LEARNER MANAGEMENT AND 3D SIMULATION SYSTEM FOR CRANE TRAINING CENTER

GROUP: GFA25SE59

TOPIC: FA25SE097

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Introduction

Context & problem

1.Context:

This system is designed for a driving training center to organize crane operation training courses using simulation exercises for trainees before they practice on real equipment. It helps track trainee progress and simulate real practice to prepare trainees and improve safety.

2.Problem:

- Crane simulation in Vietnam is not available
- Safety risks for beginners using real equipment.
- Manual, inefficient management of programs, classes, and trainee progress.
- Existing LMS and simulators are not integrated.

Solution

LSSCTC provides an all-in-one training ecosystem combining:

- A web-based LMS for managing users, courses, classes, materials, quizzes, and performance.

- A desktop 3D simulation app for safe, low-cost, repeatable crane practice.
- Unified tracking of theoretical and practical results.

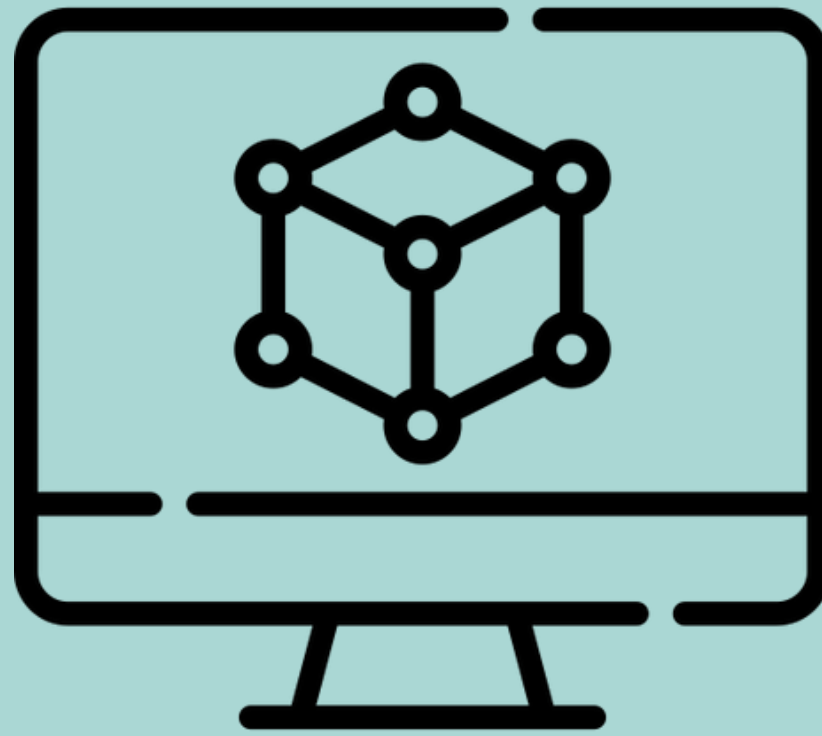This reduces cost, increases safety, improves training quality, and centralizes training center operations.

Technology

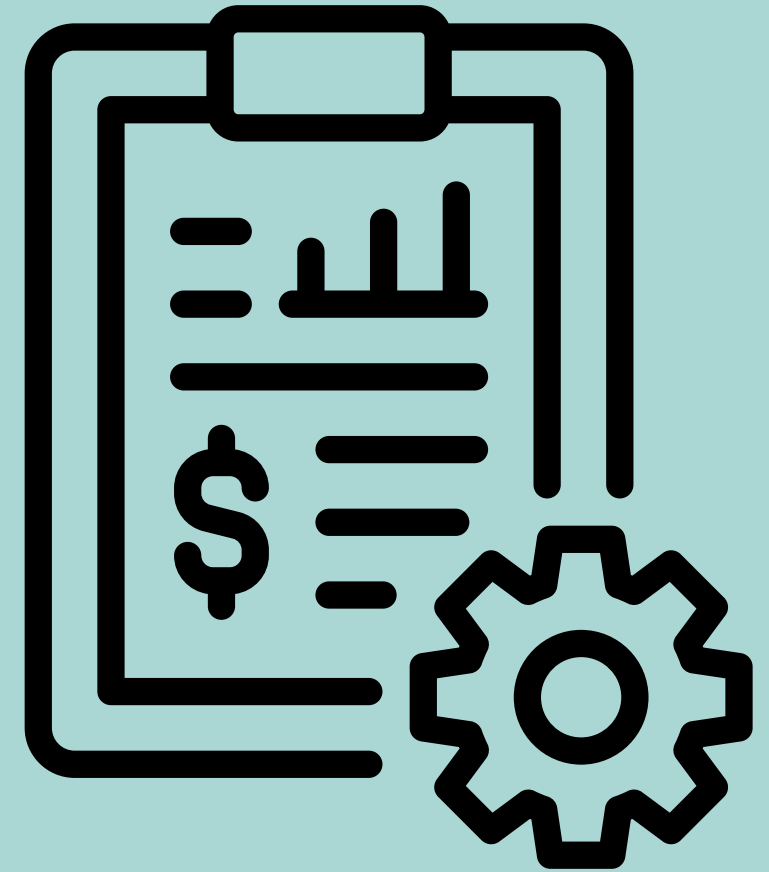| Category	Tool / Infrastructure
Technology	ReactJs (Front-End), .Net (Back-End), Unity (Simulation)
Database	SQL Server
IDEs/Editors	Visual Studio Code, Visual Studio
Diagramming	Draw.io
Documentation	Google Docs/Sheets
Version Control	GitHub (Source Codes), Google Drive (Documents)
Deployment Server	Azure Web Service, Azure VM
Project Management	Google Sheet

Main Features

Learning Management System (LMS)

Simulation Training System

Management

Actors

Actors

Trainee

- View and enroll in available programs, courses, classes
- View class syllabus and sections
- Access and download assigned learning materials
- Access and attempt quizzes, view recorded results
- View and attempt assigned practices, view recorded results
- In 3D simulation: view assigned practices, select practice attempts, view guides/settings, interact with simulation tasks/components, receive tasks results.
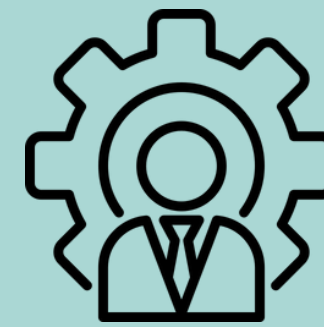
Instructor

- Manage class members (view, add)
- Manage class sections (view, add, update)
- Manage learning materials (view, add, update, assign to sections)
- Manage quizzes (view, add, update, assign to sections)
- View and assign practices to class sections
- View trainee quiz and practice results, provide direct feedback
- View overall trainee performance and confirm pass/fail status

Admin

- Manage user accounts (view, add, deactivate)
- Manage programs (view, add, update, assign courses)
- Manage courses (view, add, update)
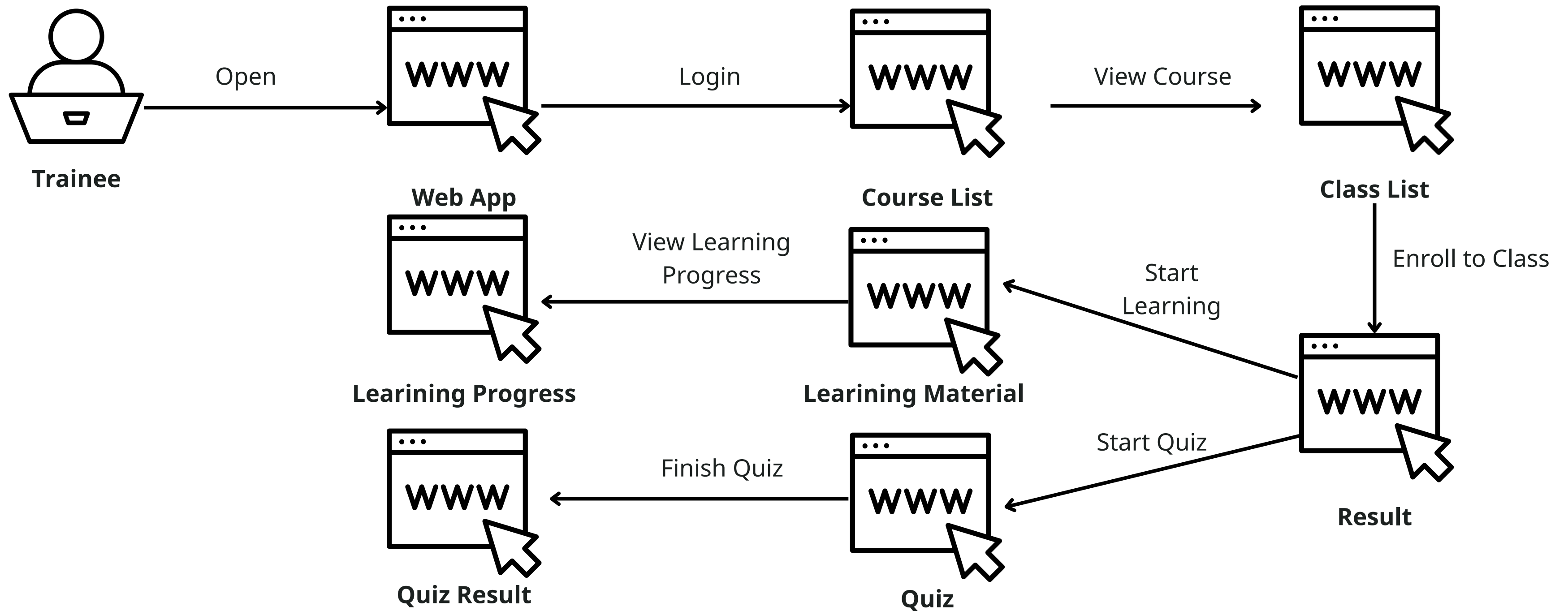- Manage classes (view, add for courses, update, assign instructors)
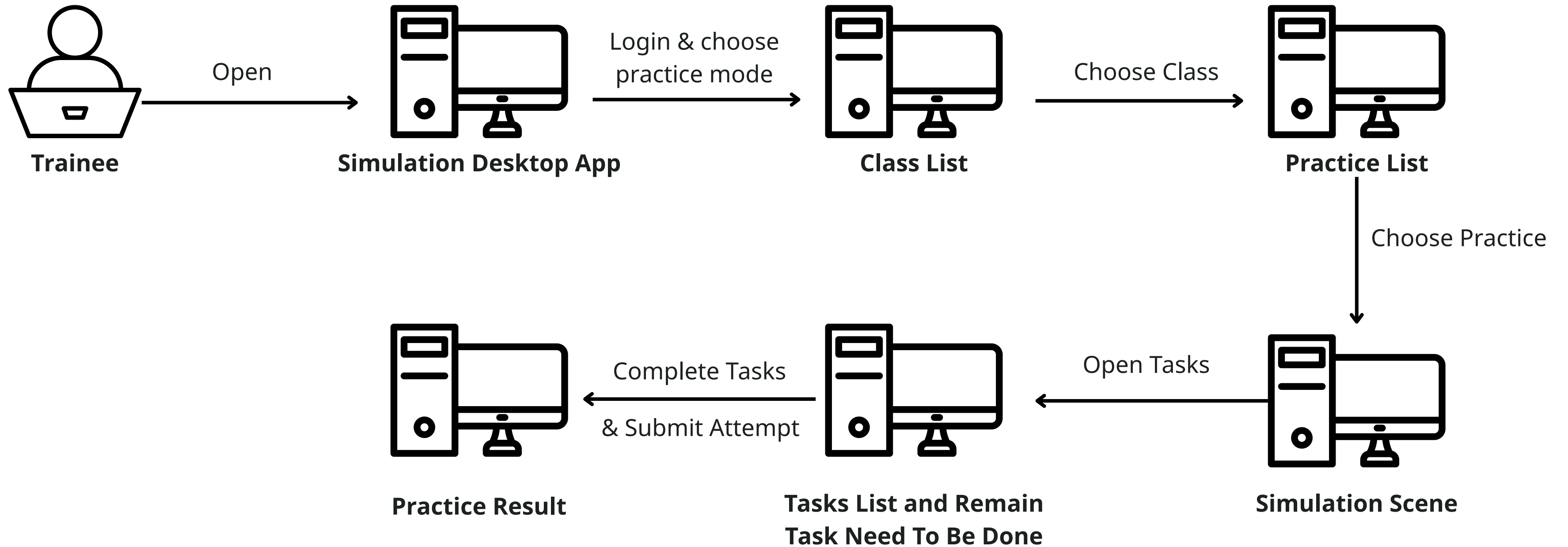
Simulation Manager

- Manage simulation components (view, add, update)
- Manage simulation practices (view, add, update)
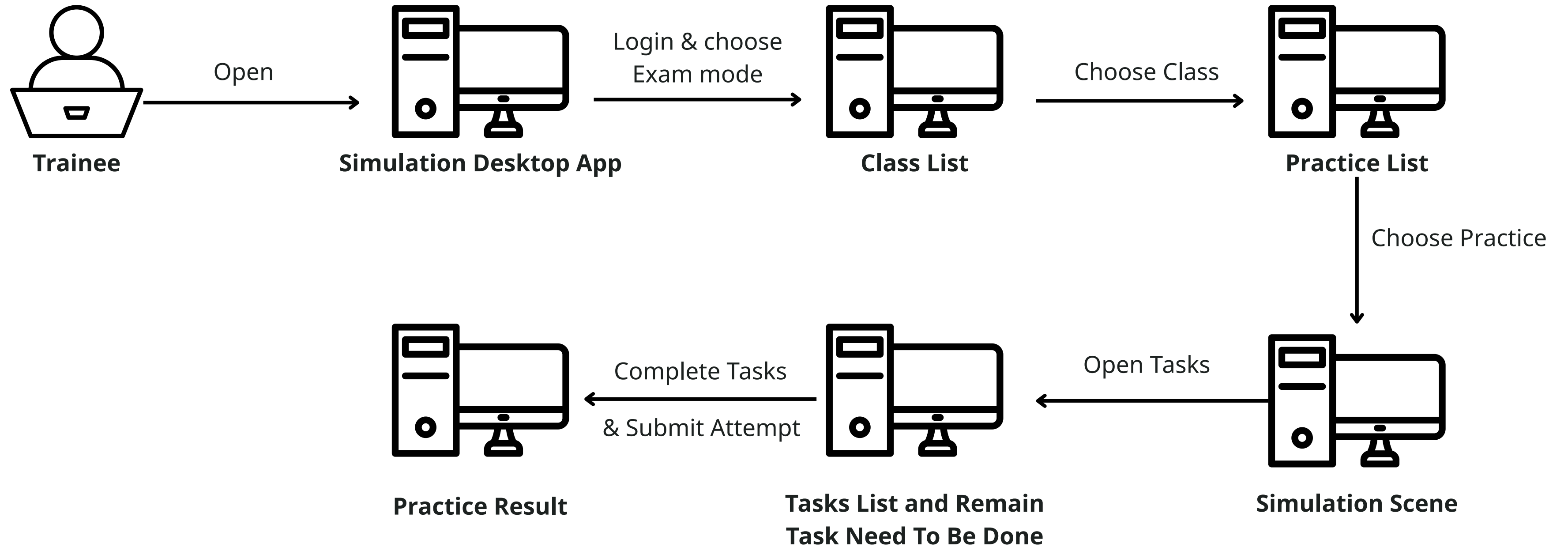- Manage practice tasks (view, add, update)

Demo

Workflow : Enroll to class & leaning

Workflow : Simulation practice

Trainee — Open → **Simulation Desktop App** — Login & choose practice mode → **Class List** — Choose Class → **Practice List**

Choose Practice ↓

Practice Result ← Complete Tasks & Submit Attempt — **Tasks List and Remain Task Need To Be Done** ← Open Tasks — **Simulation Scene**

Workflow : Final Exam

Trainee —Open→ **Simulation Desktop App** —Login & choose Exam mode→ **Class List** —Choose Class→ **Practice List**

Practice List —Choose Practice→ **Simulation Scene**

Simulation Scene —Open Tasks→ **Tasks List and Remain Task Need To Be Done** —Complete Tasks & Submit Attempt→ **Practice Result**
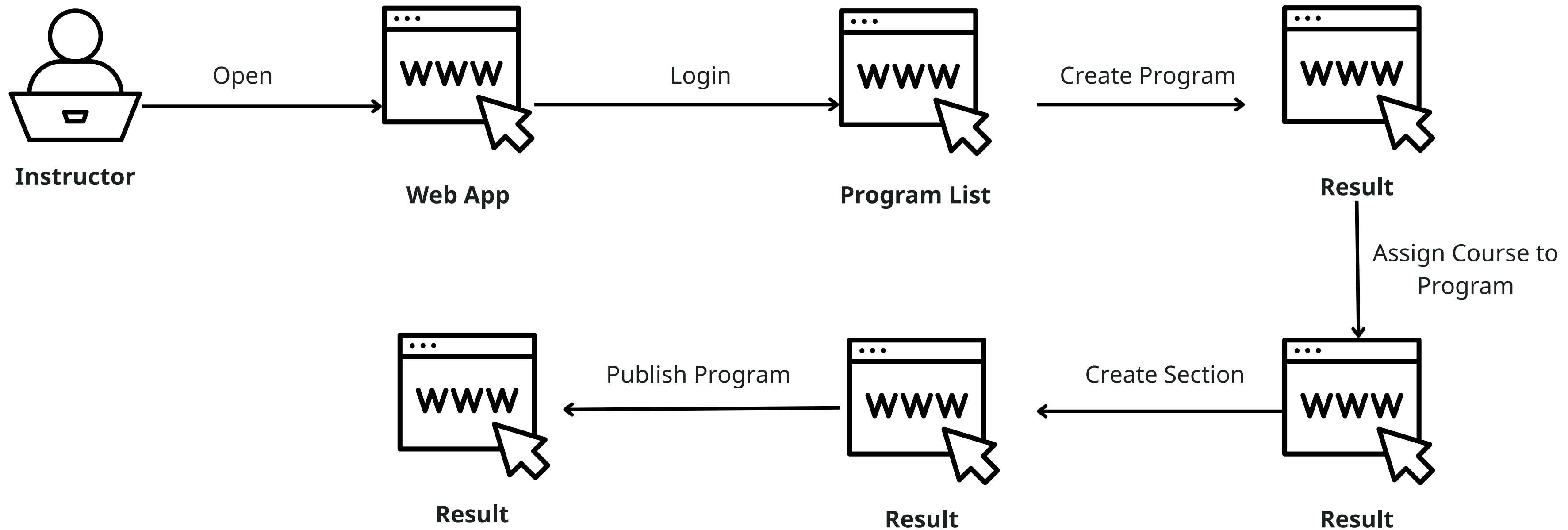
Workflow : Final Reporting and Summary Evaluation

Workflow : Create And Manage Learning Programs, Courses

Thank you very much!

BY LSSCTC

Q&A