TRAINOSYS

REACTJS & TYPESCRIPT

Day 1

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Introduction

Introduction

- Name / Nickname
- Current Job / Position
- Tech Stack
- Choose an animal that best represents you ☺

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Jem Laguda

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Course Overview

- Introduction to ReactJS and TypeScript (Day 1)
- React Component Development (Day 2)
- React Routing and Data Fetching (Day 3)
- State Management with Redux and TypeScript (Day 4)
- Advanced Topics and Project Development (Day 5)

Program

Day 01

- Introduction to ReactJS and it's benefits
- Setting up the development environment with NodeJS and npm
- Creating a new React project with Typescript using Create React App
- Understanding the basics of TypeScript: types, interfaces, and modules
- Building a simple React component with TypeScript

Day 02

- Recap of React component structure and lifecycle methods
- Creating functional components with TypeScript
- Working with props and prop types in TypeScript
- State management in React components using hooks with TypeScript
- Building a simple React component with TypeScript
- Handling events and form inputs in TypeScript-based components

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REACTJS

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Example Projects

- https://nexus-league-of-legends.netlify.app
- https://miguelitosfoodhub.netlify.app
- https://tax-calculator-philippines-project.netlify.app

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Introduction to React

- What is React Library?
- What React does?
- What are the benefits of React?
- How to get started with React?

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What is React?

- React is a *library* for building user interfaces
- Lets you write HTML elements inside JavaScript files (and more)
- React was initially developed by Facebook around 2011

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What is a library?

- In software, a 'library' is a published, self-contained set of code that you can import to help write your programs. Usually a library focuses on doing one thing well (React does UI)
- A *library* is a collection of related modules or packages
- From here on out you'll use libraries often. With JavaScript, we'll use the npm command to find and install libraries

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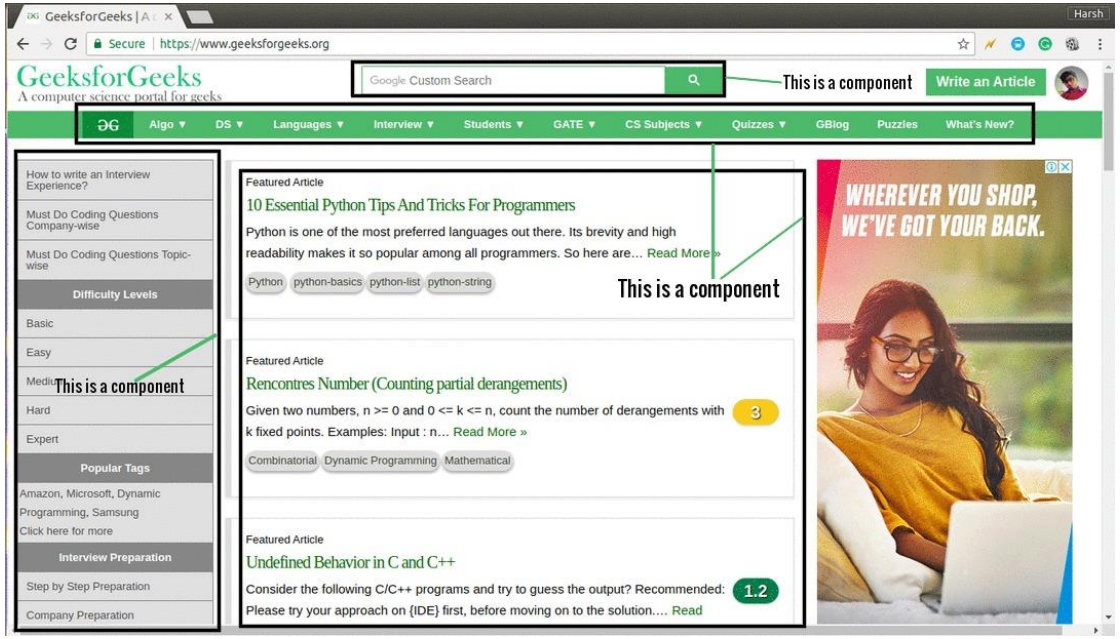
Why React?

Component based approach which helps in building reusable UI components (each UI works in isolation)

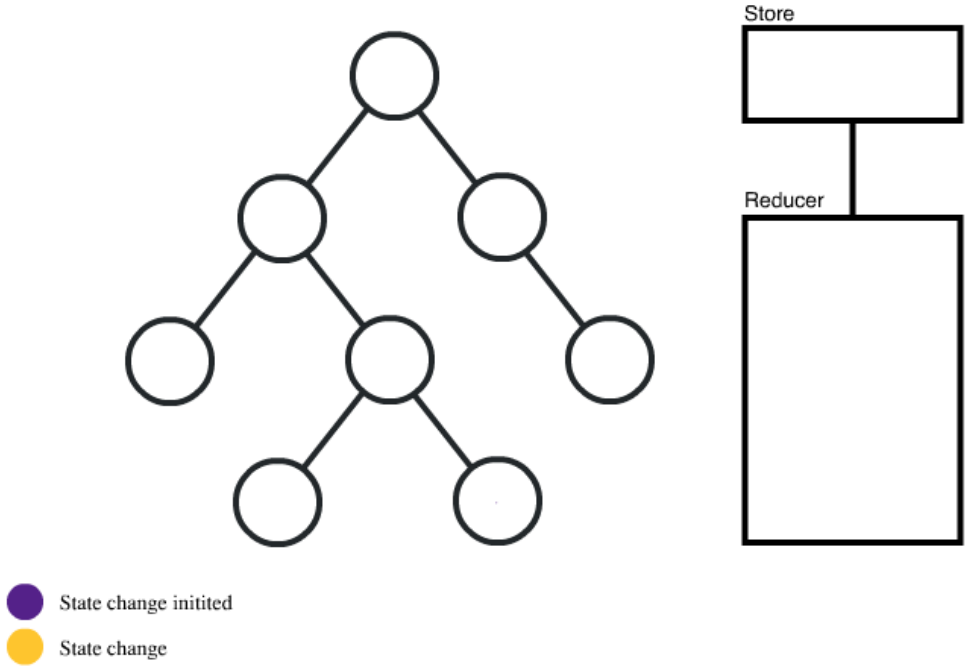


Credits to Geeks for Geeks

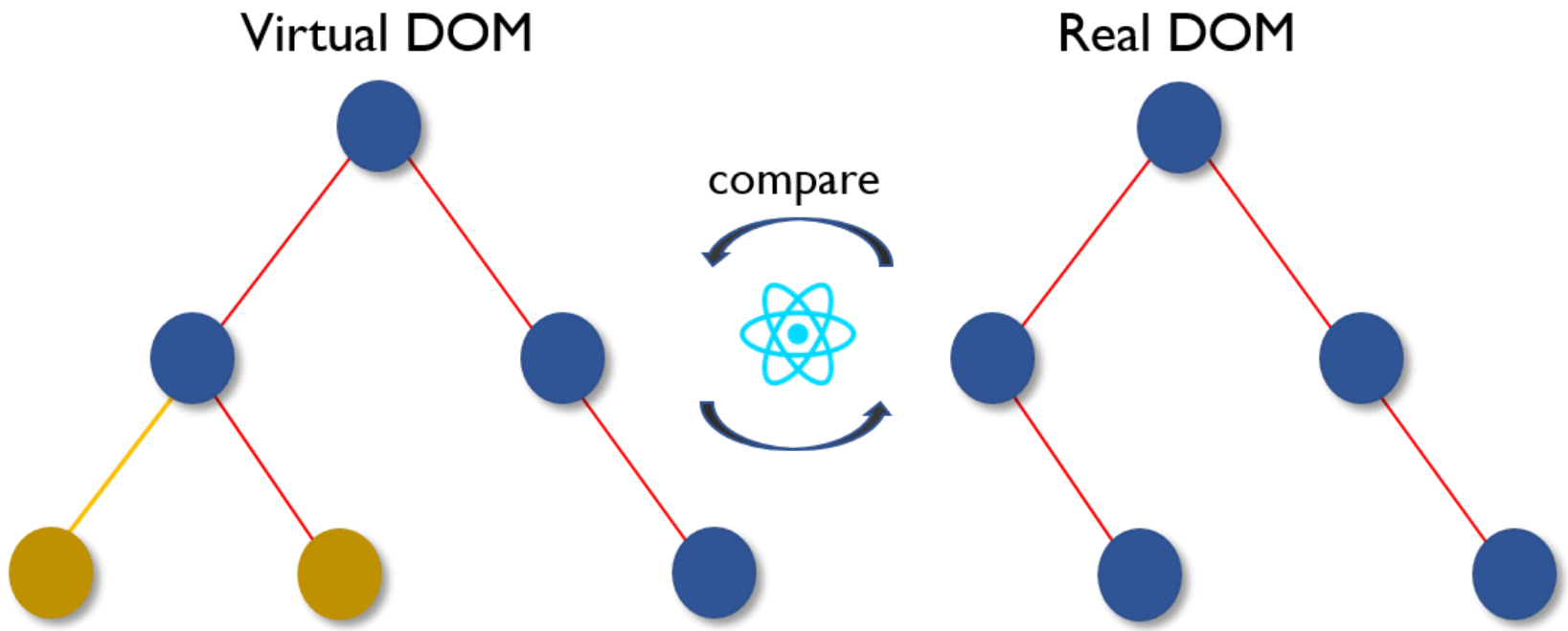
SPA - Single Page Applications (React Router Library)

https://nexus-league-of-legends.netlify.app

Unidirectional Flow



Virtual DOM



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Why React?

- Open source with robust community
- React has its own way of doing things like managing state, rendering elements and defining components

React Example Code

```
import * as React from "react";

class HelloWorld extends React.Component {
  render() {
    return (
     <div>
       <h1>Hello Delegates</h1>
       <p>And good morning!</p>
     </div>
    );
  }
}
```

React Example Code

```
import * as React from "react";

class HelloWorld extends React.Component {
  render() {
    return (
      <div>
        <h1>Hello Delegates</h1>
        <p>And good morning!</p>
      </div>
    );
  }
}
```

imports the React Library
* (imports all)

New Class Component called "Hello World"
that extends React.Component

responsible for returning JSX
JSX - JavaScript XML

JSX - defining our HTML

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JSX vs Vanilla JavaScript

JSX

```
return (<div>Hi</div>);
```

Vanilla JavaScript

```
const div=document.createElement("div");
div.textContent = "Hi";
return div;
```

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Class-based Components

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

class ExampleComponent extends Component {
  render() {
    return (
      <div>This is an example component.</div>
    );
  }
}

export default ExampleComponent;
```

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Functional Components

```
1   import React, { Component} from 'react';
2
3   class ExampleComponent extends Component {
4
5       render(){
6           return  <div > Hi! I'm a component!</div>
7       }
8   }
9
10  export default ExampleComponent
```

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Class-based Components vs Functional Components

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

function Example() {
  const [count, setCount] = useState(0);

  useEffect(() => {
    console.log('Count updated');
  }, [count]);

  const handleClick = () => {
    setCount(prevCount => prevCount + 1);
  };

  return (
    <div>
      <p>You clicked {count} times</p>
      <button onClick={handleClick}>Click me</button>
    </div>
  );
}
```

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

class Example extends Component {
  state = {
    count: 0
  };

  componentDidUpdate(prevProps, prevState) {
    if (prevState.count !== this.state.count) {
      console.log('Count updated');
    }
  }

  handleClick = () => {
    this.setState(prevState => ({ count: prevState.count + 1 }));
  };

  render() {
    return (
      <div>
        <p>You clicked {this.state.count} times</p>
        <button onClick={this.handleClick}>Click me</button>
      </div>
    );
  }
}
```

Class based Components

- Extending the React.Component class from React.
- They are defined using ES6 classes and utilize the render() method to define the component's UI.
- State management is achieved using the state object, and state updates are performed using the setState() method.
- Lifecycle methods such as componentDidMount(), componentDidUpdate(), etc., are available for implementing component lifecycle behavior.
- They can hold and manage their own internal state.
- Class-based components can have their own instance methods.
- They can use the this keyword to access props and state within the component.
- Class-based components provide a way to handle complex logic and maintain local component state.

Functional Components

- Functional components are defined as JavaScript functions.
- They are simpler and more lightweight compared to class-based components.
- They receive props as the input arguments and return JSX to define the component's UI.
- Functional components are stateless by default, but the introduction of hooks in React allows them to manage state using the useState hook.
- They don't have lifecycle methods directly. However, with the introduction of hooks, functional components can use hooks like useEffect to achieve similar behavior.
- Functional components are typically easier to read, understand, and test.
- They are more focused on presenting UI based on the received props and don't have their own internal state or instance methods.

React Alternatives

- Angular Framework
- VueJS Framework
- Backbone Framework (but its not a UI Library)

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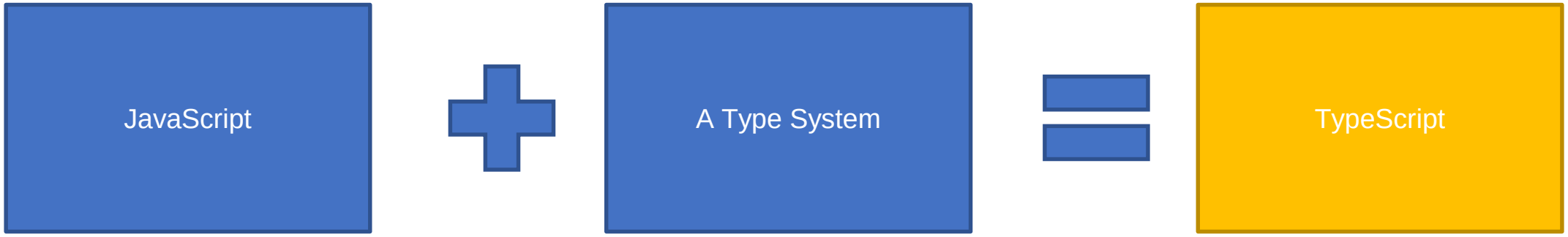
So.. What is TypeScript?



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The TypeScript System

- Helps us catch errors during development
- Uses 'type annotations' to analyze our code
- Only active during development
- Doesn't provide any performance optimization

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TypeScript vs Vanilla Javascript

```javascript
// JavaScript code
function greet(name) {
  console.log(`Hello, ${name}!`);
}

greet("John");
```

```typescript
// TypeScript code
function greet(name: string): void {
  console.log(`Hello, ${name}!`);
}

greet("John");
```

TypeScript

- Is like a friend that helps you catch error line by line

Types

- Represents the value type or object structure
- Explicitly declared or inferred
- Type annotations ensure expected value types
- Complex types include arrays, objects, and functions
- Static typing catches type errors during development

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Example of Types

```
7
8   let age: number = 25; // declaring age as a number
9   let firstName: string = "John"; // declaring firstName as a string
10  let isActive: boolean = true; // declaring isActive as a boolean
11
```

Example of Types

```
12  // declaring numbers as an array of numbers
13  let numbers: number[] = [1, 2, 3, 4, 5];
14
15  // declaring person as an object with properties name (string) and age (number)
16  let person: { name: string, age: number } = {
17    name: "John",
18    age: 25
19  };
20
21  // declaring greet as a function that takes a string parameter and returns void
22  let greet: (name: string) => void = (name) => {
23    console.log(`Hello, ${name}!`);
24  };
25
```

Interfaces

- Define the properties and methods that the implementing objects must have
- The properties in an interface can have their own types, such as string, number, or even other interfaces
- Interfaces can be used to describe the shape of functions as well, specifying the parameter types and return type
- Purely a development-time construct for type checking

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Example usage of Interface

```
8  interface Person {
9    name: string;
10   age: number;
11   sayHello: () => void;
12 }
13
14 class Student implements Person {
15   name: string;
16   age: number;
17
18   constructor(name: string, age: number) {
19     this.name = name;
20     this.age = age;
21   }
22
23   sayHello() {
24     console.log(`Hello, my name is ${this.name} and I'm ${this.age} years old.`);
25   }
26 }
27
28 const john: Person = new Student("John", 25);
29 john.sayHello(); // Output: Hello, my name is John and I'm 25 years old.
30
```

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React, TypeScript and Node

Get Familiar with ReactJS + TypeScript

Towards the end, we'll build a project with React + TypeScript + Node

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CODE ALONG

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Check list of our tools

- NodeJS
- Any IDE like VS code
- Browser
- Git
- Gitlab Account

How to create a React project Create React App

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```
npx create-react-app <app-name>
```

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Activity 1

- ❑ Create a Class based Component - DONE
- ❑ Create a Functional Component - DONE
- ❑ Display the “Hello <insert name of your crush here>” in JSX - DONE
- ❑ Create 3 nested components

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Reach Us!

Visit Us

12th/F The Trade & Financial Tower Unit 1206
32nd Street & 7th Avenue Bonifacio Global City,
Taguig 1634 Philippines

Email Us

inquiry@trainosys.com

Browse Our Website

www.trainosys.com

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