

# **LKS SMK National 2025**

## **IT Software Solutions for Business**

**Desktop Application Development**

**Esemka School Management System**

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### **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

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## **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:

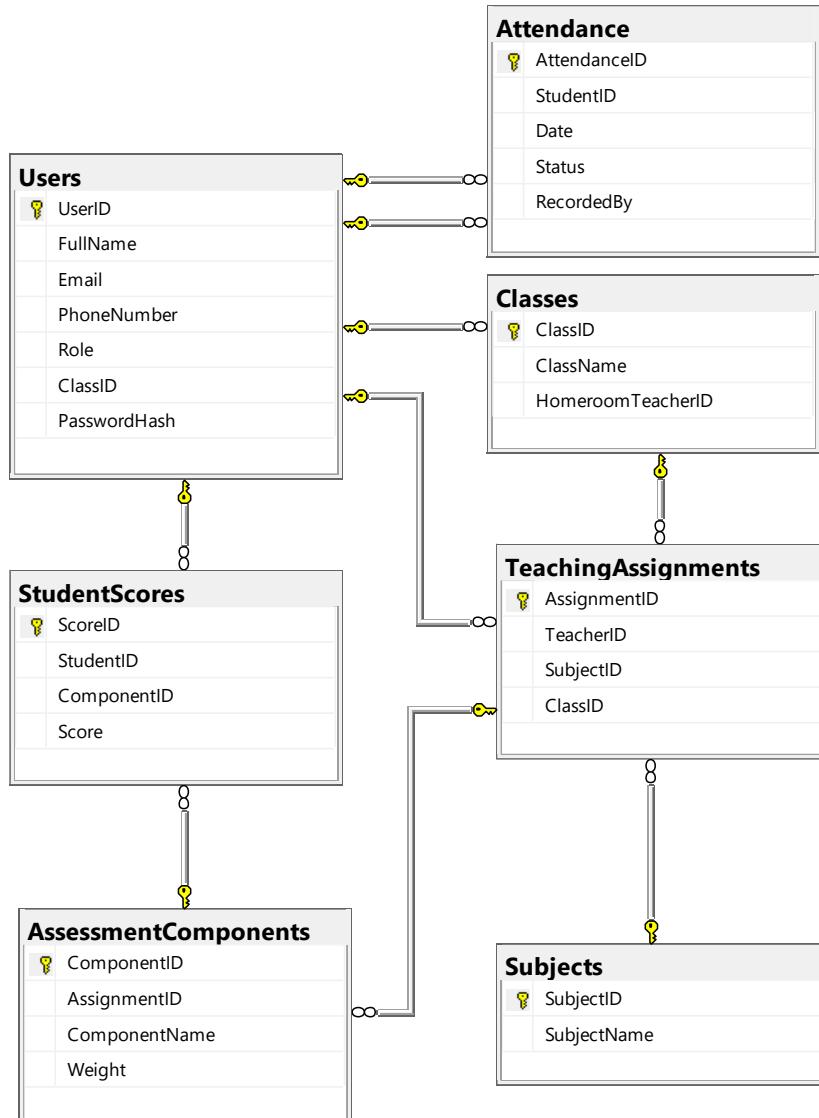
1. **Teachers:** Input scores, manage assessment components, monitor student performance
2. **Homeroom Teachers:** All teacher functions plus attendance management for assigned classes

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## **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

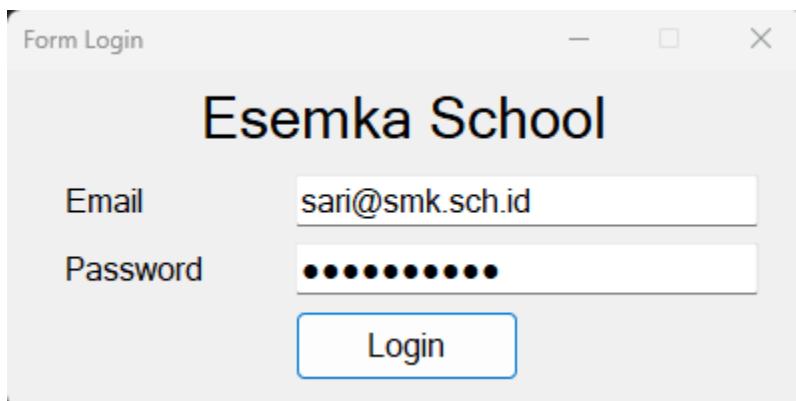
#### **Authentication Credentials:**

- [sari@smk.sch.id](mailto:sari@smk.sch.id) - Homeroom teacher for X RPL 1
- [wahyu@smk.sch.id](mailto:wahyu@smk.sch.id) - Homeroom teacher for X TKJ 1
- [budi@smk.sch.id](mailto:budi@smk.sch.id) - Regular teacher
- [amutlow0@smk.sch.id](mailto:amutlow0@smk.sch.id) - Regular teacher have 2 subjects

#### **Application Requirements**

##### **Mandatory Features**

###### **1. Authentication System**



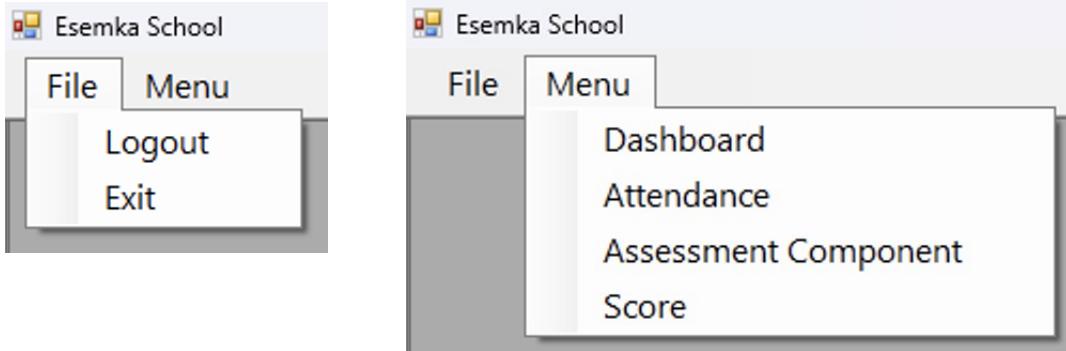
The screenshot shows a simple login interface titled "Form Login". The title bar has standard window controls (minimize, maximize, close). The main area is titled "Esemka School". It contains two input fields: "Email" with the value "sari@smk.sch.id" and "Password" with several black dots representing the password. Below the inputs is a blue rectangular button labeled "Login".

##### **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 ToolStrip navigation as demonstrated in wireframes*

### Form: Main MDI Container

- **UI Requirements:**
  - ToolStrip 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

The screenshot shows a Windows-style application window titled "Dashboard". It features a two-panel layout. The left panel is titled "10 Lowest Scoring Students" and contains a table with four columns: Name, Subject, Class, and Score. The right panel is titled "10 Students with Highest Absence Rate" and contains a table with two columns: Name and AbsenceCount.

Name	Subject	Class	Score
Chiquia Clai... ge	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

The screenshot shows a Windows-style application window titled "Attendance". At the top left, there are fields for "Class" (set to "X RPL 1") and "Date" (set to "23 Jul 2025"). To the right of these is a "Search" input field. Below the search bar is a grid table with two columns: "Student Name" and "Status". The grid contains 11 rows of student data. The first row, "Adolphe Merington", is highlighted with a blue background. The "Status" column for all students is set to "Hadir". A "Save" button is located at the bottom right of the grid area.

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

#### 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

The screenshot shows a Windows application window titled "Assessment Component". At the top, there are dropdown menus for "Subject" (set to "Pemrograman Web") and "Class" (set to "X RPL 1"), and a search bar. Below these are two tables. The first table displays a list of assessment components with columns for ComponentID, ComponentName, and Weight. The second table, labeled "Detail", shows the selected component's details: Component ID (64), Component Name (Project), and Weight (30.00). Buttons for Insert, Update, Delete, Save, and Cancel are visible at the bottom of the detail section.

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

Component ID:	64
Component Name:	Project
Weight:	30.00

Detail

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

The screenshot shows a Windows application window titled "Score". At the top, there are two dropdown menus: "Subject" set to "Pemrograman Web" and "Class" set to "XI RPL 1". Below these is a data grid table with columns: UserID, Name, Project, Tugas 1, Tugas 2, UTS, UAS, and Final Score. The data grid contains 15 rows of student records. At the bottom left, there is a "Statistic" section with input fields for Average (68.89), Min (46.00), Max (91.00), Grade A count (2), Grade B count (0), Grade C count (5), Grade D count (3), and Grade E count (1). On the right side, there are "Export CSV" and "Import CSV" buttons.

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 Clai...ge	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

### 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.*