

LKS SMK National 2025

IT Software Solutions for Business

Desktop Application Development

Esemka School Management System

Competition Information

Competition: LKS SMK National 2025 - IT Software Solutions for Business

Module: Desktop Application Development

Duration: 3 hours

Technology: C# (.NET Framework/Core), Windows Forms/WPF, SQL Server

Skill Area: Desktop Application Development, Database Integration



Problem Description

Company Background

Esemka School is a progressive vocational high school (SMK) located in Indonesia, specializing in technology education. The school was established to prepare students for careers in the rapidly growing technology sector.

School Programs:

- **RPL (Rekayasa Perangkat Lunak)** - Software Engineering Program
- **TKJ (Teknik Komputer dan Jaringan)** - Computer Network Engineering Program

Current Situation:

The school operates with classes from Grade X to XII, with multiple classes for each program level. Currently, Esemka School manages student attendance, academic assessments, and student records manually using paper-based systems. This approach has led to several operational challenges:

- **Data Inconsistencies:** Manual record-keeping results in errors and conflicting information
- **Inefficient Processes:** Teachers spend excessive time on administrative tasks
- **Limited Analytics:** Difficulty in tracking student performance trends and identifying students who need additional support
- **Poor Communication:** Lack of centralized system for academic information sharing

Business Requirements:

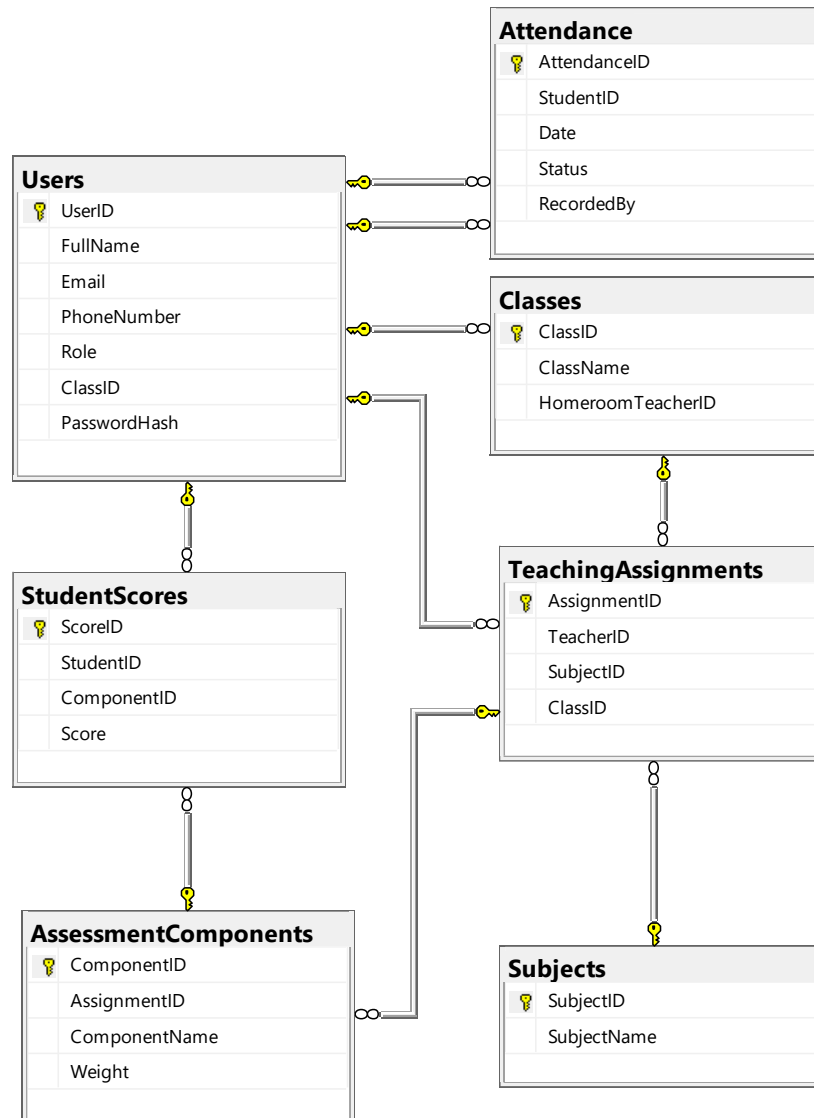
The school administration has decided to implement a comprehensive digital solution to streamline their academic management processes. The system must serve two primary user roles:

1. **Teachers:** Input scores, manage assessment components, monitor student performance
2. **Homeroom Teachers:** All teacher functions plus attendance management for assigned classes

Technical Specifications

Database Schema

The application must integrate with a SQL Server database containing the following entities:



Core Tables:

- **Users:** Teachers and Students with authentication data
- **Classes:** Class information with assigned homeroom teachers
- **Subjects:** Available subjects in the curriculum
- **TeachingAssignments:** Mapping teachers to subjects and classes
- **AssessmentComponents:** Grading components with weights
- **StudentScores:** Individual assessment scores
- **Attendance:** Daily attendance records

Sample Data:

The database includes comprehensive test data:

- 20 Teachers (including homeroom teachers)
- 9 Classes across different programs and levels
- 100+ Students distributed across classes
- Complete teaching assignments and schedules

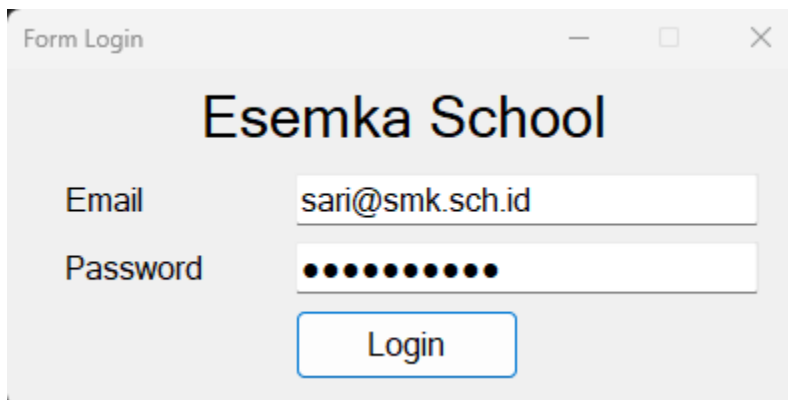
Authentication Credentials:

- sari@smk.sch.id - Homeroom teacher for X RPL 1
- wahyu@smk.sch.id - Homeroom teacher for X TKJ 1
- budi@smk.sch.id - Regular teacher
- amutlow0@smk.sch.id - Regular teacher have 2 subjects

Application Requirements

Mandatory Features

1. Authentication System

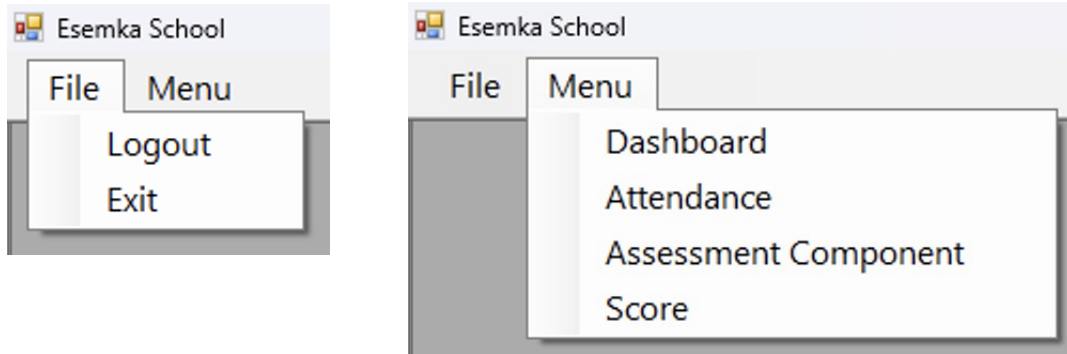


Form: Login

- **UI Requirements:**
 - Professional login interface matching provided wireframe
 - School branding with "Esemka School" title
 - Email and password input fields
 - Centered, fixed-size window
- **Functionality:**
 - Authenticate against Users table
 - Role validation (teachers only)

- Session management
- Error handling for invalid credentials

2. Main Application Interface



Note: Main form shows MenuStrip navigation as demonstrated in wireframes

Form: Main MDI Container

- **UI Requirements:**
 - MenuStrip navigation system
 - File menu: Logout, Exit
 - Main menu: Dashboard, Attendance, Assessment Component, Score
 - Professional window with school branding
- **Functionality:**
 - MDI (Multiple Document Interface) implementation
 - Role-based menu visibility
 - Session persistence
 - Clean navigation between modules

3. Dashboard Analytics

Dashboard

Name	Subject	Class	Score
Chiquia Claige	Pemrogram...	XI RPL 1	27.60
Rutledge Pa...	Pemrogram...	XI RPL 1	32.40
Gates Cuerda	Pemrogram...	XI RPL 1	38.85
Erhart Duds...	Pemrogram...	XI RPL 1	39.00
Kandace Ba...	Pemrogram...	XI RPL 1	39.45
Alyosha Truin	Pemrogram...	XI RPL 1	41.10
Jaymee Tru...	Pemrogram...	XI RPL 1	41.25
Marrilee Abr...	Pemrogram...	XI RPL 1	42.90
Abbi Marten...	Pemrogram...	XI RPL 1	44.40
Jermaine H...	Pemrogram...	XI RPL 1	53.10

Name	AbsenceCount
Adolphe Merington	4
Aldrich Gogay	4
Emlynn Vertigan	2
Clyde Cluff	1
Conway Carsberg	1
Dina Ayu	1
Ilise Huyge	1
Mead Outridge	1
Nicky Righy	1
Tyrone Nevinson	1

Form: Dashboard

- **UI Requirements:**
 - Two-panel layout with data grids
 - Left panel: "10 Lowest Scoring Students"
 - Right panel: "10 Students with Highest Absence Rate"
- **Functionality:**
 - Real-time data analysis
 - Teacher-specific data filtering
 - Performance metrics calculation
 - Visual data presentation

4. Attendance Management

Attendance

Class: X RPL 1

Date: 23 Jul 2025

Search:

Student Name	Status
Adolphe Merington	Hadir
Aldrich Gogay	Hadir
Andi Pratama	Hadir
Clyde Cluff	Hadir
Conway Carsberg	Hadir
Dina Ayu	Hadir
Emlynn Vertigan	Sakit
Ilise Huyge	Hadir
Mead Outridge	Hadir
Nicky Righy	Hadir
Tyrone Nevinson	Hadir

Save

Form: Attendance

- **UI Requirements:**
 - Class selection dropdown
 - Date picker for attendance date
 - Student grid with status dropdowns
 - Search functionality for student filtering
- **Functionality:**
 - Daily attendance recording
 - Status options: “Hadir”, “Sakit”, “Izin”, and “Alpha”
 - Bulk operations support (insert or update)
 - Historical attendance tracking

5. Assessment Component Management

Assessment Component

Subject: Pemrograman Web

Class: X RPL 1

Search:

ComponentID	ComponentName	Weight
64	Project	30.00
67	Tugas 1	15.00
70	Tugas 2	15.00
73	UTS	20.00
76	UAS	20.00

Total Weight: 100.00

Detail

Component ID: 64

Component Name: Project

Weight: 30.00

Insert Update Delete

Save Cancel

Form: Assessment Component

- **UI Requirements:**
 - Subject and class filter dropdowns
 - Main grid displaying components with weights
 - Detail section for CRUD operations
- **Functionality:**
 - Create, read, update, delete assessment components
 - Weight percentage management
 - Component name uniqueness validation
 - Integration with scoring system

6. Score Management System

UserID	Name	Project	Tugas 1	Tugas 2	UTS	UAS	Final Score
60	Abbi Martens...	74.00	71.00	77.00			44.40
58	Alyosha Truin	81.00	57.00	55.00			41.10
64	Chiquia Claige	50.00	42.00	42.00			27.60
63	Erhart Dudson	47.00	95.00	71.00			39.00
62	Gates Cuerda	66.00	46.00	81.00			38.85
57	Jaymee Trunks	66.00	93.00	50.00			41.25
56	Jermaine He...	91.00	78.00	94.00			53.10
59	Kandace Bar...	76.00	40.00	71.00			39.45
61	Marrilee Abra...	81.00	74.00	50.00			42.90
55	Ranice Reich...	96.00	90.00	82.00			54.60
54	Rutledge Pa...	43.00	68.00	62.00			32.40

Statistic

Average	68.89	A (100-85)	2	D (65-50)	3
Min	46.00	B (85-75)	0	E (50-0)	1
Max	91.00	C (75-65)	5		

Export CSV
Import CSV

Form: Score

- **UI Requirements:**
 - Load the subjects and classes associated with the user session.
 - Subject and class selection filters
 - Dynamic score grid with component columns
 - Statistical analysis section
 - Export/Import CSV functionality
- **Functionality:**
 - Individual score input for each assessment component
 - Automatic final score calculation using weighted averages
 - Class statistics generation (average, min, max)
 - Grade distribution analysis (A-E grades)

- Data export/import capabilities
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Good luck with your development!

This competition problem is designed to test comprehensive desktop application development skills including database integration, user interface design, business logic implementation, and software engineering best practices.