量架构是一种功能性方法。这里视图被视为应用程序状态的函数。最终，如果状态发生一些变化，视图也会自动重新渲染。

此外，类似的视图会根据状态生成，让应用拥有更好的可理解性和可预测性。为了使其更具可预测性，在应用程序中，父级组件与子级组件之间的数据以单一方向流动。在这种方式下，任何数据都可以在任何时候从任何视图进行更新。即使出现问题，在这种方式下，调试也不会那么复杂。

4.3 React组件

组件对React非常重要。它通常被认为是React的核心，它是一个组件的集合。它是可重复使用的小型UI元素，可以随时间变化地为视图提供数据。为了创建整个用户界面，这些小组件被组合在一起，嵌套在一起。组件让UI（用户界面）被拆分成小块，并以整体的方式进行设计和构建。UI代表用户界面，即显示在屏幕上的内容。组件就像JavaScript函数一样。他们表面上执行相同的任务，但在不同的环境实则使用不同的方法。像函数一样，它们接受属性的输入并返回React元素。这些元素描述了用户在屏幕界面中看到的内容。 React组件可以用来构建整个界面或者是其中的一部分。

创建一个React组件

React组件可以简单地写成JavaScript函数。这个函数接受属性并返回一个React元素。它们被称为功能组件。 ES6类也可以用来定义一个组件。

React组件也可以通过其他几种方式创建。 扩展、继承、或从主要组件派生，都是创建组件的方法。

功能组件也可以是无状态的。渲染每个组件都可以构建更快，更高效的用户界面。

4.4 介绍JSX语法

JSX既不是字符串也不是HTML。 它是JavaScript的静态类型化语法扩展。 它类似于一个面向对象的语言，被设计用于在现代网络浏览器上运行。 JSX建议与React配合使用来设计和构建用户界面。尽管它具有JavaScript的全部功能，但它乍一看可能看起来也是一种模板语言，尽管它不是。 React元素由JSX生成。 它可以呈现给React Virtual DOM。

1、JSX特性

JSX具有一些独特的功能，使得JSX在React和React Native开发人员中颇受欢迎。一开始，它可能看起来很难，但随着时间的推移，会很容易习惯使用JSX。

首先，它速度更快：JSX源代码编译为JavaScript时，它给出了优化非常好的结果。与用JavaScript编写的等效代码相比，JSX生成的代码运行速度更快。事实证明，JSX的iOS速度提高了12％，Android的速度提高了29％。

其次，它更安全：与JavaScript相反，JSX是静态类型的，大多数是强类型的。使用JSX开发应用程序的质量会更高，因为在编译过程中就会捕获许多错误。它还提供编译器级别的调试功能。

第三，它更简单：JSX提供了一个类似于Java的可靠的类系统，使开发人员无需使用通过JavaScript提供的过于原始的基于原型的继承系统。然而，由于表达式和语句大多与JavaScript相同，所以JavaScript程序员很容易就能开始使用JSX。还有针对编辑器/ IDE的语言服务计划，例如自动补全代码以使编码更容易。

2、实用的JSX

表达式可以嵌入到JSX中，尽管它也是一个表达式。JSX标签也可以包含子级节点。React中的对象也由JSX表示。可以通过几种方式在JSX中指定属性。JavaScript表达式、字符串文字都作为属性传递。 如else语句，while语句，for循环这些在普通JavaScript中不被认为是表达式的语句，不能直接在JSX中使用，只能在JSX代码块外使用。

3、JSX中的子级元素

JSX元素可以作为子级元素提供给父级元素，以组成嵌套的组件。 不同类型的子级元素可以混合在一起，以便JSX子级元素和字符串文字一起使用。 这是另一个类似于HTML的JSX属性。

JSX表达式可以有多个子项。 因此，如果它需要组件渲染多个元素，它必须包装在一个div中。JavaScript表达式可以在花括号内作为子项传递。以下两个表达式是相同的。

<FirstComponent>Languages</FirstComponent>

<FirstComponent>{‘languages’}</FirstComponent>

React JSX中的函数也可以作为子项传递。 一般来说，传递给JSX的表达式被认为是字符串，元素或者这些东西的组合。 所以，props.children的工作方式与其他属性类似，并且可以传递数据，不仅React可以查询到props.children，而且还可以传递任何类型的数据。例如，可以在自定义组件中启动props.children回调。

布尔值，false，true，undefined，null虽然是有效的值，但不会呈现。 他们被忽略。

**5 React Native**

React Native是由Facebook开发的用于iOS和Android本机应用程序开发的框架。 它使用JavaScript作为语言来制作跨平台移动应用程序。它使用与React.JS相同的设计，采用React.js的一切优点，并允许从声明性组件构建丰富的移动用户界面，并提供更好的应用程序用户体验。与使用Objective-C for iOS或Java for Android构建的应用程序相比，React Native应用程序与他们非常接近，难以区分。它使用与普通Android和iOS应用程序相同的基本用户界面。

5.1 在React Native中安装和打包

React native是一个框架，ReactJS是一个用于构建用户界面的JavaScript库。 使用ReactJS启动项目需要Webpack或Browserify之类的捆绑器，其中包含所有必需的模块。 但是在React Native中，它带有开始开发项目所需的一切。 该设置很容易遵循和适用于快速开发。它在终端中只需要几条命令行，即可准备就绪。 本地React应用程序可以使用ES6，ES7构建。

我们需要在机器中预装苹果机的Mac OS Xcode和Android Studio for Android应用程序开发。它可以在特定平台的模拟器或仿真器上运行，甚至可以直接在自己的设备上运行。

5.2 样式是React Native

React Native中的组件不使用HTML来呈现应用程序。它提供了呈现应用程序的替代组件。这些替代组件映射实际的UI组件以在应用程序上呈现。大部分这些替代组件都被翻译成与HTML类似的东西。在这个阶段，一个视图组件类似于一个HTML div标签，一个Text组件类似于一个p标签。图14显示了React Native中的另一个组件。图14：React Native中的替代组件。

如图14所示，React Native中的替代组件与HTML类似。由于此代码不会以HTML格式呈现，因此无法重新使用ReactJS中可用于呈现任何类型HTML的任何库。但是还有一些替代库，例如React.parts可以得到这个解决方案。

JavaScript中的样式表与CSS类似，并且需要对React组件进行样式设置。 有一个名为Flexbox的工具，可以用于在React Native应用程序中进行布局。

5.3 React Native中的动画和导航

React Native为应用程序动画设计和导航带来了新的方向。除了常规功能，在应用程序切换中使用动画，滚动对于本机应用程序来说也是一项优势。他们为设计动画和导航设计了许多API。这些动画很好看且易于使用。 React Native应用程序中不需要CSS动画。应用程序中的不同组件可以使用JavaScript以全新的方式制作动画。

React Native提供了自己构建的API来为组件设置动画。它可以与名为Veloity.JS的现有JavaScript库进行比较，Veloity.JS广泛用于与基于Web的应用程序中的手势相关的不同类型的动画。对于React native，有一个名为LayoutAnimation的API，它非常好用，易于使用，但此时仅适用于iOS。它也可以在Android中使用，但它不能很好地支持它。

还有另一个名为PanResponder的API，它类似于JavaScript触摸事件来与用户手势进行交互。 为了在两个场景或两个页面之间导航，React Native提供了一个名为Navigator组件的组件。

5.4 谁在使用React Native？

大量的应用程序开发人员在生产中使用React Native。从成立的财富500强公司到热门的新创公司也都在使用React Native进行开发。

Naimul Islam Naim

ReactJS: An Open Source JavaScript library for front-end development

# 二、外文翻译原文

2 Why Learn React

React was introduced to the world two years ago, and since then it has seen impressive growth, both inside and outside Facebook. [1] New web projects at Facebook are commonly built using React in one form or another, and it is being broadly adopted across the industry. [1] Developers and engineers are choosing React because it allows spending more time to focus more on the product development and less time spent on fighting and learning to the framework. A React application is a collection of discrete components, each representing a single view. The idea of every individual view component makes it easy to iterate on product development because to make changes on a single view or component, it is not necessary to consider the entire system. When an application is built with React, the code is generally predictable, it is because React wraps the DOM mutative, imperative API with a declarative one, which raises the level of abstraction and simplifies the programming model. [1] Moreover, it is easier to scale the application built with React. The combination of React and the rapid iteration cycle of the web, has enabled to make some excellent products including many Facebook components. An amazing JavaScript framework called Relay has also been made on top of React, which helps simplifying data fetching on a large scale. [1]

2.1 Short and Easy Learning Curve

Unlike some other JavaScript libraries where it takes a lot of time to learn about the frameworks, in React it does not take much of an effort to start building an application. React is comprised of many strong features. Readability is one of the greatest strength of React. It is easily readable even to those who are unfamiliar to it. While other frameworks require learning many concepts about the framework itself, ignoring the language fundamentals, React does the absolute opposite.

2.2 React is Fast and Agile

ReactJS is featured with one-way unidirectional data flow between the states and layers in an application. This means data flows in single direction between the application states and layers. In two-way data binding like Angular, if a model is changed, the view also changes and vice-versa. React renders the updates in the DOM much quicker than alternative frameworks and it is a much smaller library. DOM means document object model. Thus, it is easy to choose the tools to get the job done.

2.3 React Introduced JSX

JSX is a language that lets you specify the DOM elements before the components right inside of JavaScript files. This means the logic behind the components and the visuals are all in one place. This is such a great idea when other frameworks are taking queues to place them.

2.4 Big Development Community Big companies like New York Times, Airbnb, Facebook, and Netflix are using React in production. They are continuously contributing to develop the React core and building amazing third party libraries that work great with any React applications.

3 Environment Setup

3.1 Installing Text Editor

There are plenty of text-editors to start working with. Most of them are open source and free of cost. Atom is one of them. It is a very useful text-editor. It has a great community of developers around it and they have enough useful plugin updates constantly. It is usable in every platform including Windows, Mac and Linux.

For Windows users it is needed to install Git-bash while mac and Linux users can do the job from the terminal. The reason behind using Git bash in Windows is so that you can have access to the same commands that are available in Linux environments like Ubuntu distribution or on a mac laptop.

3.2 Installing Nodejs Bundles

To install Nodejs, it is needed to go to the website called nodejs.org and there are couple of download facilities available for different operating systems. Node can be downloaded from there. This download will install a couple of things. First it will install nodejs. Nodejs allows creating a web server so that React components can be used locally and can be deployed to the web directly. It also installs node package manager called npm which will let us install various third party modules like React into our applications. Figure 4 shows a screenshot of some initial setup.

Figure 4 Screenshot of installation of Nodejs and npm package manager.

As shown in Figure 4, Nodejs and npm package manager are both primary requirements for ReactJS development setup. Node and npm both come in a bundle while downloading from the node website.

3.3 Creating Web Server

To start working with React it is necessary to create a simple webserver beforehand. Without a webserver, there is no way to see the files in the browser. After opening the terminal we can use npm-init to create a new node project. Here first we create a folder in the desktop to store the project named HelloReact. We run npm-init command from the terminal and it creates one file in the project. It gives a little introduction of what exactly it is doing and then asks a few basic questions. Figure 5 will show how to create a package.json file for the project.

4 React Core Architecture

4.1 React Virtual DOM

DOM stands for Document Object Model. DOM manipulation is very important for modern interactive web technologies. It is often called the heart of the modern web. It is an abstraction of the structured text. But it works slower than other JavaScript operations because most JavaScript frameworks usually update the DOM even if they do not need to do it. That means those updates are not necessarily required to perform the actions but they still do by default. For example, let us assume nine items have been put in a shopping basket in an online web store. Now let us say only the first item is needed to buy and proceed to checkout. Here, most technologies would rebuild the entire list that has been put in the basket. This means the framework has to unnecessarily work ten times more. Because of only one change the system has to rebuild the list exactly how it was before.

React did not invent Virtual DOM but uses and provides it to the developer community for free. Virtual Dom is simply an abstraction of HTML DOM. React has a corresponding virtual DOM object for every DOM object like a correspondent or a lightweight copy. Virtual DOM is also characterized with similar properties to a real DOM. However, it cannot make any changes directly to the view. DOM manipulation is quite a slow process. But manipulating Virtual DOM is faster because it has nothing to do with the view part and does not make any changes to the screen. Figure 13, reprinted from stackoverflow.com, is an illustration of Virtual DOM in the memory.

a React virtual DOM in the memory is a lightweight copy of the real DOM.

React uses a method called “diffing” which means rendering a JSX element gets every single Virtual DOM updated. This might sound inefficient but, in fact, it costs nothing as Virtual DOM is quite fast to get updated and does not make any impact in the process. After the DOM gets updated React compares the updated DOM with a pre-updated state of the DOM and determines which virtual DOM has been changed. Once React detects the changed DOMs, React updates only those objects to the real DOM. Thus, React makes the updates faster through Virtual DOM. In the above-mentioned example, React would have updated only the checked item from the list and leave the rest of the items alone. This makes the difference when updating a page in an application while React can only make changes to the necessary parts of the DOM. This virtual DOM manipulation process is one of the main reasons why React is gaining much popularity among the developer communities.

React Virtual DOM Pros and Cons

Among the many advantages of the ReactJS library, a few of the key advantages are

described here.

The diffing algorithms written in React is quite fast and efficient

Inclusion of JSX and hyperscript let us build multiple frontends for the same application.

It is very lightweight and capable to be run in every mobile device

Lots of tractions and mindshare

It can also be used without React as an independent engine

A few disadvantages of React are as follows.

It occupies quite much of the memory. Full in memory copy of the DOM.

Static and dynamic elements don’t bring much of a difference.

4.2 One-Way Data Flow

Frameworks like Angular and Ember use two-way data binding. In a two-way data binding for example in Angular, if a model is changed, the view also automatically gets changed and vice versa. An input field in the model can also mutate the model. It performs well in most of the applications but sometimes it may lead to cascading updates

and changing to one model may cause updates in other models. Again, since the state is mutable by both view and controller, the data flow can be unpredictable in some cases. Flux or Redux with React can be a better solution to avoid those uncertainties since both architectures follow one-way data flow. One-way data flow does not make cascading updates and changes in view.

One way data flow ensures that data flows throughout the application in a single direction to offer more control between the states and models in an application. One way data flow also makes the architecture less complicated and understandable. Flux architecture is a functional approach. Here the view is considered as a function of the application state. Eventually, if the state gets some changes the view also gets re-rendered automatically.

Moreover, a similar view is generated from the states and gives a better understanding and predictability to the application. To make it more predictable, in an application, data from parent to child flows in a single direction. Any data can be updated from any view, anytime in this approach. In case something goes wrong, debugging is also made less complicated in this way.

4.3 React Components

Components are very important for React. It is often considered as the heart of React, which is a collection of components. It is small reusable UI element that provides data to the view and changes over time. [6] To create the entire UI, those small components are then composed together, nested inside one another. Components let the UI (user interface) to be split into small pieces and to design and build in a comprehensive way. UI stands for user interface, i.e. what is shown on the screen. Components are like JavaScript functions. They literally perform the same task but in different environment and different approaches. Like functions, they take inputs called props and return React elements. Those elements describe what the user sees in the interface on the screen. React components can be used to build the entire interface or even a part of it.

Creating a React Component

A React component can be simply written as a JavaScript function. This function accepts props and returns a React element. They are called as functional components. ES6 class can also be used to define a component.

function Welcome(props){

return <h1>Hello, {props.name}</h1>;

}

A React component can also be created in several other ways. To extend or to inherit or to derive a class from the main component which it attached to object is another way to create a component. [7]

Functional components can also be stateless. Rendering every component builds the user interface experiencing faster and efficient

4.4 Introducing JSX Syntax

JSX is neither a string nor HTML. It is statically typed syntax extension to JavaScript. It is similar to an object-oriented language which is designed to run on modern web browsers. JSX is recommended to be used with React to design and build the user interface. While it comes with the full power of JavaScript it might even seem as a template language too at the first glance though it is not. The React element is produced by JSX. It can be rendered to the React Virtual DOM. [9]

4.4.1 JSX characteristics

JSX has got some unique features which made JSX quite popular among the React and React Native developers. At the beginning, it may look difficult but with time adopting JSX is easy.

First of all, it is faster: While JSX source code is compiled to JavaScript, it shows a very optimized result. Compared to the equivalent code written in JavaScript, JSX generated code runs faster. JSX has proved to be 12 % faster in iOS and 29 % faster in Android. [6]

Secondly, it is safer: In contrast to JavaScript, JSX is statically-typed and mostly typesafe. The quality of applications becomes higher when being developed using JSX, since many errors will be caught during the compilation process. It also offers debugging features at the compiler level as well.

Thirdly, it is easier: JSX offers a solid class system much like Java, freeing the developers from working with the too-primitive prototype-based inheritance system provided by JavaScript. Expressions and statements, however, are mostly equal to JavaScript, so it is easy for JavaScript programmers to start using JSX. There are also plans on language-services for editors / IDEs, for example code completion to make coding easier.

4.4.2 Practical JSX

Expressions can be embedded in JSX though it is an expression too. The function written below is an expression.

function formatName(user) {

return user.firstName + ' ' + user.lastName;

}

const user = {

firstName: 'Naimul ',

lastName: 'Islam'

};

const element = (

<h1>

Hello, {formatName(user)}!

</h1>

);

ReactDOM.render(

element,

document.getElementById('root')

);

JSX tags can also contain children.

const element = (

<div>

<h1>Hello!</h1>

<h2>Is React JSX worthy or not?</h2>

</div>

);

Objects in React are also represented by JSX.

const element = (

<h1 className="greeting">

Hello, Naimul!

</h1>);

const element = React.createElement(

'h1',

{className: 'greeting'},

'Hello, Naimul!'

);

Props can be specified in JSX in several ways. JavaScript expressions, string literals can also be passed as props. If, else if, do, while statements, for loops those are not considered as expressions in normal JavaScript, so they cannot be used directly in JSX but with a surrounding.

function NumberDescriber(props) {

let description;

if (props.number % 2 == 0) {

description = <strong>even</strong>;

} else {

description = <i>odd</i>;

}

return <div>{props.number} is an {description} number</div>;

}

4.4.3 Children in JSX

JSX elements can be provided as children to help displaying nested components. Different types of children can be mixed together so that JSX children and string literals can be used together. This is another JSX property that is similar to HTML. [7]

A JSX expression can have multiple children. As a result, it has to be wrapped in a div if it requires the component to render multiple things. JavaScript expressions can be passed as children within {} enclosing. The two following expressions are identical.

<FirstComponent>Languages</FirstComponent>

<FirstComponent>{‘languages’}</FirstComponent>

Functions in React JSX can also be passed as children. In general, expressions that are passed to JSX are evaluated to a string, an element or as a list of those things. Though, props.children works similar to other props and can pass data that not only React knows itself but any sort of data can be passed. For example, a props.children callback can be initiated in a custom component. [8]。

function Repeat(props) {

let items = [];

for (let i = 0; i < props.numTimes; i++) {

items.push(props.children(i));

}

return <div>{items}</div>;

}

function ListOfTenThings() {

return (

<Repeat numTimes={10}>

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{(index) => <div key={index}>This is item {index} in the list</div>}

</Repeat>

);

}

Booleans, false, true, undefined, null are not rendered though they are valid children. They are ignored.

5 React Native

React Native is a framework developed by Facebook for native application development for both iOS and Android. It is used for making cross platform mobile applications using JavaScript as a language. It uses the same design as React.JS, takes everything that is great about React.js and allows to build rich mobile user interfaces from declarative components and gives a better application user experience. (2) A React Native app is truly indistinguishable compared to an application built with Objective-C for iOS or Java for Android. It uses the same fundamental User Interface as regular Android and iOS apps do.

5.1 Setup and Bundling in React Native

React native is a framework, where ReactJS is a JavaScript library for building user interfaces. [4] Starting a project with ReactJS requires a bundler like Webpack or Browserify which consists of all necessary modules within it. But in React Native, it comes with everything that is needed to start developing a project. The setup is quite easy to follow and fast. It takes only a few command lines in the terminal and becomes ready to go. A native React application can be built using ES6, ES7. [4]

It is required to have Xcode for iOS in Mac and Android Studio for Android application development preinstalled in the machine. It can either be run on a simulator or emulator of the specific platform or even directly to the own devices.

5.2 Styling is React Native

Components in React Native do not use HTML to render the application. It provides alternative components that render the app. Those alternative components map the actual UI components to get rendered on the application. [4] Most of those alternative components are then translated to something that is similar to HTML. At this phase, a view component is similar to a HTML div tag and a Text component is similar to a p tag. Figure 14 shows an alternative component in React Native. Figure 14: Alternative components in React Native.

As shown in Figure 14, alternative components in React Native look similar to HTML. Since this code will not be rendered in HTML, so it is not possible to reuse any libraries that could be used in ReactJS that could render any type of HTML. But there are some alternative libraries for example React.parts get a solution of this.

A stylesheet in JavaScript looks similar to CSS and is required to style the React native components. [4] There is a tool called Flexbox which is designed to make the layout in React Native applications. [5] Figure 15 shows responsive styling with flexbox for React native applications.

Figure

Responsive styling for React Native app using flexbox.

As shown in Figure 15, responsive styling for React Native app using flexbox is nothing complicated but quite similar to CSS styling.

5.3 Animation and Navigation in React Native

React Native has brought a new dimension to application animation design and navigation. Alongside regular features, attracting animations in application swapping, sliding is an advantage for native applications. They have designed many API’s for the design, animation and navigation purposes. Those animations are good to see and use. There is no need for CSS animations in the React Native application. Different components in the application can be animated in a completely new way using JavaScript.

React Native provides own built API’s to animate the components. It can be compared to the existing JavaScript library called Veloity.JS which is widely used for different kind of animation associated to gestures in the web based applications. For React native, there is an API provided called LayoutAnimation which is very nice and easy to use but works only in iOS at this moment. [4] It also can be used in Android but it doesn’t support it very well.

There is another API called PanResponder which is similar to JavaScript touch events to interact with user gestures. [4] To navigate between two scenes or two pages there is a component provided by React Native called Navigator component.

5.4 Who are Using React Native?

A large number of app developers are using React Native in production. From established Fortune 500 companies to hot new startup companies are also using React Native in developments. [7] Figure 16 shows the applications and companies that are using React Native.

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ReactJS: An Open Source JavaScript library for front-end development