RQF LEVEL 3

SWDVF301

SOFTWARE DEVELOPMENT

Vue.JS Framework

TRAINER'S MANUAL

October 2024

VUE.JS FRAMEWORK

KOICA Korea International Cooperation Agency

TQUM TVET Quality Management Project

2024

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- *HQs: Rwanda TVET Board-RTB*
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Original published version: October 2024

ACKNOWLEDGEMENTS

The publisher would like to thank the following for their assistance in the elaboration of this training manual:

Rwanda TVET Board (RTB) extends its appreciation to all parties who contributed to the development of the trainer and trainee's manuals for the TVET Certificate III in Software Development, specifically for the module **"SWDVF301: Vue.JS Framework."**

We extend our gratitude to KOICA Rwanda for its contribution to the development of these training manuals and for its ongoing support of the TVET system in Rwanda

We extend our gratitude to the TQUM Project for its financial and technical support in the development of these training manuals.

We would also like to acknowledge the valuable contributions of all TVET trainers and industry practitioners in the development of this training manual.

The management of Rwanda TVET Board extends its appreciation to both its staff and the staff of the TQUM Project for their efforts in coordinating these activities.

This training manual was developed:

Under Rwanda TVET Board (RTB) guiding policies and directives

Under Financial and Technical support of

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TABLE OF CONTENT

ACRONYMS

CDN: Content delivery network

CI/CD: Continuous integration/Continuous deployment

CLI: Command Line Interface

CMS: Content Management Systems

CSS: Cascading Style Sheets

GUI: Graphical user interface

HTML: Hypertext Mark-up Language

IDE: Integrated Development Environment

MVVM: Model-View-View Model

RTB: Rwanda TVET Board

SPA: Single Page Application

SWD: Software Development

TQUM Project: TVET Quality Management Project

VS Code: Visual Studio Code

INTRODUCTION

This trainer's manual includes all the methodologies required to effectively deliver the module titled **"Vue.JS Framework."** Trainees enrolled in this module will engage in practical activities designed to develop and enhance their competencies.

The development of this training manual followed the Competency-Based Training and Assessment (CBT/A) approach, offering ample practical opportunities that mirror real-life situations.

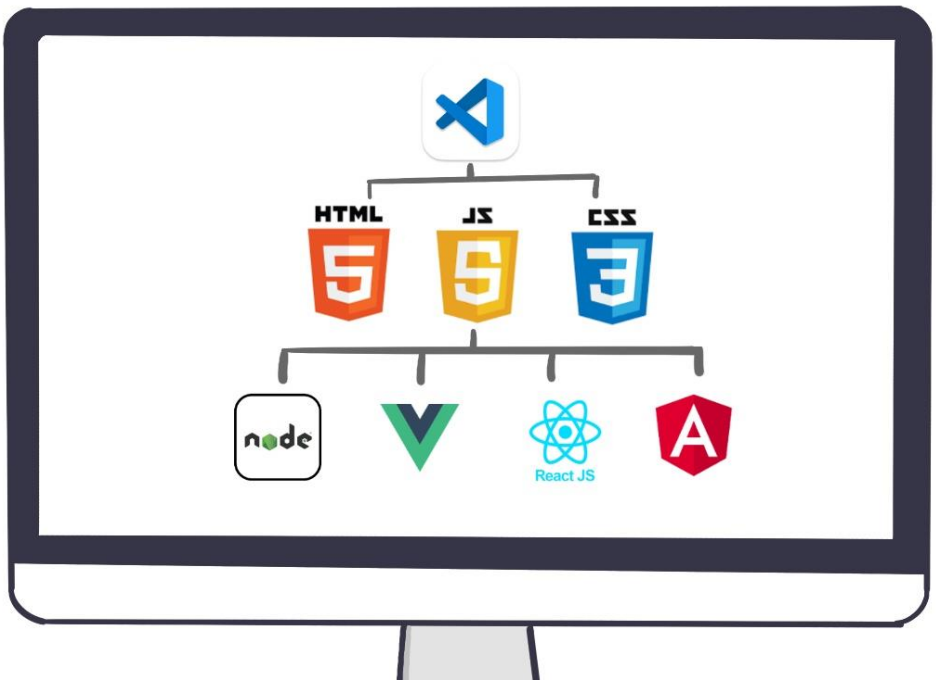
The trainer's manual is organized into Learning Outcomes, which is broken down into indicative content that includes both theoretical and practical activities. It provides detailed information on the key competencies required for each learning outcome, along with the objectives to be achieved.

As a trainer, you will begin by asking questions related to the activities to encourage critical thinking and guide trainees toward real-world applications in the labour market. The manual also outlines essential information such as learning hours, didactic materials, and suggested methodologies.

This manual outlines the procedures and methodologies for guiding trainees through various activities as detailed in their respective trainee manuals. The activities included in this training manual are designed to offer students opportunities for both individual and group work. Upon completing all activities, you will assist trainees in conducting a formative assessment known as the end learning outcome assessment. Ensure that students review the key reading and the points to remember section.

MODULE CODE AND TITLE: SWDVF301 DEVELOP SIMPLE GAME IN VUE FRAMEWORK

Learning Outcome 1: Set Up Environment
Learning Outcome 2: Apply Vue Framework
Learning Outcome 3: Plan game
Learning Outcome 4: Develop Game


HTML
JS
CSS
node
React JS

Indicative contents
1.1 Description of key concepts **1.2 Vue project installation** **1.3 Description of Vue project folder & files**

Key Competencies for Learning Outcome 1: Set Up Environment

Knowledge	Skills	Attitudes
• Differentiation of command line Interface from IDE • Differentiation frontend from backend • Description of JavaScript framework • Explanation of single page application • Explanation of dependencies and the Vue development environment. • Description of Vue project folder and files	• Installing NodeJS. • Using command line interface (cmd) • Configuring NPM • Installing of Vue framework • Testing JavaScript file using NodeJs • Initializing Vue project using terminal • Running Vue project • Interpreting vue project folder and files	• Having Team work spirit ability • Being critical thinker • Being Innovative • Being attentive. • Being creative • Problem solving • Being Practical oriented • Being Detail oriented
Duration: 20 hrs		

Learning outcome 1 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe correctly key concepts that are used in Vue.JS framework.

2.Describe properly folders and files as used in Vue.JS framework project

3. Explain correctly the term dependencies and single page application as applied in Vue.JS framework

4. Install properly Node.JS and Vue.JS framework as used in single page application development.

5. Run properly Vue.JS projects as applied in the software Development process.

6. Test properly Vue.JS projects as applied in the software Development process.

7. Initialize correctly vue project as applied in frontend development

8. Describe correctly JavaScript frameworks as used in single application development.

9. Differentiate correctly frontend from backend as applied in software Development.

10. Interpret correctly vue project folder and files as used in project creation.

11. Configure properly NPM as used in installation of packages and libraries.

 **Resources**

Equipment	Tools	Materials
• Computer	• Text editor (VSCode) • Node.JS • Web browser	• Internet

 **Advance Preparation:**

Before delivering this learning outcome, you are recommended to:

- Have Visual studio code installed on all computers.
- Have a well prepared computer lab with internet accessibility for trainees

- Have a video used as didactic material.
- Have web browser installed on all computers.

Indicative content 1.1: Description of Key Concepts

Duration: 6 hrs

Theoretical Activity 1.1.1: Explanation of the key concepts related to Vue js Framework.

Notes to the trainer:

While delivering this content, small groups can be used for explaining the key concepts related to Vue.JS Framework.

Key steps:

While delivering this activity, pass through the following steps:

Step1: Involve trainees in group formulation

Step2: Introduce the activity and request trainees to answer to the following questions:

I. Differentiate Command Line Interface (CLI) from Integrated Development Environment (IDE).
II. What are the key differences between backend and frontend development?
III. Provide explanations for the following terms:
    a) Node.js and NPM
    b) Single Page Application (SPA)
    c) Dependencies

Step 2: Involve trainees in presentation of their answers.

Step 3: Provide expert view and clarifies ideas by using didactic materials.

Step 4: Address any questions or concerns.

Step 5: Ask trainees to read the key reading 1.1.1 in the trainee manual.

Points to Remember

- In Vue.JS framework you can create a project by using command line interface or integrated development environment.
- Front end of application deals with the client side or graphical user interface while the backend deals with server side part considering the logic part and database.
- Once you install node.JS it come up with it default package manager (NPM) that you can use to install all dependencies and packages that will be used in development of single page application.

Theoretical Activity 1.1.2: Explanation of environment in Vue js Framework

Notes to the trainer:

While delivering this content, small groups can be used for explaining the environment in Vue Js framework.

Key steps:

While delivering this content pass through the following steps:

Step 1: Introduce the activity and ask trainees to provide answers to the following question:

I. How could you describe the following environments?
   a) Development environment
   b) Testing environment
   c) Production environment

Step 2: Ask any trainees to write answers provided on flipchart/paper.
Step 3: Ask trainees to discuss the provided answers and choose correct answers.
Step 4: Provides expert view and clarifies ideas by using didactic materials.
Step 5: Address any questions or concerns.
Step 6: Ask trainees to read the key reading 1.1.2 in the trainee manual.

Points to Remember

- In Vue.js, the term "environment" typically refers to the configuration settings and variables that can vary based on the environment in which the Vue.js application is running. There are environments used in the Vue.js framework such as Development environment, Testing environment, Production environment.

Theoretical Activity 1.1.3: Introduction to Vue JS Framework

Notes to the trainer:

- While delivering this content, small groups can be used for discussing on introduction to vue js framework.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and ask trainees to discuss on the following as related to intro duction to vue js framework:

I. History of Vue.js Framework
II. Advantages of Vue.js Framework
III. Purpose of Vue.js Framework
IV. Requirements for Learning Vue.js Framework
V. Specific areas where Vue.js can be effectively utilized.

Step 2: Ask trainees to write their findings on flipchart/paper.

Step 3: Ask trainees to present their findings.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 1.1.3 in the trainee manual.

Points to Remember

Vue.js, created by Evan You and first released in 2014, is a progressive JavaScript framework designed to build interactive web interfaces with ease. Its component-based architecture, versatility, and lightweight nature make it ideal for a wide range of applications, from single-page applications (SPAs) and progressive web apps (PWAs) to complex enterprise systems and even mobile and desktop applications. Vue.js offers several advantages, including a gentle learning curve, seamless integration, and strong performance, supported by official libraries and a vibrant community. To effectively learn Vue.js, familiarity with HTML/CSS, JavaScript (ES6+), Node.js, npm, and basic asynchronous programming concepts is beneficial. With its flexibility and reactivity, Vue.js can be used to develop dynamic UIs, data-driven dashboards, e-commerce platforms, real-time applications, and more, making it a powerful tool for modern software development.

Practical Activity 1.1.4: Use command prompt (CMD)

Notes to the trainer

- This activity should take place in the computer lab where trainees should use command prompt to create, manage folders and apply other basic commands.
- While delivering this content, you are required to:
  Avail computers with command prompt (CMD).

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees to do the task described below:

> As a software developer, you are asked to go the computer lab to use command prompt (CMD) to create and manage folders.

Step 2: Explain the task and provide clear work instruction.
Step 3: Demonstrate how to use command prompt. While demonstrating, explain the steps to use the command prompt.
Step 4: Asks trainees to use command prompt and monitor the procedures.

Step 5: Verify whether folders are correctly created and managed by using command prompt**.**

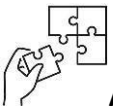
Step 6: Ask trainees to read key reading 1.1.3.

Points to Remember

- Using the Command Prompt in Windows allows you to execute various commands to interact with the operating system.

  Here are the steps to use the Command Prompt:

  1. Open command prompt
  2. Navigate folders
  3. List files and folders
  4. Run different commands depending on the task to be performed such as rename, delete and change directory.



Application of learning 1.1.

The KT-company is an IT company located at KICUKIRO District, that company develop software by using Vue js framework, as developer who is working there you are assigned task of creating and managing folders that will be used in saving the information of clients on desktop.

Checklist:

Elements	**Indicators**	**Observation**	
		Yes	**No**
Command prompt(CMD) is correctly used	Command Prompt is opened		
	Folders on desktop have been created		
	Navigate Folders have been performed		
	List folders if performed		
	Rename folder have been performed		
	Delete folder is performed		
	Change directory using cd command have been performed		

Indicative content 1.2: Vue Project Installation

Duration: 8 hrs

Theoretical Activity 1.2.1: Description of key terms used in Vue js framework

Notes to the trainer:

While delivering this content, a small group can be used for describing the term framework, List JavaScript framework, Discuss the importance of JavaScript framework.

Key steps:

While delivering this content pass through the following steps:

Step 1: Engage trainees in group formation.

Step 2: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about the term Framework?
II. List JavaScript Frameworks.
III. Discuss the importance of JavaScript frameworks

Step 3: Engage trainees in presentation of their findings

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 1.2.1 in the trainee manual.

Points to Remember

- JavaScript frameworks are essential tools for web developers to build dynamic and interactive web applications efficiently. There are some commonly used JavaScript frameworks: React, Angular, Express.js, Vue.js.

Practical Activity 1.2.2: Develop JavaScript program

Notes to the trainer

- This activity should take place in the computer lab where trainees should use node js and vs code to develop a sample JavaScript program.
- While delivering this content, you are required to:
  Avail computer with node js and vs code installed.

Key steps:

While delivering this content pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a software developer, you are asked to go to the computer lab to develop a sample JavaScript program.

Step 2: Explain the task and provide clear work instruction

Step 3: Demonstrate how to develop a JavaScript program. While demonstrating, explain the steps to develop a JavaScript program.

Step 4: Asks trainees to develop JavaScript program and monitor the procedures.

Step 5: Verify whether NodeJs, VSCode are used in developing JavaScript program.

Step 6: Ask trainees to read key reading 1.2.2.

Points to Remember

- Developing a JavaScript program involves writing code that can be executed in a web browser or server environment.

  Here are the steps to develop a JavaScript program:

  1. Set up your development environment
  2. Create a new JavaScript file
  3. Write your JavaScript code
  5. Debug your code
  6. Test your JavaScript program
  7. Refine and optimize your code

Practical Activity 1.2.3: Create Vue project

Notes to the trainer

This activity should take place in a Computer Lab where trainees should install Vue CLI with node package manager (npm), initiate Vue project using terminal and run Vue project.

While delivering this content, you are required to:

Avail computer with node js installed.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a software developer, you are asked to go to the computer lab to create Vue project.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to create Vue project. While demonstrating, explain the steps to create Vue project.

Step 4: Asks trainees to create Vue project and monitor the procedures.

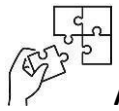
Step 5: Verify whether Vue CLI with npm, Initiate Vue Project using terminal used in Vue project are clearly performed.

Step 6: Ask trainees to read key reading 1.2.3.

Points to Remember

- To create a new Vue project, you can use Vue CLI (Command Line Interface) to set up a Vue.js project quickly and efficiently.
  Here are the steps to create a Vue project using Vue CLI:
  1. Install Vue CLI
  2. Create a new Vue project

3. Project configuration
4. Navigate to project directory
5. Run the development server
6. Access your Vue project
7. Start coding



Application of learning 1.2.

You have been hired by your school to develop a Vuejs game for students to always play at break time in the computer Lab, as game developer in Vuejs framework create a Vuejs project on your computer desktop using Vue CLI and name it my project. Open it in VS CODE and display the output by loading the server URL on a web browser of your choice.

Checklist:

Elements	**Indicators**	**Observation**	
		Yes	**No**
Vue project is well created	Vue CLI have been Installed		
	New Vue Project have been created		
	Project Configuration is performed		
	Navigate to Project Directory using cd is performed		
	Run the Development Server using npm run serve or yarn serve is performed		
	Vue Project is Access in web browser		
	welcome world is Displayed		

Indicative content 1.3: Description of Vue project Folder & Files

Duration: 6 hrs

Theoretical Activity 1.3.1: Description of Folder and file structure in vue js project

Notes to the trainer:

- While delivering this content, a small group can be used for describing folder and file structure in Vue Js project.
- The use of videos as didactic materials is required.

Key steps:

While delivering this content pass through the following steps:

Step1: Engage trainees in group formulation

Step2: Introduce the activity and request trainees to respond to the following questions:

I. Explain the following terms commonly used in Vue projects folder:

a) node_modules
b) Public
c) src
d) asset
e) components
f) app.vue
g) main.js
h) app.vue
i) package. Json
j) vue.config.js
k) .gitignore
l) babel.config.js
m) jsconfig.json
n) Readme.md and package-lock.json.

Step3: Ask trainees to present their findings to the whole class.

Step4: Provides expert view and clarifies ideas by using didactic materials.

Step5: Address any questions or concerns.

Step6: Ask trainees to read the key reading 1.3.1 in the trainee manual.

Points to Remember

In a Vue project created using Vue CLI, the project folder and files are structured in a way to facilitate the development, configuration, and deployment of Vue.js applications. There are typical structure of a Vue project folder and the key files: Node _modules, Public folder, src, Asset, Components, helloWorld.vue, app.vue, main.js, App.vue, Package.json Vue.config.js, .git ignore,babel.config.js.

Practical Activity 1.3.2: Navigate through Vue project folder & files

Notes to the trainer

- This activity should take place in a computer lab where trainees should create a Vue project folders and files used for Vue project creation and navigate through the created project.
- While delivering this content, you are required to:
  Avail any created project in Vue js Framework that will be used for navigating through files and folders.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees to do the task described below:

As a Software developer, you are asked to go into the computer lab to navigate through the created Project folder and files.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can navigate through the created Project folder. While demonstrating, explain the steps to navigate through the created project folder.

Step 4: Asks trainees to Navigate through the created project folder and monitor the procedures.

Step 5: Verify whether Vue project folders and files are used in navigation of project folder are clearly created.

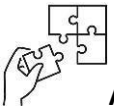
Step 6: Ask trainees to read key reading 1.3.2.

Points to Remember

- Navigating through a Vue project folder allows you to explore the project structure, view files, make changes, and manage your Vue.js application effectively.

  Here are the steps to navigate through a created Vue project folder:

  1. Open Command Line Interface (CLI)
  2. Change directory to your Vue project
  3. List files and folders
  4. Navigate to specific folders
  5. View files and content
  6. Navigate back to previous directory
  7. Run development server
  8. Access the Vue application



Application of learning 1.3.

As a developer joining a Vue.js project for the first time, you're tasked with familiarizing yourself with the project's folder structure and files, through navigating the Vue project's created of folders and files. By removing, all unwanted links on main interface and display on welcome message that attract visitors of the school website.

Checklist:

Elements	Indicators	Observation	
		Yes	No
Navigate through Vue project folder & files is well performed	Vue CLI have been Installed		
	New Vue Project have been created		
	Project Configuration is performed		
	Navigate to Project Directory using cd is performed		
	The project is opened in vs code		
	Run the Development Server using **npm run serve** or **yarn serve** is performed		
	Vue Project output is accessed in web browser		
	Attractive Welcome world is Displayed		
	Unnecessary links have been removed by accessing **app.vue** and **helloworld.vue**		

Learning outcome 1 end assessment

Theoretical assessment

1. Which term refers to the client-side of a web application, which is what the users interact with directly in their web browsers, while _____ are responsible for creating an engaging and user-friendly experience?

A. **Frontend**

B. Backend

C. Middleware

D. Fullstack

2. Select the best term that define single page application (SPA):

A. **A web application that loads a single HTML page and dynamically updates it as the user interacts with the app**

B. An application that requires multiple HTML pages to function

C. An application that only works offline

D. An application that runs only on mobile devices

3. Which commands can be used to check the version of Node.js and npm installed on your computer?

A. **node -v**

B. npm -version

C. **npm -v**

D. node -version

4. How can you install Vue.js in your project?

A. **npm install vue**

B. npm add vue

C. npm create vue

D. npm vue install

5. Which of the following are necessary steps to run a simple JavaScript program that can add up two numbers using Node.js?

A. Write the JavaScript code

B. Save the file with a .js extension

C. Open the terminal and navigate to the directory containing the file

D. Run the command node filename.js

E. **All of the above**

6. Suppose that you are a developer, nd you want to create a game project with the name "snake game." Which command can be used to create the desired project?

A. npm create snake-game

B. npm init snake-game

C. **vue create snake-game**

D. create-react-app snake-game

7. CLI stands for:

a) Command Line Interface

b) Computer Learning Interface

c) Client-Side Interface

d) Client-Side Logic

8. Which of the following is NOT a common feature of an IDE?

a) Code editor

b) Build tools

c) Debugging capabilities

d) Web browser

9. The frontend of a web application primarily deals with:

a) Server-side logic

b) Database interactions

c) User interface and presentation

d) Network communication

10. In a Single Page Application (SPA)

a) **The entire application runs on a single HTML page.**

b) Multiple HTML pages are loaded for each user action.

c) The server handles all the rendering.

d) The user experience is static.

11. Vue.js is primarily a:

a) Backend framework

b) Frontend framework

c) Database management system

d) Programming language

12. Match the following files and folders typically included in a Vue.js project with their descriptions:

a. src

b. components

c. node_modules

d. App.vue

e. package.json

f. .gitignore

i. Contains metadata about the project and dependencies

ii. Stores reusable Vue components

iii. Main folder for source code

iv. Entry point component of a Vue.js application

v. Ignored files and directories for version control

vi. Installed packages and dependencies

Answer:

a.iii

b.ii

c.vi

d.iv

e.i

f.v

13.Respond by True or False to the followings:

a) A framework provides a structured and reusable foundation for building applications.

b) The cd command is used to create a new directory in the Command Prompt.

c) IDEs typically include a code editor, build tools, and debugging capabilities.

d) The Vue.js framework is primarily used for backend development.

e) Single Page Applications (SPAs) require page reloads for every user action.

f) The virtual DOM is a real-time representation of the browser's DOM.

g) Vue.js follows a component-based architecture.

h) The del command is used to list files and directories in the Command Prompt.

i) A dependency in Vue.js refers to an external library or module required by your project.

j) The mkdir command is used to change the current directory in the Command Prompt.

Answers to True or False

a) **True.** A framework provides a structured and reusable foundation for building applications.

b) **False.** The cd command is used to change the current directory, not create a new one.

c) **True.** IDEs typically include a code editor, build tools, and debugging capabilities.

d) **False.** The Vue.js framework is primarily used for frontend development.

e) **False.** Single Page Applications (SPAs) do not require page reloads for every user action.

f) **False.** The virtual DOM is an in-memory representation of the browser's DOM.

g) **True.** Vue.js follows a component-based architecture.

h) **False.** The del command is used to delete files.

i) **True.** A dependency in Vue.js refers to an external library or module required by your project.

j) **False.** The mkdir command is used to create a new directory.

Practical assessment

XYZ Rwandan museum is a museum located in Musanze district, Muhoza sector, they have a campaign directed toward educating children about historical figures and their contribution to our history.
In the beginning this campaign was conducted via historians in the museum explaining the children about those historical figures, but this method was ineffective since children would get bored and stop paying attention.
As developer, you have been assigned a task to create a **game project** folder by using vue framework that will be used while developing the system that will help them display "**welcome to Rwanda Museum** ''on the main interface that can attract users.
The needed tools, materials and equipment have been provided by company.

Checklist:

Elements	**Indicators**	**Observation**	
		Yes	**No**
Tools are appropriately configured	nodejs is installed		
	Vs code is installed		
Project folder are properly created	The project is created		
	Message have been displayed on browser		
	The provided image has been inserted		
Decision			

Further information to the trainer

Shavin, M. (2024). Learning Vue. O'Reilly Media.

Lynch, A., & Murray, S. (2018). Fullstack Vue: The Complete Guide to Vue.js. Fullstack.io.

Hufkens, S. (2021). Getting to Know Vue.js: Learn to Build Single Page Applications in Vue from Scratch. Apress.

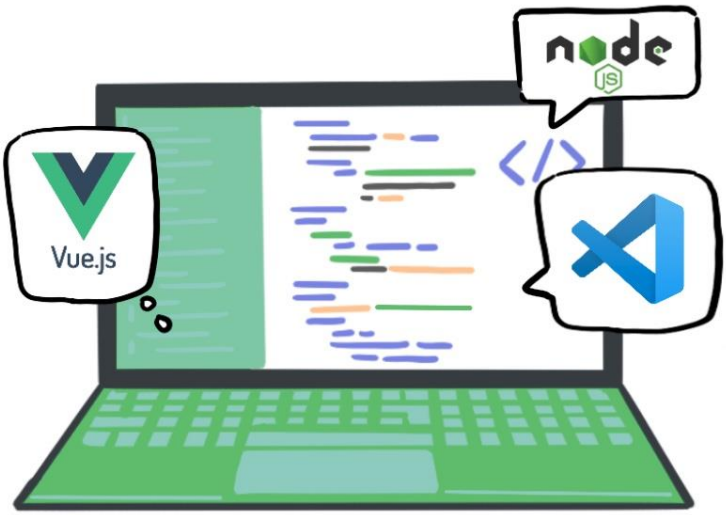
Bemmerl, H. (2021). Vue.js 3 Cookbook: Discover actionable solutions for building modern web apps with the latest Vue features. Packt Publishing.

Vue.js. (n.d.). Vue CLI [Computer software]. GitHub. Retrieved March 14, 2022, from https://github.com/vuejs/vue-cli

Vue.js. (n.d.). *Vue CLI*. Retrieved March 14, 2022, from https://cli.vuejs.org/

Vue.js Forum. (n.d.). Vue.js Community Forum. Retrieved March 14, 2022, from https://forum.vuejs.org/

Vue.js. (n.d.). Installation guide. Retrieved March 14, 2022, from https://vuejs.org/v2/guide/installation.html


node
JS
Vue.js

Indicative contents
2.1 Create folder structure **2.2 Apply Vue component structure** **2.3 Apply navigation in Vue project using router** **2.4 Data manipulation in Vue** **2.5 API requests** **2.6 Manage data using state management**

Key Competencies for Learning Outcome 2: Apply Vue Framework

Knowledge	Skills	Attitudes
• Description of the term API request • Description of elements that make up a form • Description of the term state management	• Creating folder structure • Creating Vue components • Using Vue components • Using form in Vue • Applying navigation in Vue project using router • Managing data using state management	• Having Team work spirit • Being critical thinker • Being Innovative • Being attentive. • Being creative • Being Problem solver • Being Practical oriented

Duration: 30 hrs

Learning outcome 2 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe clearly the term API request in accordance with user stories
2. Describe properly elements that make up a form based on user story
3. Describe properly the term state management in accordance with user stories
4. Create correctly routes in line with project pages
5. Develop correctly reusable components in accordance with HTML elements
6. Handle properly form data based on user requirements
7. Validate correctly form data based on user requirements
8. Develop correctly features in accordance with user requirements
9. Make correctly API requests in accordance with system requirements

 **Resources**

Equipment	**Tools**	**Materials**
• Computer	• Text Editor (vscode) • Nodejs • Vue framework	• Internet

 **Advance Preparation:**

Before delivering this learning outcome, you are recommended to:

- Avail Computers and internet connection.
- Avail computer with installed Nodejs and vscode.
- Prepare Videos to be used as didactic materials.

Indicative content 2.1: Create Folder structure

Duration:3 hrs

Theoretical Activity 2.1.1: Description of key concepts

Notes to the trainer:

- While delivering this content, a small group can be used for describing key concepts used to apply Vue framework.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step1: Engage trainees in group formulation

Step2: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about the following terms used in Vue framework?

a) Components
b) Vue lifecycle
c) Routes
d) State management
e) API Endpoint
f) . env file

Step3: Ask trainees to present their findings to the whole class.

Step4: Provides expert view and clarifies ideas by using didactic materials.

Step5: Address any questions or concerns.

Step6: Ask them to read the Key readings 2.1.1 in their manuals.

Points to Remember

- There are key concepts used to apply the Vue framework that developers should understand to form the foundation of Vue development. Here are key concepts used

to apply the Vue framework: Components, Routes, Vue lifecycle, State management, API Endpoint, .env file.

Practical Activity 2.1.2: Create folder structure in VueJS project

Notes to the trainer

- This activity should take place in the computer lab where trainees should create Components folder, Router folder, Store folder, Views folder.
- While delivering this content, you are required to:
    - Avail text editor or integrated development environment (IDE) such as vs code
    - Avail computer with installed Node.js and npm (Node Package Manager)
    - Avail created Vue js project to be used

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a software developer, you are asked to go to the computer lab to create folder structure

Step 2: Explain the task and provide clear work instruction

Step 3: Demonstrate how to create folder structure. While demonstrating, explain the steps to create folder structure.

Step 4: Asks trainees to create project structure and monitor the procedures.

Step 5: Verify whether Assets folder, Source code folder, Components, Router folder, Store folder, Views folder and Mixins folder are clearly created.

Step 6: Ask trainees to read key reading 2.1.2.

Points to Remember

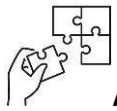
- Creating a well-organized folder structure is essential for maintaining and scaling a Vue.js project effectively.

Here are the steps to create a typical folder structure in a Vue.js project:

1. Initialize a Vue project

2. Navigate to your project directory

3. Create a structured folder layout



Application of learning 2.1.

You have been assigned task to create a project called **Vue-project** and within that project, there is a folder called src, as a developer in the company you are requested to create the following folders (Router, Store, Views and Mixins) and those folders will be used to save other project files.

Checklist:

Elements	**Indicators**	**Observation**	
		Yes	**No**
Folder structure in VueJS project is well created	Vue Project has been created		
	Router folder is created		
	Store Folder is created		
	Views folder is created		
	Mixins folder have been created		

Indicative content 2.2: Apply Vue Component Structure

Duration: 3 hrs

Theoretical Activity 2.2.1: Description of components in VueJS framework

Notes to the trainer:

- While delivering this content, a small group can be used for describing components in Vue framework.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step1: Engage trainees in group formulation

Step2: Introduce the activity and request trainees to respond to the following questions:

I. What are the key differences between CSS, HTML, and JavaScript?"
II. What do you understand about component?
III. What are the main parts that make up a component inVue.js?
IV. What are the benefits of using components in Vue.js?

Step3: Ask trainees to present their findings to the whole class.

Step4: Provides expert view and clarifies ideas by using didactic materials.

Step5: Address any questions or concerns.

Step6: Ask trainees to read the key reading 2.2.1 in the trainee manual.

Points to Remember

- In Vue.js, components are the building blocks of a Vue application, allowing developers to encapsulate and reuse UI elements and functionality. There are three main parts of a Vue component include: Template, Script, Style.

Theoretical Activity 2.2.2: Description of CSS framework

Notes to the trainer:

- While delivering this content, a small group can be used for describing CSS framework
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about the term CSS and CSS framework?
II. What are some examples of CSS frameworks?
III. What are the Benefits of using CSS frameworks?

Step 2: Asks any learner to write answers provided on flipchart/paper.

Step 3: Asks trainees to discuss the provided answer and choose correct answers.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 2.2.2 in the trainee manual.

Points to Remember

There are various CSS frameworks available to assist developers in creating responsive and visually appealing web designs efficiently. Some popular examples of CSS frameworks include Bootstrap, Foundation, Bulma, Tailwind CSS, Materialize CSS, Semantic UI, and UIKit.

Theoretical Activity 2.2.3: Description of reusable components and bootstrap in Vue JS framework

Notes to the trainer:

- While delivering this content, a small group can be used for describing reusable components and bootstrap in Vue JS framework.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about Bootstrap?
II. What are reusable components and how do they benefit the development process?

Step 2: Asks any learner to write answers provided on flipchart/paper.

Step 3: Asks trainees to discuss the provided answer and choose correct answers.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 2.2.3 in the trainee manual.

Points to Remember

In Vue.js, reusable components are a fundamental concept that allows developers to create modular, self-contained elements that can be easily reused across different parts of a Vue application. By leveraging reusable components in Vue.js, developers can achieve several benefits, including Code Reusability, Modularity and Maintainability, Consistency and Standardization, Scalability.

Practical Activity 2.2.4: Create reusable component in components folder

Notes to the trainer

- This activity should be performed in a computer lab where trainees should use VSCode to create reusable components in VueJS Framework in components folder, assign codes to created reusable components and import the created reusable component in other components like app.vue.
- While delivering this content, you are required to:
  - Avail text editor or integrated development environment (IDE)
  - Avail computer with installed Node.js and npm (Node Package Manager)
  - Avail a sample Vue js project to be used

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a Software developer, you are asked to go into the computer lab to create reusable component in components folder.

Step2: Demonstrate how you can create reusable component in components folder while demonstrating, explain the steps to follow.

Step 3: Asks trainees to create reusable component in components folder and monitor the procedures.

Step 4: Verify whether a reusable component creation, assign code to created component and import it in app.vue file is properly performed.

Step 5: Ask trainees to read key reading 2.2.4.

Points to Remember

- To create a reusable component in the Vue.js framework and organize it within the components folder, you can follow these steps:

    1. Define the Component:
    2. Customize the Component
    3. Export and Use the Component
    4. Save the component file
    5. Use the Component in Other Files
    6. Use the component within the template section of the file

Practical Activity 2.2.5: Apply Bootstrap to Vue components

Notes to the trainer

- This activity should be performed in a computer lab where trainees should install bootstrap in VueJS, import bootstrap in the main project file and Vue components and use bootstrap classes in HTML Templates, Utilize Bootstrap Components.
- While delivering this content, you are required to:

- Avail text editor or integrated development environment (IDE)
- Avail computer with installed Node.js and npm (Node Package Manager)
- Avail a sample Vue js project created on practical activity 2.2.4 to be used

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a software developer, you are asked to go to the computer lab, to apply bootstrap to Vue components in created project on practical activity 2.2.4.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to apply the bootstrap to Vue components. While demonstrating, explain the steps to apply bootstrap to the Vue component.

Step 4: Asks trainees to apply bootstrap to Vue components and monitor the procedures.

Step 5: Verify whether bootstrap importation, bootstrap in Vue JS installation, Bootstrap Components Utilization used in bootstrap Vue components are clearly performed.

Step 6: Ask trainees to read key reading 2.2.5.

Points to Remember

- To apply Bootstrap to Vue components, you can follow these steps:

1. Install Bootstrap
2. Import Bootstrap in Vue components
3. Use Bootstrap classes in HTML templates
4. Utilize Bootstrap components

Practical Activity 2.2.6: Reuse components in multiple places

Notes to the trainer

- This activity should take place in a computer lab, where trainees should create components in VueJS Framework in components folder, create another component

and import the created reusable component in other components like app.vue and any other created component.

- While delivering this content, you are required to:
  - Avail text editor or integrated development environment (IDE)
  - Avail computer with installed Node.js and npm (Node Package Manager)
  - Avail computer connected to the internet.
  - Use project developed on practical activity 2.2.5 for support

Key steps:

While delivering this activity, pass through the following steps:

Step1: Introduce the topic and ask trainees do the task described below:

As a Software developer, you are asked to go to the computer lab to create components in Vue JS Framework in components folder and use the created component in other components like app.vue and others.

Step2: Provide instructions that will be followed

Step3: Demonstrate how you can create components in Vue JS Framework in components folder.

Step 4: Asks trainees to create components in Vue JS Framework in components folder and monitor the procedures.

Step 5: Verify whether the components are clearly reused in many places.

Step3: Ask trainees to read key reading 2.2.6.

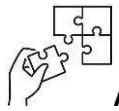
Points to Remember

- Let's say you are building a web application that requires a consistent header component across multiple pages. Instead of duplicating the header code in each page, you can create a reusable header component and include it wherever needed.

  Here's how it can be done:

  1. Identify the header component
  2. Extract the header component
  3. Generalize the component
  4. Create a component library

5. Document the component usage
6. Test and validate the component
7. Integrate the component into pages
8. Maintain and update the component



Application of learning 2.2.

You have given task of building a web application that requires a consistent header component across multiple pages. As developer who has skills in Vue.JS framework and Bootstrap as CSS framework, create a header component in components folder and include it in other pages like Home.vue, About us.vue and Contacts.vue.

Checklist:

Elements	**Indicators**	**Observation**	
		Yes	**No**
Reusable component in components folder is well created	Component is defined		
	Component is customized		
	Component is exported and Used		
	Component file is saved		
	Component is used in other files		
Bootstrap to Vue components are well Applied	Bootstrap is installed		
	Bootstrap in Vue Components is imported		
	Bootstrap Classes in HTML templates are used		
	Bootstrap components are utilized		
Components in multiple places are well reused	Header component is identified		
	Header component is extracted		
	Component is generalized		
	Component library is created		
	Component usage is documented		
	Component is tested and validated		
	Component into pages is integrated		
	Component is maintained and updated		

Indicative content 2.3: Apply Navigation in Vue Project Using Router

Duration: 5 hrs

Theoretical Activity 2.3.1: Description of Router and route in Vue framework

Notes to the trainer:

- While delivering this content, a small group can be used for describing Router and route in Vue framework.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to respond to the following questions:

I. What are the differences between Vue's route and router?
II. What are the key concepts and features associated with Vue Router?

Step 2: Asks trainees to write answers provided on flipchart/paper.

Step 3: Asks trainees to discuss the provided answer and choose correct answers.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 2.3.1 in the trainee manual.

Points to Remember

- There are differences between Vue's route and router where Vue Router is the routing library used in Vue.js applications to manage navigation and routing logic, while a route is a specific configuration that maps a URL path to a component within the application.

Theoretical Activity 2.3.2: Description of declarative navigation

Notes to the trainer:

- While delivering this content, a small group can be used for describing declarative navigation.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step1: Engage trainees in group formulation

Step2: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about declarative navigation in Vue framework?
II. What are the advantages of using declarative navigation in Vue.js applications?
III. Provide examples of implementing navigation in the Vue framework

Step3: Ask trainees to present their findings to the whole class.

Step4: Provides expert view and clarifies ideas by using didactic materials.

Step5: Address any questions or concerns.

Step6: Ask them to read the Key readings 2.3.2 in their manuals.

Points to Remember

- Declarative navigation in Vue.js allows developers to define routing and navigation logic in a straightforward and intuitive manner using template directives and components. Here are some examples of declarative navigation in Vue: Router Links, Dynamic route parameters, Programmatic navigation with methods.

Theoretical Activity 2.3.3: Description of the parameters used inside the router

Notes to the trainer:

- While delivering this content, a small group can be used for describing parameters used inside the router.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step1: Engage trainees in group formulation

Step2: Introduce the activity and request trainees to respond to the following questions:

I. Explain the concept of 'Router' in Vue.js.

Step3: Ask trainees to present their findings to the whole class.

Step4: Provides expert view and clarifies ideas by using didactic materials.

Step5: Address any questions or concerns.

Step6: Ask them to read the Key readings 2.3.3 in their manuals.

Points to Remember

- In the Vue Router, various parameters can be used to configure and customize the behavior of routes. These parameters allow you to pass dynamic values, query parameters, and apply route-specific guards.

Practical Activity 2.3.4: Install router and create router instance

Notes to the trainer

- This activity should take place in a computer lab where trainees should install Router in Vue JS. creating Vue router instance in the created Vue router package.
- While delivering this content, you are required to:
  - ✓ Avail text editor or integrated development environment (IDE)
  - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
  - ✓ Avail computer connected to the internet.
  - ✓ Avail sample vue js project developed on previous practical activity to be used.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a software developer, you are asked to go to the computer lab to install Router in Vue JS and create a Vue router instance in the created Vue router package.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can install a Router in Vue JS and create a Vue router instance in the created Vue router package, while demonstrating explain the steps to be followed.

Step 4: Asks trainees to install a Router in Vue JS and create a Vue router instance in the created Vue router package and monitor the procedures.

Step 5: Verify whether the installation of a Router in Vue JS and creation of a Vue router instance in the created Vue router package are performed.

Step 6: Ask trainees to read key reading 2.3.4

Points to Remember

- To install the Vue Router and create a router instance in the Vue.js framework, you'll need to follow these steps:

    1. Install the Vue Router package
    2. Create a router instance
    3. Import your Vue components that will be used as routes.
    4. Use the Vue Router plugin
    5. Create an array of route objects, where each object represents a route with a corresponding path and component.
    6. Create a new instance of Vue Router by passing the routes array to the constructor and assign it to a variable.
    7. Create a new Vue instance and pass the router instance as an option
    8. Save the changes to the main project file.

Practical Activity 2.3.5: Importing component into router instance

Notes to the trainer

- This activity should take place in a computer lab where trainees should Import the components, Use the components in the router configuration and use the router instance in your Vue app.
- While delivering this content, you are required to:
  - ✓ Avail text editor or integrated development environment (IDE)
  - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
  - ✓ Avail computer connected to the internet.
  - ✓ Avail sample project developed on practical activity 2.3.4

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a software developer, you are asked to go to the computer lab to import the components into router instance.

Step 2: Explain the task and provide clear work instruction.

Step 4: Demonstrate how you can Import the components into the router instance. While demonstrating explain the steps to follow.

Step 5: Ask trainees to Import the components into router instance and monitor the procedures.

Step 6: Verify whether Importation of the components, Using the components in the router configuration and Using the router instance in your Vue app are properly performed.

Step 4: Ask trainees to read key reading 2.3.5.

Points to Remember

- To import component in Vue Router instance, you need to follow these steps:

    1. Import the components
    2. Use the components in the router configuration
    3. Use the router instance in your Vue app

Practical Activity 2.3.6: Passing router into Vue instance

Notes to the trainer

- This activity will take place in a computer lab where trainees should import required modules, import and configure the routes, create the Vue app and set up the template to display/use the router views.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE)
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
    - ✓ Avail computer connected to the internet.
    - ✓ Avail sample project developed on practical activity 2.3.5

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As software developer, you are asked to go to the computer lab to pass router into Vue instance.

Step 2: Demonstrate how you can pass router into Vue instance while demonstrating explain the steps to follow.

Step 3: Ask trainees to pass router into Vue instance and monitor the procedures.

Step 4: Verify whether required modules importation, importation and configuration of the routes, creation of the Vue app and setting up of the template to display/use the router views are properly performed.

Step 5: Ask trainees to read key reading 2.3.6.

Points to Remember

- To pass the Vue Router instance into the Vue app, you need to follow these steps:

    1. Import the required modules
    2. Import and configure the routes
    3. Create the Vue app
    4. Set up the template to use the router views

Practical Activity 2.3.7: Create navbar reusable component

Notes to the trainer

- This activity should take place in a computer lab where trainees should create a reusable navigation bar (navbar) component in Vue.js, Import and use the Navbar component, Customize the navbar styling and behavior.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE)
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
    - ✓ Avail computer connected to the internet.
    - ✓ Sample project developed on practical activity 2.3.6

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a software developer, you are asked to go to the computer lab to create a reusable navigation bar (navbar) component in Vue.js.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can create a reusable navigation bar (navbar) while demonstrating, explain the steps followed.

Step 4: Ask trainees to create a reusable navigation bar (navbar) component in Vue.js and monitor the procedure.

Step 5: Verify whether to create a reusable navigation bar (navbar) component in Vue.js, Import and use the Navbar component, Customize the navbar styling and behavior are properly performed.

Step 6: Ask trainees to read key reading 2.3.7.

Points to Remember

- To create a reusable navigation bar (navbar) component in Vue.js, you can follow these steps:

    1. Create a new Vue component file
    2. Define the Navbar component
    3. Import and use the Navbar component
    4. Customize the navbar styling and behavior

Practical Activity 2.3.8: Using nested routes

Notes to the trainer

- This activity should take place in a computer lab where trainees should Set up the parent route, Create the child components and use the nested routes in your application.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE)
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
    - ✓ Avail computer connected to the internet.
    - ✓ Avail sample project developed on practical activity 2.3.7

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a software developer, you are asked to go to the computer lab to use the nested routes in your application.

Step 2: Explain the task and provide clear work instruction.

Step 3: Ask trainees to read key reading 2.3.8

Step 4: Demonstrate how you can use the nested routes in your application while demonstrating explain the steps to use nested routes.

Step 5: Ask trainees to use the nested routes in your application and monitor the procedure.

Step 6: Verify whether the parent route, child components used in the nested routes in your application have been used.

Points to Remember

- To use nested routes in Vue.js, you can follow these steps:

    1. Set up the parent route
    2. Create the parent component
    3. Create the child components
    4. Use the nested routes in your application

Practical Activity 2.3.9: Using dynamic router

Notes to the trainer

- This activity should take place in a computer lab where trainees should set up the dynamic route in the router configuration, to create the dynamic component and use the created dynamic route in existing applications.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE)
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)

- ✓ Avail computer connected to the internet.
- ✓ Sample project to be used

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a software developer, you are asked to go to the computer lab to use the dynamic router.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can use the dynamic router, while demonstrating explain the steps to follow.

Step 4: Ask trainees to use the dynamic router and monitor the procedure.

Step 5: Verify whether to set up dynamic route in the router configuration, creation of dynamic component used in dynamic router are clearly performed.

Step 6: Ask trainees to read key reading 2.3.9.

Points to Remember

- To use dynamic routing in Vue.js, you can follow these steps:

1. Set up the dynamic route in the router configuration
2. Create the dynamic component
3. Use the dynamic route in your application

Theoretical Activity 2.3.10: Description of 404 page

Notes to the trainer:

- While delivering this content, a small group can be used for describing 404 page.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation

Step 2: Introduce the activity by asking trainees to:

I. What do you understand about 404 page?
II. List and explain the advantages of the 404 page.

Step 3: Ask trainees to present their findings to the whole class.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask them to read the Key readings 2.3.10 in their manuals.

Points to Remember

- A 404 page in a web application offers several advantages that contribute to a positive user experience and overall website performance.
- There are the advantages of implementing a 404 page like: Improved user experience, branding opportunity, Reducing bounce rate.

Practical Activity 2.3.11: Create 404 Page

Notes to the trainer

- This activity should take place in a computer lab where trainees should create a 404-page component.
- While delivering this content, you are required to:
  - ✓ Avail text editor or integrated development environment (IDE)
  - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
  - ✓ Avail computer connected to the internet.
  - ✓ Sample vue js project to be used

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:

As a software developer, you are asked to the computer lab to create a 404-page component.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to create a 404-page component, while demonstrating explain the steps to create a 404 page.

Step 4: Ask trainees to create 404 page and monitor the procedure.

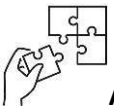
Step 5: Verify whether the Set up the catch-all route, Customization the behavior and appearance used in 404-page component are clearly performed.

Step 6: Ask trainees to read key reading 2.3.11.

Points to Remember

- How to create a custom 404 page in a Vue.js application:

1. Create a 404 component
2. Set up the catch-all route
3. Customize the behavior and appearance



Application of learning 2.3.

BG Tech is a company that develop websites, as software developer you have been given task for creating a Vue.js application with routing, a navigation bar, nested routes, dynamic routes, and a custom 404 page.

The website has to contain the following components:

- ✓ Home.vue
- ✓ About.vue
- ✓ Contact.vue
- ✓ Registration.vue
- ✓ Login.vue
- ✓ Profile.vue
- ✓ Dashboard.vue
- ✓ Overview.vue

- ✓ Settings.vue
- ✓ Reports.vue
- ✓ NotFound.vue

Checklist:

Elements	Indicators	Observation	
		Yes	No
Router and create router instance are well installed	Vue Router package is installed		
	Router instance is created		
	Vue components that will be used as routes are imported		
	Vue Router plugin is used		
Component into router instance is well imported	Components are imported		
	Components in the router configuration are used		
	Router instance in your Vue app is used		
Router into Vue instance is well passed	Required modules are imported		
	Configure the routes have been done		
	Vue app have been created		
	Set up the template to use the router views have been performed		
Navbar reusable component is well created	The navbar component have been created		
	Navbar component have been defined		
	Import and use the Navbar component have been done		
	navbar styling and behavior have been customized		
404 Page is well created	404 component have been created		
	Set up the catch-all route have been done		
	behavior and appearance have been customized		

Indicative content 2.4: Data Manipulation in Vue

Duration:8 hrs

Theoretical Activity 2.4.1: Description of Vue lifecycle

Notes to the trainer:

- While delivering this content, a small group can be used for describing Vue lifecycle.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation

Step 2: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about vue life cycle?
II. List the main lifecycle hooks available in Vue.js 2.x
III. Discuss the main lifecycle hooks available in Vue.js 2.x

Step3: Ask trainees to present their findings to the whole class.

Step4: Provides expert view and clarifies ideas by using didactic materials.

Step5: Address any questions or concerns.

Step6: Ask them to read the Key readings 2.4.1 in their manuals.

Points to Remember

- In Vue.js 2.x, there are several main lifecycle hooks that allow developers to manage the lifecycle of Vue components effectively. Like before Create, created, before Mount and mounted.

Theoretical Activity 2.4.2: Introduction to JSON data

Notes to the trainer:

- While delivering this content, a small group can be used for introducing JSON data.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to respond to the following questions:

I. Describe JSON
II. Describe API data
III. What do you understand about component props, state management, and application configuration?

Step 2: Asks any learner to write answers provided on flipchart/paper.

Step 3: Asks trainees to discuss the provided answer and choose correct answers.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 2.4.2 in the trainee manual.

Points to Remember

- JSON data in Vue.js can be utilized in various scenarios to enhance data handling and application functionality. There are various scenarios where JSON data can be used in Vue.js, such as: API Data, Component Props, State Management, Configuration.

Practical Activity 2.4.3: Import necessary packages & components

Notes to the trainer

- This activity should take place in a computer lab where trainees should install necessary packages, import the necessary packages and use them in app.vue.
- While delivering this content, you are required to:
  - ✓ Avail text editor or integrated development environment (IDE)
  - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
  - ✓ Avail computer connected to the internet.
  - ✓ Avail sample project to be used

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to import necessary packages & components.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can Import the required packages and components while demonstrating explain the steps to import required packages & components

Step 4: Ask trainees to Import the required packages and components and monitor the procedures

Step 5: Verify whether the required packages and components are clearly imported.

Step 6: Ask trainees to read key reading 2.4.3.

Points to Remember

To import necessary packages and components in a Vue.js application, you can follow these steps:

1. Set up Node.js and npm
2. Create a new project or navigate to an existing project
3. Initialize the project (if starting a new project)
4. Install required packages

5. Use the installed package in your code
6. Start using the package

Practical Activity 2.4.4: Apply Vue lifecycle methods

Notes to the trainer

- This activity should take place in a computer lab where trainees should apply the following vue lifecycle methods, beforeCreate method, created method, mounted method, beforeUpdate method, updated method, beforeDestroy method and destroyed method.
- While delivering this content, you are required to:
  - ✓ Avail text editor or integrated development environment (IDE)
  - ✓ Avail computer installed with Node.js and npm (Node Package Manager
  - ✓ Avail computer connected to the internet.
  - ✓ Sample project to be used

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to apply vue lifecycle methods.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can apply vue lifecycle methods while demonstrating explain the steps to apply Vue lifecycle method.

Step 4: Ask trainees to apply Vue lifecycle method and monitor the procedures.

Step 5: Verify whether Vue lifecycle methods are clearly applied.

Step 6: Ask trainees to read key reading 2.4.4.

Points to Remember

- To apply Vue lifecycle methods in a Vue.js application, follow these steps:

    1. Understanding Vue Lifecycle Methods
    2. Implement Lifecycle Methods in Vue Components
    3. Use Lifecycle Methods for Data Initialization
    4. Handle DOM Manipulation in Lifecycle Hooks
    5. Clean Up Resources in Lifecycle Hooks
    6. Test and Debug

Practical Activity 2.4.5: Using Vue layout components

Notes to the trainer

- This activity should take place in a computer lab where trainees should install vue JS, set up Vue JS project, create new vue component for layout, use created layout component in a parent component and check if they have main Vue instance configured to render the `Home` component or any other components as needed.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE)
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
    - ✓ Avail computer connected to the internet.
    - ✓ Avail sample project to be used

Key steps:

While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees do the task described below: As a software developer, you are asked to go to the computer lab to use Vue layout components.
Step 2:	Explain the task and provide clear work instruction
Step 3:	Demonstrate how to use Vue layout components while demonstrating, explain the steps to use Vue layout components.
Step 4:	Ask the trainees to use Vue layout components and monitor the procedures.
Step 5:	Verify whether Vue layout components are clearly used.

Step 6: Ask the trainees to read key readings 2.4.5

Points to Remember

- To use Vue layout components in your Vue.js application, you can follow these steps:
    1. Install Vue CLI (if not already installed)
    2. Create a Vue.js Project
    3. Navigate to Project Directory
    4. Install Vue Router (if needed)
    5. Install Vue Layout Components Library
    6. Import Layout Components
    7. Use Layout Components in Vue Templates
    8. Customize Layout Components
    9. Run the Vue.js Application

Practical Activity 2.4.6: Create form in Vue component

Notes to the trainer

- This activity will be carried out in the computer lab where trainees will be asked to create form inputs, input binding, validate form inputs and submit form data.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE)
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
    - ✓ Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to create form in Vue components.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can create form in Vue component while demonstrating, explain the steps to create a form in Vue component.

Step 4: Ask trainees to create form in Vue components and monitor the procedures.

Step 5: Verify whether the form inputs, input binding, validate form inputs and submit form data used to create form in vue component are clearly performed.

Step 6: Ask trainees to read key reading 2.4.6.

Points to Remember

- To create a form in Vue.js, you can follow these steps:

    1. Set up a Vue.js project
    2. Create a Vue component
    3. Define the form template
    4. Define the form data and methods
    5. Register and use the component
    6. Style the form (optional)
    7. Run the Vue.js application

Practical Activity 2.4.7: Display JSON data in a table

Notes to the trainer

- This activity should take place in a computer lab where trainees will be involved in parsing the JSON data, Identify the table structure, use html to create the table structure, generate table rows dynamically append the table to the document and apply CSS styles to the table to enhance its appearance or match the overall design of your application.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE)
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
    - ✓ Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to display JSON data in a table.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can display JSON data in a table while demonstrating, explain the steps to display JSON data in a table.

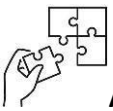
Step 4: Ask trainees to display JSON data in a table and monitor the procedures

Step 5: Verify whether the parse on JSON data, the table structure, html to create the table structure, table rows dynamically, the table to the document used to display JSON data in a table are clearly performed.

Step 6: Ask the trainees to read key readings 2.4.7

Points to Remember

- To display JSON data in a table, you can follow these steps:
    1. Parse the JSON data
    2. Identify the table structure
    3. Create the HTML table structure
    4. Style the table



Application of learning 2.4.

As software developer you have been tasked to create a Vue.js application that fetches JSON data, displays the data in a table, and includes a form to add new data to the table. This project will help your school to manage student's data including: Names, Address, Email, Phone number and DOB.

Your project has to include Vue.js lifecycle hooks, handling JSON data, and input binding.

Checklist:

Elements	Indicators	Observation	
		Yes	No
Necessary packages and components are well imported	Required packages are installed		
	Installed package in your code is used		

Vue lifecycle methods are well applied	Lifecycle Methods in Vue Components are implemented		
	Lifecycle Methods for Data Initialization are used		
	DOM Manipulation in Lifecycle Hooks are handled		
	Resources in Lifecycle Hooks are cleaned		
	Test and Debug are performed		
Vue layout components are well used	Vue Layout Components Library are installed		
	Layout Components are imported		
	Layout Components in Vue Templates are used		
	Layout Components are customized		
	Vue.js Application is run		
Form in Vue.js is well created	Form Vue component is created		
	Form template is defined		
	Form data and methods are defined		
	Register and use the component are registered and used		
	Form is styled		
JSON data in a table are well displayed	JSON data are parsed		
	Table structure is identified		
	HTML table structure is created		
	Table is styled		

Indicative content 2.5: API Request

Duration : 6 hrs

Theoretical Activity 2.5.1: Introduction to API Request

Notes to the trainer:

- While delivering this content, a small group can be used for describing API.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation

Step 2: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about the term API?
II. What are the different types of API and how do they differ from each other?
III. Describe key aspects or components of APIs.
IV. What are main benefits of using APIs in your application?

Step 3: Ask trainees to present their findings to the whole class.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask them to read the Key readings 2.5.1 in their manuals

Points to Remember

- There are different types of APIs commonly used in software development such as Web APIs, Library APIs, Operating System APIs, Database APIs.

Theoretical Activity 2.5.2: Description of Axios

Notes to the trainer:

- While delivering this content, a small group can be used for describing axios.

- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation
Step 2: Introduce the activity and request trainees to respond to the following questions:
I. What do you understand about the term Axios?
II. What are the advantages of using Axios?
III. What are the key features of Axios?
Step 3: Ask trainees to present their findings to the whole class.
Step 4: Provides expert view and clarifies ideas by using didactic materials.
Step 5: Address any questions or concerns.
Step 6: Ask them to read the Key readings 2.5.2 in their manuals.

Points to Remember

- Axios is a popular JavaScript library used for making HTTP requests from the browser or Node.js. There are the key features of Axios like: Promise-based, Interceptors, Browser and Node.js support, Automatic JSON data transformation.

Theoretical Activity 2.5.3: Description of CRUD operation

Notes to the trainer:

- While delivering this content, a small group can be used for describing CRUD operation.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation
Step 2: Introduce the activity and request trainees to respond to the following questions:
I. What do you understand about CRUD operation?

II. Explain the usage of Create, Retrieve, Update, and Delete operations (CRUD)

Step 3: Ask trainees to present their findings to the whole class.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask them to read the Key readings 2.5.3 in their manuals.

Points to Remember

- The CRUD acronym stands for Create, Read, Update, and Delete, which are the four basic functions that can be performed on a database or data storage system.

Practical Activity 2.5.4: Install Axios file.

Notes to the trainer

- This activity should take place in a computer lab where trainees should Install Axios file, Create API helper file, Import Axios, Configure Axios and create helper functions.
- While delivering this content, you are required to:
  - ✓ Avail text editor or integrated development environment (IDE)
  - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
  - ✓ Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to Install Axios file and configure in API helper file.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can Install Axios and configure in API helper file.

Step 4: Ask trainees to Install Axios, configure in API helper file and monitor the procedures.

Step 5: Verify whether the Axios is installation, API helper file creation, Axios importation, Axios configuration and helper functions are clearly performed.

Step 6: Ask trainees to read key reading 2.5.4.

Points to Remember

- To install and configure Axios in an API helper file, you can follow these steps:
    1. Install Axios
    2. Create an API Helper file
    3. Import Axios
    4. Configure Axios

Practical Activity 2.5.5: Creating JSON file

Notes to the trainer

- This activity should take place in a computer lab where trainees should create JSON files in an existing Vue Project folder, Read the JSON files and Display JSON data in the table.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE)
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
    - ✓ Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to the computer lab to Create JSON files in an existing Vue Project folder.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can create JSON files in an existing Vue Project folder while demonstrating explain the steps to create JSON files.

Step 4: Ask trainees to create JSON files in an existing Vue Project folder and monitor the procedures

Step 5: Verify whether a JSON file is created in an existing Vue Project folder, read the JSON files and display JSON data in the table are properly performed.

Step 6: Ask trainees to read key reading 2.5.5.

Points to Remember

- To create a JSON file and display its data in a table, you can follow these steps:

    1. Create a JSON file

    2. Read the JSON file

    3. Display data in a table

Practical Activity 2.5.6: Integrating API calls from backend

Notes to the trainer

- This activity should take place in a computer lab where trainees should integrate API from backend.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE) VS Code
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
    - ✓ Avail computer connected to the internet.
    - ✓ Avail sample backend project containing developed API to be used.

Key steps:

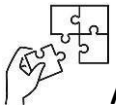
While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees do the task described below: As a software developer, you have given the API developed by backend and you are requested to integrate the given API in order to access the backend data.
Step 2:	Explain the task and provide clear work instruction.
Step 3:	Demonstrate how you can integrate API while demonstrating explain the steps to integrate API.
Step 4:	Ask trainees to repeat the task of step 3 and monitor the procedures
Step 5:	Verify whether the integration of API have been properly performed.
Step 6:	Ask trainees to read key reading 2.5.6.

Points to Remember

- To integrate API calls into your Vue components

  - ✓ Set Up Axios in Your Vue Project
  - ✓ Create a service file to manage API calls (ex. Student.js)
  - ✓ Create Vue Components
    - A component for creating and editing records.
    - A component for displaying the list.
  - ✓ Set up Routing (Configure routes in your router.js (or equivalent) file to map to these components.)
  - ✓ Handle API Responses
  - ✓ Testing and Debugging



Application of learning 2.5.

FGB TSS is one of technical secondary schools located in Muhanga district. The school is facing with problem of data collection about student's records that is done manually, as a developer who has skills in Vue Js framework, you have been hired to develop a web app that will be used to collect those needed data, the data have to be stored in one file as JSON file.

Checklist:

Elements	Indicators	Observation	
		Yes	No
Axios file is correctly installed	Axios in your Vue project is settled up		
	service file to manage API calls is created		
	Vue components is created		
	A component for displaying the list is created		
	Set up routing is performed		
	Handle API Responses is performed		
JSON file is properly created	JSON file is created		
	Read the JSON file is done		
	Data in a table are displayed		

API calls from backend is properly integrated	Axios is Installed		
	API Helper file is created		
	Axios is imported		

Indicative content 2.6: Manage Data using State Management

Duration: 5 hrs

Theoretical Activity 2.6.1: Description of key concepts used in state management

Notes to the trainer:

- While delivering this content, a small group can be used for introducing key concepts used in state management.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation

Step 2: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about the term state management?
II. Describe the key concepts involved in state management, such as getter, action, mutation, dispatch, and state.
III. What are the benefits of state management?
IV. Provide a list of state management libraries and explain each of them.

Step 3: Ask trainees to present their findings to the whole class.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the Key readings 2.6.1 in their manuals.

Points to Remember

- State management libraries play a crucial role in managing the state of an application, especially in complex front-end applications with multiple components and data interactions. There are some popular state management libraries like: Pinia, Redux, Vuex.

Theoretical Activity 2.6.2: Description of Vue DevTools in browser

Notes to the trainer:

- While delivering this content, a small group can be used for describing Vue DevTools in browser
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation

Step 2: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about the term vue Devtools?

II. What are the key features and functionalities offered by Vue Devtools, and provide an explanation for each?

Step 3: Ask trainees to present their findings to the whole class.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask them to read the Key readings 2.6.2 in their manuals.

Points to Remember

- Vue Devtools is a browser extension that provides a set of powerful tools for debugging and inspecting Vue.js applications. These are the key features and functionalities of Vue Devtools like: Component Tree, Component Inspection, State Management.

Theoretical Activity 2.6.3: Introduction to state Modules

Notes to the trainer:

- While delivering this content, a small group can be used for introducing state modules.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation
Step 2: Introduce the activity and request trainees to respond to the following questions:
I. What do you understand about state modules?
II. What are the purposes of state modules in Vue.js?
Step 3: Ask trainees to present their findings to the whole class.
Step 4: Provides expert view and clarifies ideas by using didactic materials.
Step 5: Address any questions or concerns.
Step 6: Ask them to read the Key readings 2.6.3 in their manuals.

Points to Remember

- State management modules in Vue.js, like Vuex, serve several important purposes in Vue.js applications. There are the key purposes of state modules in Vue.js like: Organization, Encapsulation, Reusability, Scalability.

Practical Activity 2.6.4: Install Vue DevTool in a browser

Notes to the trainer

- This activity should take place in a computer lab where trainees should Install vue Devtools in browsers like google chrome and Mozilla firebox.
- While delivering this content, you are required to:
  - ✓ Avail computer installed with web browser
  - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
  - ✓ Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to Install vue DevTools in browser.

Step 2: Explain the task and provide clear work instruction

Step 3: Demonstrate how to install Vue DevTools in browser. While demonstrating, explain the steps to follow.

Step 4: Asks trainees to install Vue DevTools in browser and monitor the procedures.

Step 5: Verify whether Vue DevTools are clearly installed.

Step 6: Ask trainees to read key reading 2.6.4.

Points to Remember

- **Install vue Devtools** Considering google chrome browser you can follow the following steps:

    1. Open Google Chrome
    2. Visit the Chrome Web Store (https://chrome.google.com/webstore/category/extensions) and search for "Vue.js Devtools."
    3. Find the Vue.js Devtools extension in the search results.
    4. Click the "Add to Chrome" button to install the extension.
    5. A confirmation dialog will appear. Click "Add Extension" to install it.
    6. Once installed, you'll see the Vue.js icon in the Chrome toolbar

Practical Activity 2.6.5: Installing and configuring State Management

Notes to the trainer

- This activity should take place in a computer lab where trainees should create a Vue.js Project, Install Vuex as state management, set up the Vuex Store and connect the Store to Your Vue App.
- While delivering this content, you are required to:
  - ✓ Avail Vuex set up file
  - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
  - ✓ Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees do the task described below: As a software developer, you are asked to go to the computer lab to install state management.
Step 2:	Explain the task and provide clear work instruction.
Step 3:	Demonstrate how to Install and configure State Management, while demonstrating explain the steps to follow.
Step 4:	Ask trainees to Install, configure State Management and monitor the procedure.
Step 5:	Verify whether state management is clearly installed
Step 6:	Ask trainees to read key reading 2.6.5
Step 7:	Ask trainees to perform the task provided in application of learning 2.6.

Points to Remember

To install and configure state management the following steps are followed:

1.Create a Vue.js Project:

2.Then, create a new Vue.js project:

3. Follow the prompts to set up your project.

4. Install Vuex

5.Set up the Vuex Store

6. Now, you can use the `Counter` component in your application to interact with the state managed by Vuex.

Practical Activity 2.6.6: Define state modules

Notes to the trainer

- This activity should take place in a computer lab where trainees should define the state module in Vuex.
- While delivering this content, you are required to:
  - ✓ Avail text editor or integrated development environment (IDE)
  - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
  - ✓ Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As software developer, you are asked to go to the computer lab to define state modules.

Step 2: Explain the task and provide clear work instruction

Step 3: Demonstrate how to define state modules. While demonstrating, explain the steps to define state modules.

Step 4: Asks trainees to define state modules and monitor the procedures.

Step 5: Verify whether state modules are clearly defined.

Step 6: Ask trainees to read key reading 2.6.

Points to Remember

- To define a state module in Vuex, the state management library for Vue.js, follow these steps:

  1. Install Vuex

  2. Create a Vuex Store

3. Define State
4. Create Mutations
5. Define Actions
6. Set up Getters
7. Create the Vuex Store
8. Integrate Vuex Store in Vue Application

Practical Activity 2.6.7: Getting data from state getters

Notes to the trainer

- This activity should take place in a computer lab where trainees should get data from state getters, Define Vuex store with a getter, use the computed property to access the getter.
- While delivering this content, you are required to:
  - ✓ Avail text editor or integrated development environment (IDE)
  - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
  - ✓ Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees to do the task described below: As a software developer, you are asked to go to the computer lab to get data from state getters.
Step 2:	Explain the task and provide clear work instruction.
Step 3:	Demonstrate how you can get data from state getters, while demonstrating explain the steps followed.
Step 4:	Ask trainees to get data from state getters and monitor the procedures
Step 5:	Verify whether define getters in Vuex Store, access getters in Vue components and display data in the Component are properly performed.
Step 6:	Ask trainees to read key reading 2.6.7

Points to Remember

- To get data from state getters in a Vuex store within a Vue.js application, you can follow these steps:

    1. Define Getters in Vuex Store

    2. Access Getters in Vue components

    5. Display data in the component

Practical Activity 2.6.8: Commit mutations

Notes to the trainer

- This activity should take place in a computer lab where trainees should set up Vuex Store, Define Mutations, Commit Mutations and Access State.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE)
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
    - ✓ Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees do the task described below: As a software developer, you are asked to go to the computer lab to commit mutations.
Step 2:	Explain the task and provide clear work instruction.
Step 3:	Demonstrate how to commit mutations, while demonstrating explain the steps to commit mutations.
Step 4:	Ask trainees to commit mutations and monitor the procedures.
Step 5:	Provide more explanations and Support where necessary.
Step 6:	Verify whether the setting up of Vuex Store, defining mutations, accessing of State used in commit mutations are clearly performed.
Step 7:	Ask trainees to read key reading 2.6.8

Points to Remember

- Following the steps below, we are going to define mutations, to update the state in a Vuex store and commit those mutations from your Vue components when you want to change the application's state. This will help us to maintain a clear and predictable state management process in your Vue.js application

    1. Setup Vuex Store
    2. Define Mutations
    3. Commit Mutations
    4. Access State

Practical Activity 2.6.9: Dispatch actions

Notes to the trainer

- This activity should take place in a computer lab where trainees should define Vuex Store, define Actions in the Vuex Store and dispatch the Action from a Vue Component.
- While delivering this content, you are required to:
    - ✓ Avail text editor or integrated development environment (IDE)
    - ✓ Avail computer installed with Node.js and npm (Node Package Manager)
    - ✓ Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees do the task described below: As a software developer, you are asked to go to the computer lab to dispatch the action from a Vue Component.
Step 2:	Explain the task and provide clear work instruction.
Step 3:	Demonstrate how to dispatch the action from a Vue Component, while demonstrating, explain the steps to dispatch the action.
Step 4:	Ask trainees to dispatch the action from a Vue Component and monitor the procedures.

Step 5: Verify whether defining the Vuex Store, defining Actions in the Vuex Store and dispatching the action from a Vue Component are clearly performed.

Step 6: Ask trainees to read key reading 2.6.9

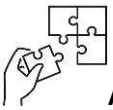
Points to Remember

- Dispatching actions in Vuex involves several steps:

    1.Define Vuex Store

    2.Define actions in the Vuex Store

    3.Dispatch the action from a Vue Component



Application of learning 2.6.

JAMTECH is a private company located in KAYONZA district that develop website for different institutions, due to different clients that they have, they are hiring a software developer who will develop for them the front end of DEREVA Hotel that will be used while connecting to back end. As Front-end developer, you are hired to perform that task. The front end part will contain the followings:

- ✓ Home, About, Contacts, Registration, footer that contains different stakeholders address.
- ✓ All pages will have same header
- ✓ The registration form will be used while registering a room and display all records in table as JSON data and will be used once connecting to back end part
- ✓ Application will include routing between different views, fetching data from an API, displaying it in components, and managing state with Vuex.
- ✓ The application will have a 404 page that will help in case of connection to server.
- ✓ A structured folder with clear separation of concerns (components, views, etc.), functioning navigation using Vue Router, API integration using Axios, and state management using Vuex.

Checklist:

Elements	Indicators	Observation	
		Yes	No
Dispatching actions in Vuex is properly performed	Vuex Store is defined		
	Actions in the Vuex Store is defined		
	Action is dispatched		
Commit mutations is well performed	Setup Vuex Store is performed		
	Mutations are defined		
	Mutations are committed		
	State is accessed		

Learning outcome 2 end assessment

Theoretical assessment

1. What is Vue.js? Select the best option

A. A programming language

B. A JavaScript framework for building user interfaces

C. A database management system

D. A server-side scripting language

Answer: B

2. Which directive is used for two-way data binding in Vue.js?

A. v-model

B. v-bind

C. v-show

D. v-if

Answer: A

3. How do you create a new Vue instance?

A. new Vue()

B. createVueInstance()

C. Vue.create()

D. initVue()

Answer: A

4. What is the purpose of the `v-for` directive in Vue.js?

A. Conditional rendering

B. Two-way data binding

C. List rendering

D. Event handling

Answer: C

5. Which lifecycle hook is called after the Vue instance has been mounted to the DOM?

A. created

B. mounted

C. updated

D. destroyed

Answer: B

6. How can you communicate between parent and child components in Vue.js?

A. Props and events

B. Data and methods

C. Slots

D. Both A and C

Answer: A

7. What does the `v-bind` directive do in Vue.js?

A. Binds a class to an element

B. Binds an attribute to an expression

C. Binds a style to an element

D. Binds an event to a method

Answer: B

8. Which Vue.js feature allows you to transition between elements when they are inserted or removed from the DOM?

A. v-model

B. v-transition

C. v-if

D. v-show

Answer: B

9. What is the purpose of the `v-if` directive in Vue.js?

A. Conditional rendering

B. Two-way data binding

C. List rendering

D. Event handling

Answer: A

10. How can you include external libraries or plugins in a Vue.js project?

A. Using the `<script>` tag in HTML

B. Using the `import` statement in JavaScript

C. Both A and B

D. Vue.js does not support external libraries

Answer: C

11. What is the role of Vuex in Vue.js?

A. Routing

B. State management

C. Form validation

D. Animation

Answer: B

12. Which of the following is the correct way to bind a class dynamically based on a condition in Vue.js?

A. v-class

B. v-bind:class

C. v-style

D. v-if:class

Answer: B

13. How can you handle user input in Vue.js?

A. Using the `v-model` directive

B. Using the `v-bind` directive

C. Using the `v-show` directive

D. Using the `v-if` directive

Answer: A

14. What does the `vshow` directive do in Vue.js?

A. Renders an element only if a condition is true

B. Toggles the visibility of an element based on a condition

C. Binds a class to an element

D. Binds an attribute to an expression

Answer: B

15. How can you optimize performance in a Vue.js application?

A. Use computed properties

B. Use `v-if` instead of `v-show`

C. Use key attributes in `v-for` loops

D. All of the above

Answer: D

16. What is the purpose of the `v-on` directive in Vue.js?

A. Two-way data binding

B. Event handling

C. List rendering

D. Conditional rendering

Answer: B

17. Which Vue.js feature allows you to reuse content across different components?

A. Mixins

B. Filters

C. Directives

D. Components

Answer: A

18. What is the purpose of the `v-model` directive in Vue.js?

A. Bind a class to an element

B. Bind an attribute to an expression

C. Implement two-way data binding on form elements

D. Render a list of items

Answer: C

19. In Vue.js, what does the `nextTick` method do?

A. Delays the execution of a function until the next animation frame

B. Forces a rerender of the component

C. Executes a function after the DOM has been updated

D. Navigates to the next route in the application

Answer: C

20. Which Vue.js lifecycle hook is called when a component is about to be destroyed?

A. beforeCreate

B. beforeDestroy

C. destroyed

D. beforeMount

Answer: B

Practical assessment

BTICTHUB is a private company located in Huye district that develop website for different institutions, due to different clients that they have, they are hiring a software developer who will develop for them the front end of UBUMWE Hotel that will be used while connecting to back end. As Front-end developer, you are hired to perform that task. The front end part will contain the followings:

- ✓ Home, About, Contacts, Registration, footer that contains different stakeholders address.
- ✓ All pages will have same header
- ✓ The registration form will be used while registering a room and display all records in table as JSON data and will be used once connecting to back end part
- ✓ Application will include routing between different views, fetching data from an API, displaying it in components, and managing state with Vuex.
- ✓ The application will have a 404 page that will help in case of connection to server.
- ✓ A structured folder with clear separation of concerns (components, views, etc.), functioning navigation using Vue Router, API integration using Axios, and state management using Vuex.

Checklist

Elements	**Indicators**	**Observation**	
		Yes	**No**
Folder structure is well created	Assets folder have been created		
	Source code folder have been created		
	Components folder have been created		
	Store folder have been created		
	Router folder have been created		
	Views folder have been created		
	Mixins folder have been created		
Vue component structure is well	View components in views folder are created		
	Reusable components in component folder are		

applied	created (Footer &Header)		
	Bootstrap to Vue components are Applied		
	components in multiple places have been reused		
Navigation in Vue project using router is well applied	Router package (vue-router) have been installed		
	JavaScript file in router folder is created		
	routes array in router instantiation have been defined		
	View components (pages) have been created		
	Declarative navigation have been used		
	Nested routes have been used		
	Parameters inside the router have been used		
	404 Page have been created		
Data in Vue are well manipulated	Necessary packages & components have been imported		
	Vue lifecycle methods have been applied		
	Vue layout components have been used		
	JSON data in a table have been displayed		
Form in Vue component is well used	Form inputs (registration form) have been created		
	Input binding on registration form have been used		
	Form input have been validated		
	Form data in table have been submitted		
	API requests are performed		
	All CRUD APIs data to component are fetched		
	Data to component are displayed		
	Vue DevTool in a browser have been installed		
	State management(Vuex) have been installed		
	Store and retrieve data in state management		
	Vuex as state management have been configured		

Further information to the trainer

Cuomo, S. (2023). Vue.js 3 for Beginners: Learn the Essentials of Vue.js 3 and Its Ecosystem to Build Modern Web Applications. Packt Publishing.

Passaglia, A. (2018). Vue.js 2 cookbook: Build modern, interactive web applications with Vue.js. Packt Publishing.

Hanchett, E., & Listwon, B. (2018). Vue.js in Action. Manning Publications.

Peacemaker19881. (n.d.). *API Vue* [Computer software]. GitHub. https://github.com/peacemaker19881/apivue.git

peacemaker19881. (n.d.). apibackend. GitHub. https://github.com/peacemaker19881/apibackend.git

Peacemaker19881. (n.d.). Student Registration System [GitHub repository]. GitHub. Retrieved March 14, 2022, from https://github.com/peacemaker19881/studentreg.git

Vue.js. (n.d.). *Vue CLI* [Computer software]. GitHub. Retrieved March 14, 2022, from https://github.com/vuejs/vue-cli

Vue.js. (n.d.). Vue.js forum. Retrieved March 14, 2022, from https://forum.vuejs.org/

Indicative contents
3.1 Description of the Game
3.2 Creation of Narrative
3.3 Game mechanics
3.4 Identification of game controls
3.5 Identification of Game Interface

Key Competencies for Learning Outcome 3: Plan game

Knowledge	Skills	Attitudes
• Definition of computer game • Description of game type • Differentiate narrative from storyline • Description of game mechanics • Description of game target devices • Description of game environment (scenery) • Identification of game controls • Identification of Game Interface	• Creating narrative	• Having Team work spirit • Being critical thinker • Being Innovative • Being attentive. • Being creative • Being Problem solver • Being Practical oriented

Duration: 25 hrs

Learning outcome 3 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe correctly game based on purpose
2. Describe clearly game mechanics based on game type
3. Identify correctly game controls based on game to be developed
4. Identify appropriately game interface based on purpose
5. Create correctly narrative based on game type

Resources

Equipment	Tools	Materials
• Computer	• Text Editor (VS Code) • Nodejs	• Internet

Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail of Computers and internet connection.
- Avail of Nodejs and VS Code installer.
- Prepare Videos to be used as didactic materials.

Indicative content 3.1: Description of the Game

Duration:5 hrs

Theoretical Activity 3.1.1: Description of key concepts used in planning games

Notes to the trainer:

- While delivering this content, a small group can be used for describing key concepts used in planning games.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation

Step 2: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about the term game?

II. What are the different types of games?

III. What is the distinction between narrative and storyline?

Step 3: Ask trainees to present their findings to the whole class.

Step 4: Provides expert view and clarifies ideas by using didactic materials

Step 5: Address any questions or concerns.

Step 6: Ask them to read the Key readings 3.1.1 in their manuals.

Points to Remember

- There are the differences between narrative and storyline where the narrative provides the overarching framework and thematic depth of a story while the storyline focuses on the specific events and plot progression that drive the narrative forward.
- There are various types of games that cater to different interests and preferences. Here are some common types of games: Puzzle Games, Quiz Games, Word Games, Memory Games, Arcade Games.

Theoretical Activity 3.1.2: Description of characteristics of game

Notes to the trainer:

- While delivering this content, a small group can be used for describing characteristics of the game.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

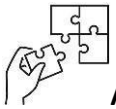
Step 1: Introduce the activity and request trainees to respond to the following questions:

I. What is the main objective of the game?
II. What devices are typically targeted for games and how are they utilized?
III. Explain the concepts of game dimension and game perspective.

Step 2: Asks any learner to write answers provided on flipchart/paper.
Step 3: Asks trainees to discuss the provided answer and choose correct answers.
Step 4: Provides expert view and clarifies ideas by using didactic materials.
Step 5: Address any questions or concerns.
Step 6: Ask trainees to read the key reading 3.1.2 in the trainee manual.

Points to Remember

- Game objectives are the specific goals or targets that players aim to achieve within a game. These objectives provide structure, motivation, and a sense of progression for players as they navigate through the gameplay experience and Game target devices refer to the platforms or devices on which games are designed to be played.



Application of learning 3.1.

N/A

Indicative content 3.2: Creation of Narrative

Duration: 5 hrs

Theoretical Activity 3.2.1: Description of storyline

Notes to the trainer:

- While delivering this content, a small group can be used for introducing narrative
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about a storyline?

II. What are the key components that make up a storyline?

Step 2: Asks learner to write answers provided on flipchart/paper.

Step 3: Asks trainees to discuss the provided answer and choose correct answers.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 3.2.1 in the trainee manual.

Points to Remember

- A storyline is composed of various components that work together to create a cohesive and engaging narrative structure. These components help shape the plot, characters, conflicts, and themes of the story. There are the key components that make up a storyline like: Characters, Setting, Plot, Conflict.

Practical Activity 3.2.2: Create a storyline

Notes to the trainer

- This activity should take place in a computer lab where trainees should create a sample storyline of their choice.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to create a storyline.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to create a storyline. While demonstrating, explain the steps to create storyline.

Step 4: Asks trainees to create storyline and monitor the procedures.

Step 5: Verify whether the storyline is clearly created.

Step 6: Ask trainees to read key reading 3.2.2.

Points to Remember

- Creating a compelling storyline involves a series of steps that help structure the narrative, develop characters, establish conflicts, and engage the audience.
  Here are the essential steps to create a storyline:
  1. Identify the Central Theme
  2. Develop Characters

3. Outline the Plot

4. Establish Setting

7. Write Dialogue

Practical Activity 3.2.3: Prepare different game sounds and background music

Notes to the trainer

- This activity will take place in a computer lab where trainees can visit the game sound and effect website, select game effect and sound of their choice, download it and store it in the assets folder in their vue project folder for future use.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to download and prepare different game sounds and background music.

Step 2: Explain the task and provide clear work instruction

Step 3: Demonstrate how to Download and prepare different game sounds and background music. While demonstrating, explain the steps to download and prepare different game sounds and background music.

Step 4: Asks trainees to download and prepare different game sounds and background music and monitor the procedures.

Step 5: Verify whether game sounds, background music are clearly prepared.

Step 6: Ask trainees to read key reading 3.2.3.

Points to Remember

- To download and prepare different game sounds effectively, you can follow a series of steps that involve sourcing, organizing, editing, and integrating audio assets for game development. Here are the steps to download and prepare different game sounds:
    1. Identify Sound Requirements
    2. Search for Sound Resources
    3. Download Sound Assets
    4. Organize Sound Files
    6. Optimize Sound Quality
    7. Create Sound Variations

Theoretical Activity 3.2.4: Identification of game environment components

Notes to the trainer:

- While delivering this content, a small group can be used for identifying components of game environment.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation

Step 2: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about Game environments?

II. What are the key aspects that make up game environments?

III. Explain the different game components, including game levels, reward levels, and missions.

Step 3: Ask trainees to present their findings to the whole class.

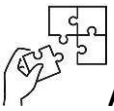
Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask them to read the Key readings 3.2.4 in their manuals.

Points to Remember

- Game environments are crucial elements that contribute to the overall gaming experience, setting the tone, atmosphere, and immersion for players. There are key aspects that make up game environments: Landscapes and Terrain, Architecture and Structures, Natural Elements, Props and Objects.



Application of learning 3.2.

The game development team has a plan to develop a game that will enable the person moving on a plain road to Jump an obstacle every time he meets it on the way. The development team will need game effects like background music and other sound effects. As a VueJs expert, you have been tasked to download and arrange the sound effects and background music.

Create a storyline that will be used for development of the cited game.

Checklist:

Elements	Indicators	Observation	
		Yes	No
Prepare different game sounds and background music is well done	Game sound website is visited		
	Game background music is downloaded		
	The downloaded music is saved in assets folder of project		
Create a storyline is well performed	Central Theme is identified		
	Develop Characters are developed		
	Plot is outlined		
	Setting is established		
	Dialogue is written		

Indicative content 3.3: Game Mechanics

Duration: 5 hrs

Theoretical Activity 3.3.1: Description of key elements for defining game mechanics

Notes to the trainer:

- While delivering this content, a small group can be used for describing key elements to define game mechanics components of game environment.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to respond to the following questions:
   I. What is the game HUD (Heads-Up Display)?
   II. What are the essential elements that define a game mechanics?

Step 2: Asks any learner to write answers provided on flipchart/paper.

Step 3: Asks trainees to discuss the provided answer and choose correct answers.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 3.3.1 in the trainee manual.

Points to Remember

- Several key elements make up a game, contributing to its structure, mechanics, and overall player experience. There are essential elements that define a game like: Scores, Level, Speed, Time, Target Device.
- The Game HUD (Heads-Up Display) is a crucial element in video games that provides players with essential information, feedback, and interactive elements during gameplay.

Indicative content 3.4: Identification of Game Controls

Duration: 5 hrs

Theoretical Activity 3.4.1: Identification of game controls

Notes to the trainer:

- While delivering this content, a small group can be used for identifying game controls.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation

Step 2: Introduce the activity and request trainees to respond to the following questions:

I. What are the input keys used in the game?
II. Provide an explanation of the term 'primary control' in gaming.
III. Explain secondary control in the context of gaming.
IV. Provide an explanation of support controls in the context of gaming.

Step 3: Ask trainees to present their findings to the whole class.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask them to read the Key readings 3.4.1 in their manuals.

Points to Remember

- In a VueJS game, keyboard inputs play a crucial role in enabling player interaction and controlling gameplay elements. There are the types of keyboard inputs commonly used in VueJS games like: Keyboard Input, Mouse Input, Touch Input (for mobile devices) Game Controller Input.

Indicative content 3.5: Identification of Game Interface

Duration: 5 hrs

Theoretical Activity 3.5.1: Description of game interface components

Notes to the trainer:

- While delivering this content, a small group can be used for describing game interface components.
- The use of videos as didactic materials is required.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the activity and request trainees to respond to the following questions:

I. Explain splash screen
II. Describe characters in the game.
III. What do you understand about the following terms used in Vue.js game?
   a) Game playable characters and non-playable characters
   b) Characters' relationship
   c) Characters Interactivity
   d) Game Dimensions
   e) Game perspective
   f) Playing Zone / Game Boundaries
   g) Scenes of different levels
   h) Design tools for environment
IV. What are the key elements of good characters and game environment components?
V. Describe the different examples of alert messages, including success, failure, information, and warning.
VI. Explain game play

Step 2: Asks any learner to write answers provided on flipchart/paper.

Step 3: Asks trainees to discuss the provided answer and choose correct answers.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the key reading 3.5.1 in the trainee manual.

Points to Remember

- Creating compelling and engaging characters is essential in game development to immerse players in the game world and drive the narrative forward. There are key elements that contribute to making good characters in games: Visual Appeal, Personality and Backstory, Character Arc and Growth, Voice Acting and Dialogue
- Alert messages are used in various applications to communicate important information, warnings, notifications, or feedback to users.
- There are different examples of alert messages commonly found in digital interfaces: Success Messages, Failure Messages, Information Messages, Warning Messages.

Learning outcome 3 end assessment

Theoretical assessment

1. What contributes to making a good character in games? Select one answer
    A. Visual Appeal, Personality and Backstory, Character Arc and Growth, Voice Acting and Dialogue
    B. Visual Appeal, Sound Effects, Level Design
    C. Gameplay Mechanics, Marketing Strategy, Music Composition
    D. Difficulty Levels, Achievements, User Interface
2. Personality and Backstory are important elements in creating compelling characters for game narratives. (True/False)
3. Voice acting is not necessary for engaging characters in video games. (True/False)
4. What are examples of alert messages commonly found in digital interfaces? Select one
    A. Victory Messages, Defeat Messages, Neutral Messages
    B. Success Messages, Failure Messages, Information Messages, Warning Messages
    C. Start Messages, Stop Messages, Continue Messages
    D. Loading Messages, Waiting Messages, Ready Messages
5. Alert messages are used in applications solely for decorative purposes. (True/False)
6. Warning messages are used to notify users of potential issues. (True/False)
7. Which types of keyboard inputs are commonly used in Vue.js games? Select one option
    A. Keyboard Input, Gesture Input, Voice Input
    B. Keyboard Input, Mouse Input, Touch Input (for mobile devices), Game Controller Input
    C. Keyboard Input, Joystick Input, Camera Input
    D. Keyboard Input, Scroll Input, Screen Tap Input
8. Mouse Input is typically used in Vue.js games to control gameplay elements. (True/False)
9. Game Controller Input is only used for console games and not for web-based games developed with Vue.js. (True/False)
10. What are the essential elements that define a game?
    A. Scores, Level, Speed, Time, Target Device
    B. Characters, Dialogue, Music, Graphics

C. Networking, Servers, Code Structure

D. None of the above

11. Speed is not an essential element in defining a game. (True/False)

12. The target device can impact the design and mechanics of a game. (True/False)

13. What is the purpose of the Game HUD in video games?

A. To display essential information, feedback, and interactive elements during gameplay

B. To enhance the background music

C. To provide real-time weather updates

D. To manage network connections

14. The Game HUD is only used in first-person shooter games. (True/False)

15. HUD elements include health bars, score displays, and mini-maps. (True/False)

16. What are key aspects that make up game environments?

A. Landscapes and Terrain, Architecture and Structures, Natural Elements, Props and Objects

B. Character Dialogues, Soundtracks, Game Mechanics

C. Server Performance, Code Efficiency, AI Behavior

D. None of the above

17. Game environments do not affect the player's immersion. (True/False)

18. Natural elements like trees and rivers contribute to the game's atmosphere. (True/False)

19. What are the steps to download and prepare different game sounds?

A. Identify Sound Requirements, Search for Sound Resources, Download Sound Assets, Organize Sound Files, Optimize Sound Quality, Create Sound Variations

B. Search for Sound Resources, Download Sound Assets, Identify Sound Requirements, Create Sound Variations

C. Download Sound Assets, Optimize Sound Quality, Identify Sound Requirements

D. None of the above

20. Organizing sound files is an unnecessary step in preparing game sounds. (True/False)

21. Creating sound variations can enhance the audio experience in a game. (True/False)

22. What are the essential steps to create a storyline?

A. Identify the Central Theme, Develop Characters, Outline the Plot, Establish Setting, Write Dialogue

B. Develop Characters, Establish Setting, Write Dialogue

C. Outline the Plot, Write Dialogue, Develop Characters

D. None of the above

23. Establishing a setting is not important when creating a storyline. (True/False)

24. Writing dialogue helps in character development and advancing the plot. (True/False)

25. What role does the central theme play in a storyline?

A. It serves as the foundation and guiding concept for the narrative

B. It determines the game's graphics

C. It only affects the background music

D. None of the above

26. A well-developed character arc is crucial for player engagement. (True/False)

27. Game controller input is less responsive than keyboard input in Vue.js games. (True/False)

28. Information messages in applications provide users with general updates or instructions. (True/False)

29. Props and objects in game environments have no impact on gameplay mechanics. (True/False)

30. Speed adjustments in games can influence the difficulty level and player experience. (True/False)

ANSWERS

1. What contributes to making a good character in games?

A) Visual Appeal, Personality and Backstory, Character Arc and Growth, Voice Acting and Dialogue

2. Personality and Backstory are important elements in creating compelling characters for game narratives.

True

Voice acting is not necessary for engaging characters in video games.

False

4. What are examples of alert messages commonly found in digital interfaces?

B) Success Messages, Failure Messages, Information Messages, Warning Messages

5. Alert messages are used in applications solely for decorative purposes.

False

6. Warning messages are used to notify users of potential issues.

True

7. Which types of keyboard inputs are commonly used in Vue.js games?

B) Keyboard Input, Mouse Input, Touch Input (for mobile devices), Game Controller Input

8. Mouse Input is typically used in Vue.js games to control gameplay elements.

True

Game Controller Input is only used for console games and not for web-based games developed with Vue.js.

False

10. What are the essential elements that define a game?

A) Scores, Level, Speed, Time, Target Device

11. Speed is not an essential element in defining a game.

False

12. The target device can impact the design and mechanics of a game.

True

13. What is the purpose of the Game HUD in video games?

A) To display essential information, feedback, and interactive elements during gameplay

14. The Game HUD is only used in first-person shooter games.

False

15. HUD elements include health bars, score displays, and mini-maps.

True

16. What are key aspects that make up game environments?

A) Landscapes and Terrain, Architecture and Structures, Natural Elements, Props and Objects

17. Game environments do not affect the player's immersion.

False

18. Natural elements like trees and rivers contribute to the game's atmosphere.

True

19. What are the steps to download and prepare different game sounds?

A) Identify Sound Requirements, Search for Sound Resources, Download Sound Assets, Organize Sound Files, Optimize Sound Quality, Create Sound Variations

20. Organizing sound files is an unnecessary step in preparing game sounds.

False

21. Creating sound variations can enhance the audio experience in a game.

True

22. What are the essential steps to create a storyline?

A) Identify the Central Theme, Develop Characters, Outline the Plot, Establish Setting, Write Dialogue

23. Establishing a setting is not important when creating a storyline.

False

24. Writing dialogue helps in character development and advancing the plot.

True

25. What role does the central theme play in a storyline?

A) It serves as the foundation and guiding concept for the narrative

26. A well-developed character arc is crucial for player engagement.

True

27. Game controller input is less responsive than keyboard input in Vue.js games.

False

28. Information messages in applications provide users with general updates or instructions.

True

29. Props and objects in game environments have no impact on gameplay mechanics.

False

30. Speed adjustments in games can influence the difficulty level and player experience.

True

Practical assessment

The game development team has a plan to develop a game that will enable the person moving on a plain road to Jump an obstacle every time he meets it on the way. The development team will need game effects like background music and other sound effects. As a VueJs expert you have been tasked to download and arrange the sound effects and background music.

Create a storyline that will be used for development of the cited game.

Checklist:

Elements	Indicators	Observation	
		Yes	No
Creation of Narrative is well performed	Game sound website is visited		
	Game background music is downloaded		
	The downloaded music is saved in assets folder of project		
	Central Theme has been identified		
	Characters have been developed		
	Plot has been outlined		
	Setting has been established		
	Dialogue has been written		

Further information to the trainer

Schell, J. (2008). The art of game design: A book of lenses. CRC Press.

Salen, K., & Zimmerman, E. (2003). Rules of Play: Game Design Fundamentals. MIT Press.

Adams, E. W., & Dormans, J. (2012). Game Mechanics: Advanced Game Design. New Riders.

Serpa, A. (2023). The Cores of Game Design: Mechanics, Economics, Narrative, and Aesthetics. Routledge.

MasterClass. (n.d.). How to design a video game character. MasterClass. Retrieved March 14, 2022, from https://www.masterclass.com/articles/how-to-design-a-video-game-character#what-makes-a-good-video-game-character

Webdeasy. (n.d.). Multiplayer game programming with Vue.js. Retrieved March 14, 2022, from https://webdeasy.de/en/multiplayer-game-programming-with-vue-js/

Vue.js Examples. (n.d.). A simple snake game written with Vue.js. Retrieved March 14, 2022, from https://vuejsexamples.com/a-simple-snake-game-written-with-vue-js/


Netlify

Indicative contents
4.1 Design game interface
4.2 Develop game functionalities
4.3 Deploy game project on Netlify

Key Competencies for Learning Outcome 4: Develop Game

Knowledge	Skills	Attitudes
• Description key concepts about Game development	• Creating Narrative • Designing game interface • Developing game functionalities • Deploying game project on Netlify	• Having Team work spirit • Being critical thinker • Being Innovative • Being attentive • Being creative • Being Problem solver • Being Practical oriented

Duration: 45 hrs

Learning outcome 4 objectives:

By the end of the learning outcome, the trainees will be able to:

1. Describe clearly key concepts used in development of game in Vue JS framework
2. Design Properly game characters based on the storyline
3. Develop correctly game functionalities based on game purpose
4. Create correctly narrative as used in game development.
5. Deploy correctly game on static hosting platforms based on system requirements

Resources

Equipment	Tools	Materials
• Computer	• Vue js • Node js • Browser • VS Code • Illustrator	• Internet

Advance Preparation:

Before delivering this learning outcome, you are recommended to:

- Avail Computers and internet connection.
- Avail Node Js and Text editor.
- Prepare Videos to be used as didactic materials.
- Avail computer with vue js installed.

Indicative content 4.1: Design Game Interface

Duration: 10 hrs

Theoretical Activity 4.1.1: Description of the key concepts used to develop game in VueJS Framework

Notes to the trainer:

- While delivering this content, a small group can be used for describing key concepts used in Game development.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Engage trainees in group formulation

Step 2: Introduce the activity and request trainees to respond to the following questions:

I. What do you understand about the term deployment?
II. Name different deployment platforms that are commonly used.
III. Explain domain name
IV. How do SASS and SVG differ from each other?
V. What do you understand about the term canvas?

Step 3: Ask trainees to present their findings to the whole class.

Step 4: Provides expert view and clarifies ideas by using didactic materials.

Step 5: Address any questions or concerns.

Step 6: Ask trainees to read the Key readings 4.1.1 in trainee manual.

Points to Remember

- Various platforms offer different features, advantages and capabilities.
  Here are different deployment platforms/Hosting platforms used: Amazon GameLift, Google Cloud Game Servers, Unity Multiplayer, Minecraft Realms.
- There are differences between SASS and SVG where SASS (Syntactically Awesome Style Sheets) is a preprocessor scripting language that is used to extend the capabilities of CSS (Cascading Style Sheets). while SVG (Scalable Vector Graphics) can

be used in games for various purposes, such as creating game assets, UI elements, and animations.

Practical Activity 4.1.2: Design game environment using html canvas

Notes to the trainer

- This activity should take place in a computer lab where trainees should create an HTML file, set up the HTML structure, Style the canvas, Add JavaScript code, Start drawing on the canvas, Save and open the HTML file in the browser.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to design game environment using html canvas.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to design game environment using html canvas.
While demonstrating, explain the steps followed to design game environment using html canvas.

Step 4: Asks trainees to design game environments using html canvas and monitor the procedures.

Step 5: Verify whether create an HTML file, set up the HTML structure, Style the canvas, Add JavaScript code used in designing game environments using html canvas are clearly performed.

Step 6: Ask trainees to read key reading 4.1.2.

Points to Remember

- Designing a game environment using HTML canvas involves several steps to create a visually engaging and interactive space for gameplay.
  Here are the steps to design a game environment using HTML canvas:

  1. Create an HTML file
  2. Set up the HTML structure
  3. Style the canvas
  4. Add JavaScript code
  5. Start drawing on the canvas
  6. Save and open the HTML file

Practical Activity 4.1.3: Design environment components with SVG or Illustrator

Notes to the trainer

- This activity should take place in a computer lab where trainees should Set up a Vue.js project, create a component for the game environment, add an SVG element to the component, design your game environment using SVG elements, Bind SVG attributes to data properties, Add interactivity and animations.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer you are asked to go to the computer lab to design environment components with SVG or Illustrator.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can design environment components with SVG or Illustrator While demonstrating; explain the steps to design environment components with SVG or Illustrator.

Step 4: Asks trainees to design environment components with SVG or Illustrator and monitor the procedures.

Step 5: Verify whether set up a Vue.js project, create a component for the game environment, add an SVG element to the component, design your game environment using SVG elements, Bind SVG attributes to data properties, add interactivity and animations used in designing environment components with SVG or Illustrator are properly performed.

Step 6: Ask trainees to read key reading 4.1.3.

Points to Remember

- Designing environment components using SVG (Scalable Vector Graphics) involves creating scalable and visually appealing graphics for web or print projects.
  Here are the steps to design environment components using SVG:
    1. Set up a Vue.js project
    2. Create a component for the game environment
    3. Add an SVG element to the component
    4. Design your game environment using SVG elements
    5. Bind SVG attributes to data properties
    6. Add interactivity and animations
- Designing environment components with Adobe Illustrator
  Here are the steps to design environment components using Adobe Illustrator:
    1. Set up your workplace
    2. Research and Conceptualize
    3. Create a Background
    4. Design Environmental Components
    5. Add UI Elements
    6. Use Layers and Groups
    7. Add Texture and Effects
    8. Test Scalability and Resolution
    9. Export Assets

Practical Activity 4.1.4: Designing game HUD (heads-up display)

Notes to the trainer

- This activity should take place in a computer lab where trainees should develop a game that contains Containers for game stats, container for character stats, container for character resources (armor, weapon, tools).

- While delivering this content, you are required to:
  Avail computer connected to the internet.

 **Key steps:**

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As software developer, you are asked to go to the computer lab to design game HUD (heads-up display)

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can design game HUD (heads-up display) While demonstrating, explain the steps used to design game (HUD).

Step 4: Asks trainees to design game HUD (heads-up display) and monitor the procedures.

Step 5: Verify whether Containers for game stats, container for character stats, and container for character resources (armor, weapon, and tools) used in designing game HUD are properly performed.

Step 6: Ask trainees to read key reading 4.1.4.

 **Points to Remember**

- Designing a game HUD (heads-up display) is crucial for providing players with essential information and interactive elements during gameplay.
  Here are the steps to design a game HUD effectively:
  1. Define HUD Elements
  2. Sketch a Layout
  3. Create a New Document
  4. Design Visual Elements
  5. Organize Elements
  6. Optimize for Different Screen Sizes
  7. Integrate into Game

Practical Activity 4.1.5: Designing game characters

Notes to the trainer

- This activity should take place in a computer lab where trainees should design characters using Illustrator and design characters with SVG.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to design game characters.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can design game characters. While demonstrating, explain the steps to design game characters.

Step 4: Asks trainees to design game characters and monitor the procedures.

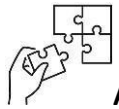
Step 5: Verify whether game characters are properly designed.

Step 6: Ask trainees to read key reading 4.1.5.

Points to Remember

- Steps used to design characters using Illustrator are:
  1. Plan and Sketch
  2. Set Up the Workspace
  3. Basic Shapes
  4. Refine the Outlines
  5. Fill and Stroke
  6. Details and Features
  7. Finalize and Export
- Steps used to design characters with SVG are:
  1. Set up your Vue.js project
  2. Plan your character
  3. Create an SVG component

4. Define the character's SVG mark-up
5. Add data properties and methods
6. Style the character
7. Bind SVG attributes to data properties
8. Reuse and extend



Application of learning 4.1.

X Rwandan museum is a museum located in Musanze district, Muhoza sector, they have a campaign directed toward educating children about historical figures and their contribution to our history. In the beginning, this campaign was conducted via historians in the museum explaining the children about those historical figures, but this method was ineffective since children would get bored and stop paying attention.

X Rwandan Museum would like to hire a game developer, to build a game where children would learn while having fun. The game to develop will be a picture slider puzzle, where the user will get a picture with pieces arranged randomly and will have to rearrange them by clicking on the piece to move. You are requested to do the following:

- ✓ Designing game environment using html canvas
- ✓ Designing environment components with SVG or Illustrator
- ✓ Designing game HUD (heads-up display)
- ✓ Designing game characters

The company will provide all tools, materials and equipment.

Checklist:

Elements	**Indicators**	**Observation**	
		Yes	**No**
Designing game environment using html canvas is well performed	HTML file is created		
	Set up the HTML structure have been performed		
	Canvas is styled		
	JavaScript code have been added		
	Drawing on the canvas have been done		
Environment components with SVG or Illustrator is well designed	Vue.js project have been settled up.		
	Component for the game environment is created.		
	SVG element to the component is added.		

	Game environment using SVG elements are designed.		
	SVG attributes to data properties have been bound.		
	Interactivity and animations have been added.		
Game HUD (heads-up display) is correctly designed	HUD Elements are defined		
	Layout is sketched		
	New Document is created		
	Visual Elements are designed		
	Elements are organized		
	Different screen Sizes are optimized		
	HUD are integrated into Game		

Indicative content 4.2: Develop Game Functionalities

Duration: 20 hrs

Practical Activity 4.2.1: Develop game settings page/section

Notes to the trainer

- This activity should take place in a computer lab where trainees should set up a new Vue.js project, define the setting section, declare and bind variables and incorporate it into the HTML code.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to develop a game setting page/section.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can develop a game setting page/section while demonstrating, explain the steps to develop a game setting page/setting.

Step 4: Asks trainees to develop a game setting page/section and monitor the procedures.

Step 5: Verify whether Set up a new Vue.js project, Define the setting section, Declare and bind variables and incorporate it into the HTML code are properly performed.

Step 6: Ask trainees to read key reading 4.2.1

Points to Remember

- To develop a game settings page/section in Vue.js, you can follow these general steps:
    1. Set up a new Vue.js project
    2. Define setting section
    3. Declare and bind variable

Practical Activity 4.2.2: Manipulating events

Notes to the trainer

- This activity should take place in a computer lab where trainees should define methods in your component to handle user interactions and update the settings data, setup animation speed, and define its behavior.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees do the task described below: As a software developer, you are asked to go to the computer lab, to manipulate events.
Step 2:	Explain the task and provide clear work instruction.
Step 3:	Demonstrate how to manipulate events. While demonstrating, explain the steps to manipulate events.
Step 4:	Asks trainees to manipulate events and monitor the procedures.
Step 5:	Verify whether methods are defined in your component to handle user interactions and settings are updated, animation speed is settled up, define its behavior used in event manipulation are properly performed.
Step 6:	Ask trainees to read key reading 4.2.2.

Points to Remember

- Manipulating events in a game involves controlling and influencing various actions, triggers, and outcomes within the game world to create engaging gameplay experiences.
  Here are the steps to manipulate events effectively in a game:
  1. Define event types
  2. Event system setup
  3. Event triggers
  4. Event conditions
  5. Testing and iteration

Practical Activity 4.2.3: Set up game conditions

Notes to the trainer

- This activity should take place in a computer lab where trainees should set the game conditions, loops and intervals.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees do the task described below: As a software developer, you are asked to go to the computer lab to set up game conditions.
Step 2:	Explain the task and provide clear work instruction.
Step 3:	Demonstrate how to set up game conditions. While demonstrating, explain the steps to set up game conditions.
Step 4:	Asks trainees to set up game conditions and monitor the procedures.
Step 5:	Verify whether loops and intervals used in setting up game conditions are clearly performed.

Step 6: Ask trainees to read key reading 4.2.3.

Points to Remember

- Setting up game conditions is essential for defining the rules, constraints, and triggers that govern gameplay mechanics and outcomes.
  Here are the steps to set up game conditions effectively:

  1.Set the conditions

  2.set loops and intervals

Practical Activity 4.2.4: Setting up random mechanisms to create diversity in the game

Notes to the trainer

- This activity should take place in a computer lab where trainees generate random numbers, use computed properties, and trigger random events
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to set up random mechanisms to create diversity in the game.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can set up random mechanisms to create diversity in the game while demonstrating, explain the steps followed.

Step 4: Asks trainees to set up random mechanisms to create diversity in the game and monitor the procedures.

Step 5: Verify whether Random Numbers, Computed Properties, Trigger Random Events used in setting up random mechanisms to create diversity in the game are clearly performed.

Step 6: Ask trainees to read key reading 4.2.4.

Points to Remember

- To set up random mechanisms for creating diversity in a game using Vue.js, you can follow these steps:

    1. Generate Random Numbers
    2. Use Computed Properties
    3. Trigger Random Events

Practical Activity 4.2.5: Setup incrementals for game scores and increase game difficulties

Notes to the trainer

- This activity should take place in a computer lab where trainees should set up incrementals and increase game difficulties, bind the score and difficulty data properties.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees do the task described below As a software developer, you are asked to go to the computer lab to Set up incrementals and increase game difficulties and Bind the score and difficulty data properties
Step 2:	Explain the task and provide clear work instruction.
Step 3:	Demonstrate how you can set up incrementals and increase game difficulties, while demonstrating, explain the steps to follow
Step 4:	Asks trainees to Set up incrementals and increase game difficulties and monitor the procedures.
Step 5:	Verify whether Bind the score and difficulty data properties used in setting up incrementals and increasing game difficulties are clearly performed.
Step 6:	Ask trainees to read key reading 4.2.5.

Points to Remember

- Setting up incrementals and increasing game difficulties are important aspects of game design to keep players engaged and challenged as they progress.
  Here are the steps to set up incrementals and increase game difficulties effectively:

  1. Establish base difficulty
  2. Identify incremental elements
  3. Define incremental progression
  4. Introduce new mechanics
  5. Dynamic difficulty scaling

Practical Activity 4.2.6: Create and display alert messages

Notes to the trainer

- This activity should take place in a computer lab where trainees should create an alert component and use the alert component in your main Vue component.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees do the task described below As a software developer, you are asked to go to the computer lab to create and display alert messages.
Step 2:	Explain the task and provide clear work instruction.
Step 3:	Demonstrate how you can create and display alert messages while demonstrating, explain the steps to follow.
Step 4:	Asks trainees to create, display alert messages and monitor the procedures.
Step 5:	Verify whether alert component in your main Vue component used in creating and displaying alerts messages are clearly created.
Step 6:	Ask trainees to read key reading 4.2.6.

Points to Remember

- Creating and displaying alert messages in a game is essential for communicating important information, warnings, notifications, or feedback to players.
  Here are the steps to create and display alert messages effectively:

    1. Create an Alert component

    2. Use the Alert component in your main Vue component

Practical Activity 4.2.7: Store data in state management

Notes to the trainer

- This activity should take place in a computer lab where trainees should Install Vuex, create a store and connect the store to an existing Vue application.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1:	Introduce the topic and ask trainees to do the task described below: As a software developer, you are asked to go to the computer lab to perform data store in state management.
Step 2:	Explain the task and provide clear work instruction
Step 3:	Demonstrate how to perform store data in state management, while demonstrating explain the steps to follow.
Step 4:	Asks trainees to perform store data in state management and monitor the procedures.
Step 5:	Verify whether Vuex installation, store creation and connect the store to an existing Vue application used in performing data store in state management are clearly performed.
Step 6:	Ask trainees to read key reading 4.2.7.

Points to Remember

To store data in state management effectively, you can follow these general steps:

1. Install Vuex
2. Create a store
3. Connect the Store to your Vue application
4. Access and modify the data in your components

Application of learning 4.2.

XCT game company is a game development company located in Huye district, that company used to develop different games that are played online for entrainment purpose due to many tasks that they have, they have hired you as game developer responsible for the jump game where you have to do the followings tasks:

- ✓ Develop a game settings page/section in Vue.js
- ✓ Manipulate events effectively in a game
- ✓ Set up game conditions effectively
- ✓ To set up random mechanisms for creating diversity in a game
- ✓ Creating and displaying alert messages
- ✓ To store data in state management

The company for support has provided all tools, materials and equipment.

Checklist:

Elements	Indicators	Observation		Comments
		Yes	No	
Game settings page/section in Vue.js are well developed	Vue.js project is set			
	Setting section is defined			
	Variable is declared and binded			
Events in a game are effectively manipulated	Event types are defined			
	Event System is set			
	Event triggers are used			
	Event conditions are used			
	Testing and Iteration are performed			
Game conditions are effectively set	Conditions are set			
	Loops and intervals are set			
Random mechanisms for creating diversity in a game are well set	Random numbers are generated			
	Trigger random events are used			
	Computed properties are used			
Alert messages are well created and displayed	Alert component is created			
	Alert component in your main Vue component is used			
Data in state management are well stored	Vuex is installed			
	Store is created			
	Store to your Vue application is connected			
	Data in your components are accessed and modified			

Indicative content 4.3: Deploy Game Project on Netlify

Duration: 15 hrs

Practical Activity 4.3.1: Create deploy account on Netlify

Notes to the trainer

- This activity should take place in a computer lab where trainees visit the Netlify Website, sign up with email,create a password, create Netlify account, verify Netlify account, login to Netlify, set up his/her account, and access his/her dashboard
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to create deployment account

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how to create deployment account. While demonstrating, explain the steps to follow.

Step 4: Asks trainees to create deployment account and monitor the procedures.

Step 5: Verify whether deployment account is clearly created.

Step 6: Ask trainees to read key reading 4.3.1

Points to Remember

- Creating a deployment account involves setting up an environment where you can deploy your application or project for public access.
  Here are the general steps to create a deployment account on Netlify:
  1. Visit the Netlify website
  2. Sign up

3. Sign up with Email
4. Create a password
5. Create an account
6. Verification
7. Login
8. Set up account

Practical Activity 4.3.2: Connecting the project with Git repository

Notes to the trainer

- This activity should take place in a computer lab where trainees should open a Terminal or Command Prompt, navigate to your project directory, initialize a new Git repository, add project files to the repository, commit the files, link to a remote repository, push your commit to the remote repository, and verify connection
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to connect the project with git repository.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can connect the project with git repository while demonstrating, explain the steps to follow.

Step 4: Asks trainees to connect the project with the git repository and monitor the procedures.

Step 5: Verify whether projects with git repository are properly connected.

Step 6: Ask trainees to read key reading 4.3.2

Points to Remember

- To connect a project with a Git repository, you'll need to follow a series of steps. assuming that you have Git installed on your computer and that you have a project you want to connect to a repository.

  Here's what you need to do:

  1. Open a Terminal or Command Prompt
  2. Navigate to your project directory
  3. Initialize a new Git repository
  4. Add project files to the repository
  5. Commit the files
  6. Link to a remote repository
  7. Push your commit to the remote repository
  8. Verify connection

Practical Activity 4.3.3: Configure deployment commands

Notes to the trainer

- This activity should take place in a computer lab where trainees should create a Netlify account, add a new site, connect your Git repository, configure build settings, deploy site, continuous deployment, additional settings, branch deploys, custom domains, and Trigger deploy.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below
As a software developer. You are asked to go to the computer lab to configure deployment commands.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can configure deployment commands while demonstrating, explain the steps to follow.

Step 4: Asks trainees to Configure deployment commands and monitor the procedures.

Step 5: Verify whether Netlify account creation, addition of a new site, Git repository connection, build settings configuration, site deployment, continuous deployment, additional settings, branch deploys, custom domains, trigger deployment used in configuring deployment commands are properly performed.

Step 6: Ask trainees to read key reading 4.3.3

Points to Remember

- To configure deployment commands in Netlify, you need to set up a Netlify account, connect your Git repository, and specify the build settings for your project.
  Here's how you can do it:
  1.Create a Netlify account
  2. Add a New site
  3. Connect your Git repository
  4. Configure build settings
  5. Deploy site
  6.Continuous deployment
  7.Additional settings
  8.Branch deploys
  9.Custom domains
  10.Trigger deploy

Practical Activity 4.3.4: Create and merge (Pull Request) PR on Github

Notes to the trainer

- This activity should take place in a computer lab where trainees should fork the repository (if it's not your own), clone the repository, create a new branch, make your changes, commit your changes, push your changes, create the pull request, submit the pull request, and merge a pull request
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below
As a software developer, you are asked to go to the computer lab to create and merge (Pull Request) PR on GitHub.

Step 2: Explain the task and provide clear work instruction.

Step 3: Demonstrate how you can create and merge (Pull Request) PR on GitHub while demonstrating, explain the steps to follow.

Step 4: Asks trainees to create and merge (Pull Request) PR on GitHub and monitor the procedures.

Step 5: Verify whether fork the Repository (if it's not your own), clone the repository, New branch creation, make your changes, commit your changes, push your changes, pull request creation, submit the pull request, merge a pull request used in create and merge (Pull Request) PR on github are properly performed.

Step 6: Ask trainees to read key reading 4.3.4

Points to Remember

- Creating and merging a Pull Request (PR) on GitHub involves a few steps. Here's a step-by-step guide to help you through the process:
  1.Create a Pull Request
  2.Merge a Pull Request

Practical Activity 4.3.5: Testing provided Netlify domain

Notes to the trainer

- This activity should take place in a computer lab where trainees should perform a domain testing as provided by Netlify.
- While delivering this content, you are required to:
  Avail computer connected to the internet.

Key steps:

While delivering this activity, pass through the following steps:

Step 1: Introduce the topic and ask trainees do the task described below:
As a software developer, you are asked to go to the computer lab to test provided Netlify domain.

Step 2: Explain the task and provide clear work instruction.

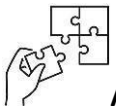
Step 3: Demonstrate how you can test the provided Netlify domain while demonstrating, explain the steps to follow.

Step 4: Verify whether the domain provided by Netlify is clearly tested.

Step 5: Ask trainees to read key reading 4.3.5

Points to Remember

- To test your site using the provided Netlify domain, follow these steps:
  1. Complete deployment
  2. Find Your Netlify subdomain
  3. Visit the URL
  4. Test site functionality
  5. Check for errors
  6. Performance testing
  7. Feedback and iteration



Application of learning 4.3.

The development team have developed a jumping game using Vue.js. The game includes a character that can jump when a specific key is pressed. The character moves up, experience gravity, and fall back down. Additionally, there should be a ground level, and the character should not be able to jump indefinitely. Implement a scoring system that increments as the character successfully jumps over obstacles or reaches higher platforms.

That developed game need to be deployed on Netlify.

As game developer, you have been hired to perform that task.

Checklist:

Elements	Indicators	Observation		Comments
		Yes	No	
Deployment account on Netlify is well Created	Netlify Website is visited			
	Sign Up button is selected or login			
	Sign Up with Email			
	Strong Password is created			
	Account is created			
	Account is verified			
	Account is set			
Project with a Git repository is well Connected	Open a Terminal or Command Prompt is opened			
	Project directory is navigated			
	New Git Repository is initialized			
	Project Files to the Repository are added			
	Files are committed			
	Remote repository is linked			
	Remote repository is pushed			
	Connection is verified			
Deployment commands in Netlify are well Configured	New Site is added			
	Git Repository is connected			
	Build Settings are configured			
	Deploy Site is deployed			
	Continuous deployment is performed			
	Additional Settings are used			
	Deploys are branched			

	Domains are customized			
	Deploy is triggered			

Learning outcome 4 end assessment

Theoretical assessment

1. Which platform is commonly used for deploying static websites?
    A. Netlify
    B. AWS
    C. Heroku
    D. Docker
2. What does a domain name uniquely identify?
    A. A physical server location
    B. A website's IP address
    C. A website's brand and identity
    D. A website's security certificate
3. What does SASS stand for?
    A. Scalable Application Style Sheets
    B. Syntactically Awesome Style Sheets
    C. Structured Application Style Sheets
    D. Scripted Awesome Style Sheets
4. Which HTML5 element is commonly used for dynamic, scriptable rendering of graphics?
    A.
    B. <svg>
    C. <canvas>
    D. <img>
5. What advantage does SVG offer over traditional image formats like JPEG or PNG?
    A. It supports animations and interactivity
    B. It has smaller file sizes
    C. It is easier to embed in HTML
    D. All of the above

6. What aspect of game design focuses on the visual representation of the game world?
    A. Game mechanics
    B. Game interface design
    C. Game physics
    D. Game narrative
7. Which JavaScript method is used to get the rendering context and drawing functions for a <canvas> element?
    A. getContext()
    B. renderContext()
    C. drawContext()
    D. canvasContext()
8. Which JavaScript function is used to draw a filled rectangle on a <canvas> element?
    A. fillRect()
    B. drawRect()
    C. rectFill()
    D. drawFilledRectangle()
9. How does SASS extend CSS?
    A. By adding variables, nesting, and mixins
    B. By converting CSS to JavaScript
    C. By optimizing CSS for faster loading
    D. By embedding JavaScript directly into stylesheets
10. What does the HUD in a game typically display?
    A. Player controls
    B. Game settings
    C. Character health, score, and resources
    D. Background story
11. Fill the empty spaces with the correct keywords in the following statements
    a) Containers for game stats typically include _____ and _____.
    b) SetInterval() in JavaScript is used to _____.
    c) To deploy a game project on Netlify, you need to connect your project to a _____ repository.

ANSWERS

1. A) Netlify
2. C) A website's brand and identity
3. B) Syntactically Awesome Style Sheets
4. C) <canvas>
5. D) All of the above
6. B) Game interface design
7. A) getContext()
8. A) fillRect()
9. A) By adding variables, nesting, and mixins
10. C) Character health, score, and resources
11.
    a) Character health, score
    b) Execute code at set intervals
    c) Git

Practical assessment

The development team have developed a jumping game using Vue.js. The game includes a character that can jump when a specific key is pressed. The character moves up, experience gravity, and fall back down. Additionally, there should be a ground level, and the character should not be able to jump indefinitely. Implement a scoring system that increments as the character successfully jumps over obstacles or reaches higher platforms.

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	Project directory is navigated			
	New Git Repository is initialized			
	Project Files to the Repository are added			
	Files are committed			
	Remote repository is linked			
	Committed to the Remote Repository is pushed			
	Connection is verified			
Deployment commands in Netlify are well configured	New Site is added			
	Git Repository is connected			
	Build settings are configured			
	Site is deployed			
	Continuous deployment is performed			
	Additional settings are used			
	Deploys are branched			
	Domains are customized			
	Deploy is triggered			

Further information to the trainer

Salen, K., & Zimmerman, E. (2003). Rules of play: Game design fundamentals. *MIT Press.* https://www.amazon.com/Rules-Play-Game-Design-Fundamentals/dp/0262240459

Game Developer. (n.d.). *Blogs*. Game Developer. https://www.gamedeveloper.com/blogs#close-modal

Johnson, A. (2020). Integrating the Vue Framework in Game Development: Best Practices and Case Studies. Game Development Quarterly, volume(issue), page numbers.

Smith, J. (2021). Setting Up the Development Environment for Game Development. Journal of Game Development, volume(issue), page numbers. URL

Williams, R. (2021). Game Planning and Design Strategies: A Comprehensive Guide. International Journal of Game Design and Development, volume(issue), page numbers.

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October 2024