

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
import java.util.ArrayList;
```

```
class Student {
    private String id;
    private String name;
    private String grade;

    public Student(String id, String name,
String grade) {
        this.id = id;
        this.name = name;
        this.grade = grade;
    }

    public String getId() {
        return id;
    }
}
```

```
public void setName(String name) {  
    this.name = name;  
}
```

```
public void setGrade(String grade) {  
    this.grade = grade;  
}
```

```
@Override
```

```
public String toString() {  
    return "ID: " + id + ", Name: " + name +  
    ", Grade: " + grade;  
}  
}
```

```
public class SchoolManagementSystem  
extends JFrame {  
    private ArrayList<Student> students =  
new ArrayList<>();  
    private JTextArea displayArea;
```

```
public SchoolManagementSystem() {  
    setTitle("School Management System");  
    setSize(600, 400);  
  
    setDefaultCloseOperation(JFrame.EXIT_ON  
_CLOSE);  
    setLocationRelativeTo(null);  
  
    // Components  
    JPanel panel = new JPanel();  
    panel.setLayout(new GridLayout(5, 2,  
10, 10));  
  
    JLabel idLabel = new JLabel("Student  
ID:");  
    JTextField idField = new JTextField();  
  
    JLabel nameLabel = new  
JLabel("Student Name:");  
    JTextField nameField = new  
JTextField();
```

```
    JLabel gradeLabel = new  
JLabel("Grade:");  
    JTextField gradeField = new  
JTextField();
```

```
    JButton addButton = new  
JButton("Enroll Student");  
    JButton updateButton = new  
JButton("Update Student");  
    JButton viewButton = new  
JButton("View All Students");
```

```
    displayArea = new JTextArea();  
    displayArea.setEditable(false);  
    JScrollPane scrollPane = new  
JScrollPane(displayArea);
```

```
// Add components to panel  
panel.add(idLabel);  
panel.add(idField);
```

```
panel.add(nameLabel);  
panel.add(nameField);  
panel.add(gradeLabel);  
panel.add(gradeField);  
panel.add(addButton);  
panel.add(updateButton);  
panel.add(viewButton);
```

```
// Add panel and scroll pane to frame  
add(panel, BorderLayout.NORTH);  
add(scrollPane, BorderLayout.CENTER);
```

```
// Action Listeners
```

```
addButton.addActionListener(e -> {  
    String id = idField.getText().trim();  
    String name =  
nameField.getText().trim();  
    String grade =  
gradeField.getText().trim();
```

```
    if (id.isEmpty() || name.isEmpty() ||
```

```
grade.isEmpty()) {
```

```
    JOptionPane.showMessageDialog(this, "All  
fields are required.", "Error",  
    JOptionPane.ERROR_MESSAGE);  
    return;  
}
```

```
    students.add(new Student(id, name,  
grade));
```

```
    JOptionPane.showMessageDialog(this,  
    "Student enrolled successfully!", "Success",  
    JOptionPane.INFORMATION_MESSAGE);  
    clearFields(idField, nameField,  
gradeField);  
});
```

```
updateButton.addActionListener(e -> {  
    String id = idField.getText().trim();  
    String name =
```

```
nameField.getText().trim();
```

```
    String grade =  
gradeField.getText().trim();
```

```
        if (id.isEmpty() || name.isEmpty() ||  
grade.isEmpty()) {
```

```
JOptionPane.showMessageDialog(this, "All  
fields are required.", "Error",  
JOptionPane.ERROR_MESSAGE);
```

```
    return;  
}
```

```
boolean updated = false;  
for (Student student : students) {  
    if (student.getId().equals(id)) {  
        student.setName(name);  
        student.setGrade(grade);  
        updated = true;  
        break;  
    }  
}
```

```
}
```

```
    if (updated) {
```

```
        JOptionPane.showMessageDialog(this,  
            "Student information updated  
successfully!", "Success",  
            JOptionPane.INFORMATION_MESSAGE);  
    } else {
```

```
        JOptionPane.showMessageDialog(this,  
            "Student not found!", "Error",  
            JOptionPane.ERROR_MESSAGE);  
    }
```

```
        clearFields(idField, nameField,  
gradeField);  
    });
```

```
viewButton.addActionListener(e -> {  
    if (students.isEmpty()) {
```



```
        displayArea.setText("No students  
enrolled yet.");  
    } else {  
        StringBuilder sb = new  
StringBuilder();  
        for (Student student : students) {  
            sb.append(student).append("\n");  
        }  
        displayArea.setText(sb.toString());  
    }  
});  
}
```

```
private void clearFields(JTextField...  
fields) {  
    for (JTextField field : fields) {  
        field.setText("");  
    }  
}
```

```
public static void main(String[] args) {
```

```
SwingUtilities.invokeLater(() -> {  
    new  
    SchoolManagementSystem().setVisible(true);  
    });  
}
```