Riphah International University – Lahore Campus

Advanced Computer Programming

Project Title: Solar Management System

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Section: BSCS-5

Submitted To:

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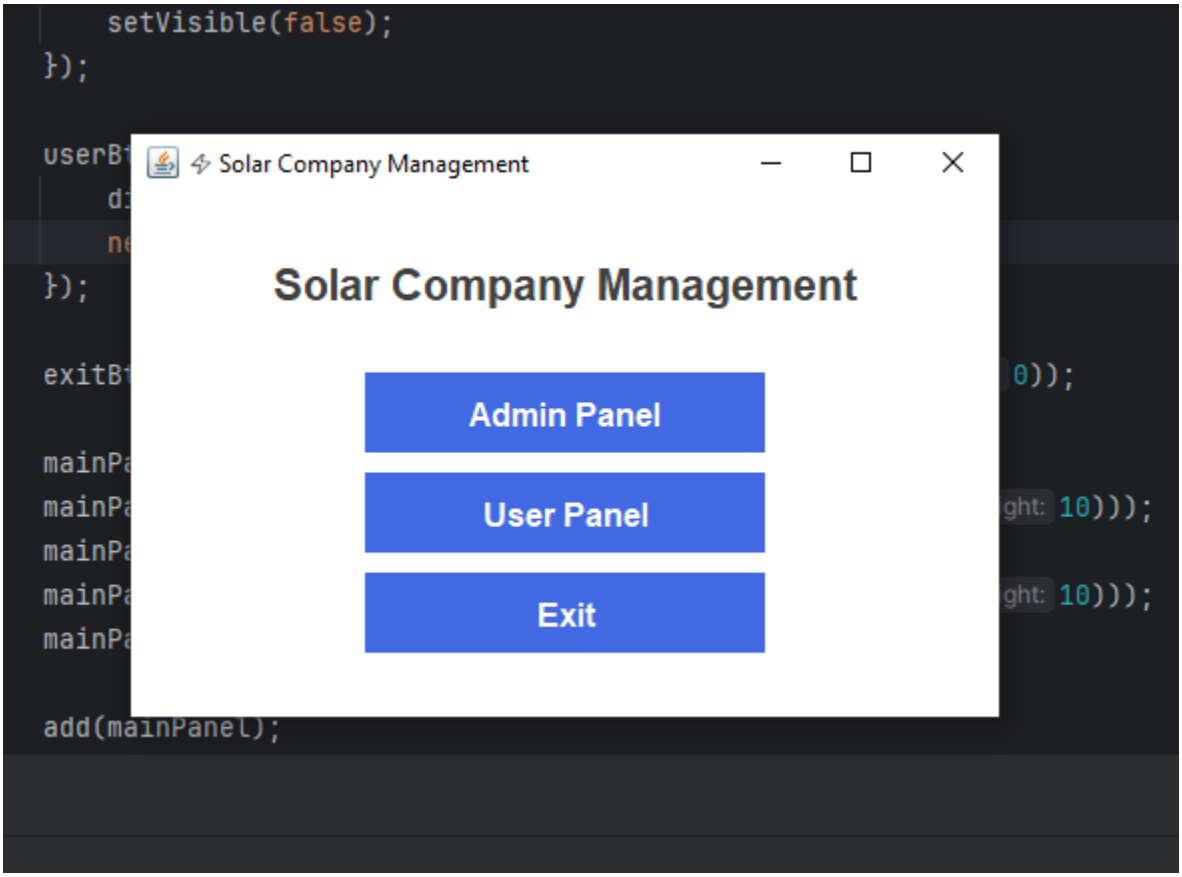
Code:

```
import javax.swing.*;
import java.awt.*;

public class MainMenu extends JFrame {
    public MainMenu() {
        setTitle("⚡ Solar Company Management");
        setSize(450, 300);
        setDefaultCloseOperation(EXIT_ON_CLOSE);
        setLocationRelativeTo(null);

        JPanel mainPanel = new JPanel();
        mainPanel.setBorder(BorderFactory.createEmptyBorder(30, 30, 30, 30));
        mainPanel.setLayout(new BoxLayout(mainPanel, BoxLayout.Y_AXIS));
        mainPanel.setBackground(Color.WHITE);

        JLabel titleLabel = new JLabel("Solar Company Management",
SwingConstants.CENTER);
        titleLabel.setFont(new Font("SansSerif", Font.BOLD, 22));
        titleLabel.setAlignmentX(Component.CENTER_ALIGNMENT);
        titleLabel.setForeground(Color.DARK_GRAY);
        mainPanel.add(titleLabel);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 30)));

        JButton adminBtn = createStyledButton("Admin Panel");
        JButton userBtn = createStyledButton("User Panel");
        JButton exitBtn = createStyledButton("Exit");

        adminBtn.addActionListener(e -> {
            new AdminLogin(this).setVisible(true);
            setVisible(false);
        });

        userBtn.addActionListener(e -> {
            dispose();
            new UserPanel(this).setVisible(true);
        });

        exitBtn.addActionListener(e -> System.exit(0));

        mainPanel.add(adminBtn);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 10)));
```

```
        mainPanel.add(userBtn);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 10)));
        mainPanel.add(exitBtn);

        add(mainPanel);
    }

    private JButton createStyledButton(String text) {
        JButton button = new JButton(text);
        button.setFont(new Font("SansSerif", Font.BOLD, 16));
        button.setBackground(new Color(65, 105, 225));
        button.setForeground(Color.WHITE);
        button.setFocusPainted(false);
        button.setOpaque(true);
        button.setContentAreaFilled(true);
        button.setBorderPainted(false);
        button.setAlignmentX(Component.CENTER_ALIGNMENT);
        button.setMaximumSize(new Dimension(200, 40));
        return button;
    }

    public static void main(String[] args) {
        SwingUtilities.invokeLater(() -> new MainMenu().setVisible(true));
    }
}
```

Output:



Admin Login:

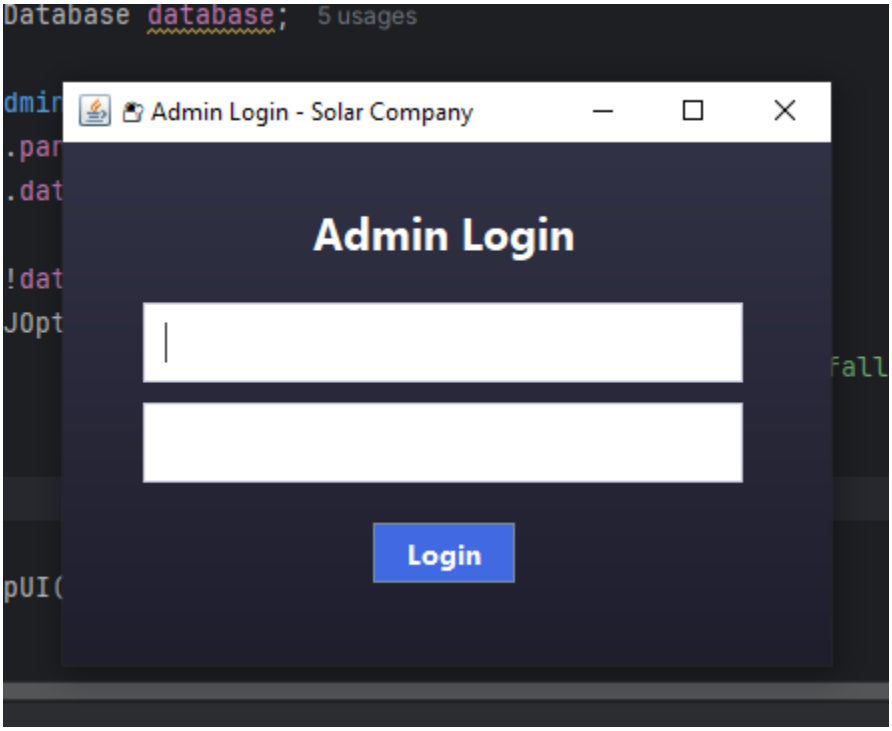
```
import javax.swing.*;
import java.awt.*;
import java.sql.*;
```

```
public class AdminLogin extends JFrame {
    private JFrame parent;
    private Database database;

    public AdminLogin(JFrame parent) {
        this.parent = parent;
        this.database = new Database();

        if (!database.isConnected()) {
            JOptionPane.showMessageDialog(this,
                    "Database connection failed. Using fallback credentials.",
                    "Warning",
                    JOptionPane.WARNING_MESSAGE);
        }

        setupUI();
    }

    private void setupUI() {
        setTitle("🔐 Admin Login - Solar Company");
        setSize(400, 300);
        setDefaultCloseOperation(DISPOSE_ON_CLOSE);
        setLocationRelativeTo(null);

        JPanel panel = new JPanel() {
            @Override
            protected void paintComponent(Graphics g) {
                super.paintComponent(g);
                Graphics2D g2d = (Graphics2D) g;
                Color color1 = new Color(50, 50, 70);
                Color color2 = new Color(30, 30, 45);
                GradientPaint gp = new GradientPaint(0, 0, color1, 0, getHeight(),
color2);
                g2d.setPaint(gp);
                g2d.fillRect(0, 0, getWidth(), getHeight());
            }
        };

        panel.setLayout(new BoxLayout(panel, BoxLayout.Y_AXIS));
        panel.setBorder(BorderFactory.createEmptyBorder(30, 40, 30, 40));

        JLabel titleLabel = new JLabel("Admin Login", SwingConstants.CENTER);
        titleLabel.setFont(new Font("Segoe UI", Font.BOLD, 22));
        titleLabel.setForeground(Color.WHITE);
        titleLabel.setAlignmentX(Component.CENTER_ALIGNMENT);
        panel.add(titleLabel);
        panel.add(Box.createRigidArea(new Dimension(0, 20)));

        JTextField usernameField = new JTextField();
        JPasswordField passwordField = new JPasswordField();
        styleField(usernameField, "Username");
        styleField(passwordField, "Password");

        panel.add(usernameField);
        panel.add(Box.createRigidArea(new Dimension(0, 10)));
        panel.add(passwordField);
        panel.add(Box.createRigidArea(new Dimension(0, 20)));

        JButton loginBtn = new JButton("Login");
        loginBtn.setAlignmentX(Component.CENTER_ALIGNMENT);
        loginBtn.setPreferredSize(new Dimension(100, 40));
        loginBtn.setFont(new Font("Segoe UI", Font.BOLD, 14));
```

```
        loginBtn.setFocusPainted(false);
        loginBtn.setBackground(new Color(65, 105, 225));
        loginBtn.setForeground(Color.WHITE);
        loginBtn.setCursor(new Cursor(Cursor.HAND_CURSOR));

        loginBtn.addActionListener(e -> {
            String username = usernameField.getText().trim();
            String password = new String(passwordField.getPassword()).trim();

            if (validateLogin(username, password)) {
                JOptionPane.showMessageDialog(this, "Login successful!", "Success",
JOptionPane.INFORMATION_MESSAGE);
                dispose();
                if (parent != null) parent.dispose();
                new AdminPanel().setVisible(true);
            } else {
                JOptionPane.showMessageDialog(this, "Invalid credentials!", "Error",
JOptionPane.ERROR_MESSAGE);
            }
        });

        panel.add(loginBtn);
        add(panel);
    }

    private boolean validateLogin(String username, String password) {
        // Fallback credentials if database is not available
       /* if (!database.isConnected()) {
            return username.equals("admin") && password.equals("admin123");
        }*/

        String sql = "SELECT * FROM adminlogin WHERE username = ? AND password = ?";

        try (PreparedStatement pstmt = database.getConnection().prepareStatement(sql)) {
            pstmt.setString(1, username);
            pstmt.setString(2, password);

            try (ResultSet rs = pstmt.executeQuery()) {
                return rs.next(); // Returns true if a matching record was found
            }
        } catch (SQLException ex) {
            JOptionPane.showMessageDialog(this,
                    "Error verifying credentials: " + ex.getMessage(),
                    "Database Error",
                    JOptionPane.ERROR_MESSAGE);
            return false;
        }
    }

    private void styleField(JComponent field, String placeholder) {
        field.setMaximumSize(new Dimension(300, 40));
        field.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        field.setBorder(BorderFactory.createCompoundBorder(
                BorderFactory.createLineBorder(new Color(200, 200, 220)),
                BorderFactory.createEmptyBorder(5, 10, 5, 10)));
        field.setForeground(Color.BLACK);
        field.setBackground(Color.WHITE);
        if (field instanceof JTextField) {
            ((JTextField) field).setToolTipText(placeholder);
        }
    }

    @Override
```

```
    public void dispose() {
        if (database != null) {
            database.close();
        }
        super.dispose();
    }
}
```

Output:

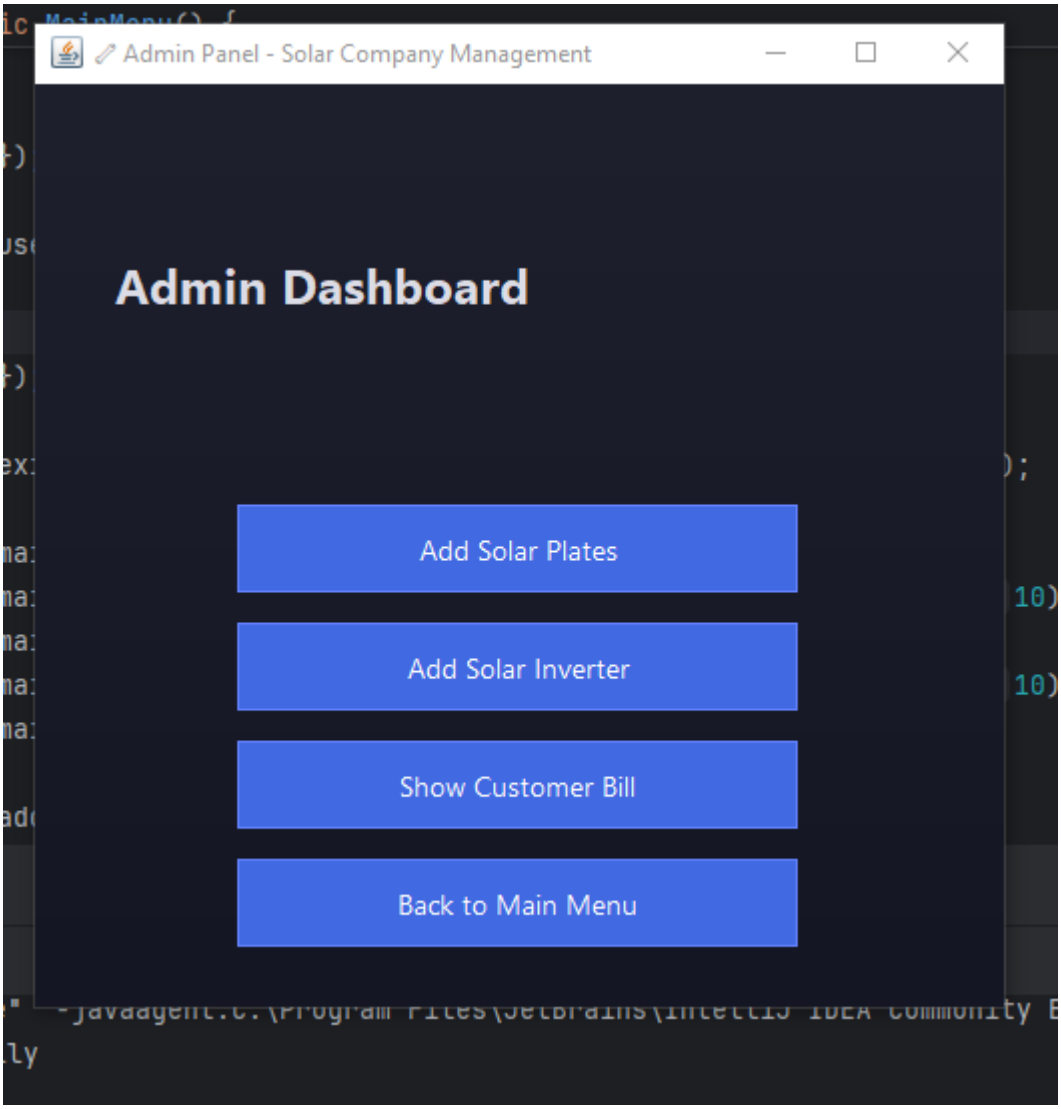


Admin panel:

```
import javax.swing.*;
import java.awt.*;
public class AdminPanel extends JFrame {
    public AdminPanel() {
        setTitle("🔧 Admin Panel - Solar Company Management");
        setSize(500, 500);
        setDefaultCloseOperation(DISPOSE_ON_CLOSE);
        setLocationRelativeTo(null);
        JPanel mainPanel = new JPanel() {
            protected void paintComponent(Graphics g) {
                super.paintComponent(g);
                Graphics2D g2d = (Graphics2D) g;
                Color color1 = new Color(30, 33, 45);
                Color color2 = new Color(20, 23, 35);
                GradientPaint gp = new GradientPaint(0, 0, color1, 0, getHeight(),
color2);
                g2d.setPaint(gp);
                g2d.fillRect(0, 0, getWidth(), getHeight());
            }
        };
        mainPanel.setLayout(new BoxLayout(mainPanel, BoxLayout.Y_AXIS));
        mainPanel.setBorder(BorderFactory.createEmptyBorder(30, 40, 30, 40));
        JPanel headerPanel = new JPanel(new BorderLayout());
        headerPanel.setOpaque(false);
        JLabel title = new JLabel("Admin Dashboard");
        title.setFont(new Font("Segoe UI", Font.BOLD, 24));
        title.setForeground(new Color(220, 220, 230));
```

```
        title.setBorder(BorderFactory.createEmptyBorder(0, 0, 20, 0));
        headerPanel.add(title, BorderLayout.WEST);
        mainPanel.add(headerPanel);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 20)));
        JButton addPlatesBtn = createProfessionalButton("Add Solar Plates");
        JButton addInverterBtn = createProfessionalButton("Add Solar Inverter");
        JButton showBillBtn = createProfessionalButton("Show Customer Bill");
        JButton backBtn = createProfessionalButton("Back to Main Menu");
        addPlatesBtn.addActionListener(e -> new SolarPlatesInfo().setVisible(true));
        addInverterBtn.addActionListener(e -> new SolarInverterInfo().setVisible(true));
        showBillBtn.addActionListener(e -> new ShowCustomerBill().setVisible(true));
        backBtn.addActionListener(e -> {
            dispose();
            new MainMenu().setVisible(true);
        });
        mainPanel.add(addPlatesBtn);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 15)));
        mainPanel.add(addInverterBtn);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 15)));
        mainPanel.add(showBillBtn);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 15)));
        mainPanel.add(backBtn);
        add(mainPanel);
    }
    private JButton createProfessionalButton(String text) {
        JButton button = new JButton(text) {
            @Override
            protected void paintComponent(Graphics g) {
                Graphics2D g2 = (Graphics2D) g;
                g2.setRenderingHint(RenderingHints.KEY_ANTIALIASING,
RenderingHints.VALUE_ANTIALIAS_ON);
                if (getModel().isPressed()) {
                    g2.setColor(new Color(65, 105, 225).darker());
                } else if (getModel().isRollover()) {
                    g2.setColor(new Color(65, 105, 225).brighter());
                } else {
                    g2.setColor(new Color(65, 105, 225));
                }
                g2.fillRect(0, 0, getWidth(), getHeight());

                g2.setColor(new Color(100, 130, 255));
                g2.drawRect(0, 0, getWidth()-1, getHeight()-1);
                super.paintComponent(g);
            }
        };

        button.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        button.setForeground(Color.WHITE);
        button.setContentAreaFilled(false);
        button.setBorder(BorderFactory.createEmptyBorder(12, 25, 12, 25));
        button.setFocusPainted(false);
        button.setAlignmentX(Component.CENTER_ALIGNMENT);
        button.setMaximumSize(new Dimension(280, 45));
        button.setCursor(new Cursor(Cursor.HAND_CURSOR));

        return button;
    }


}
```

Output:



Solarpanels.java:

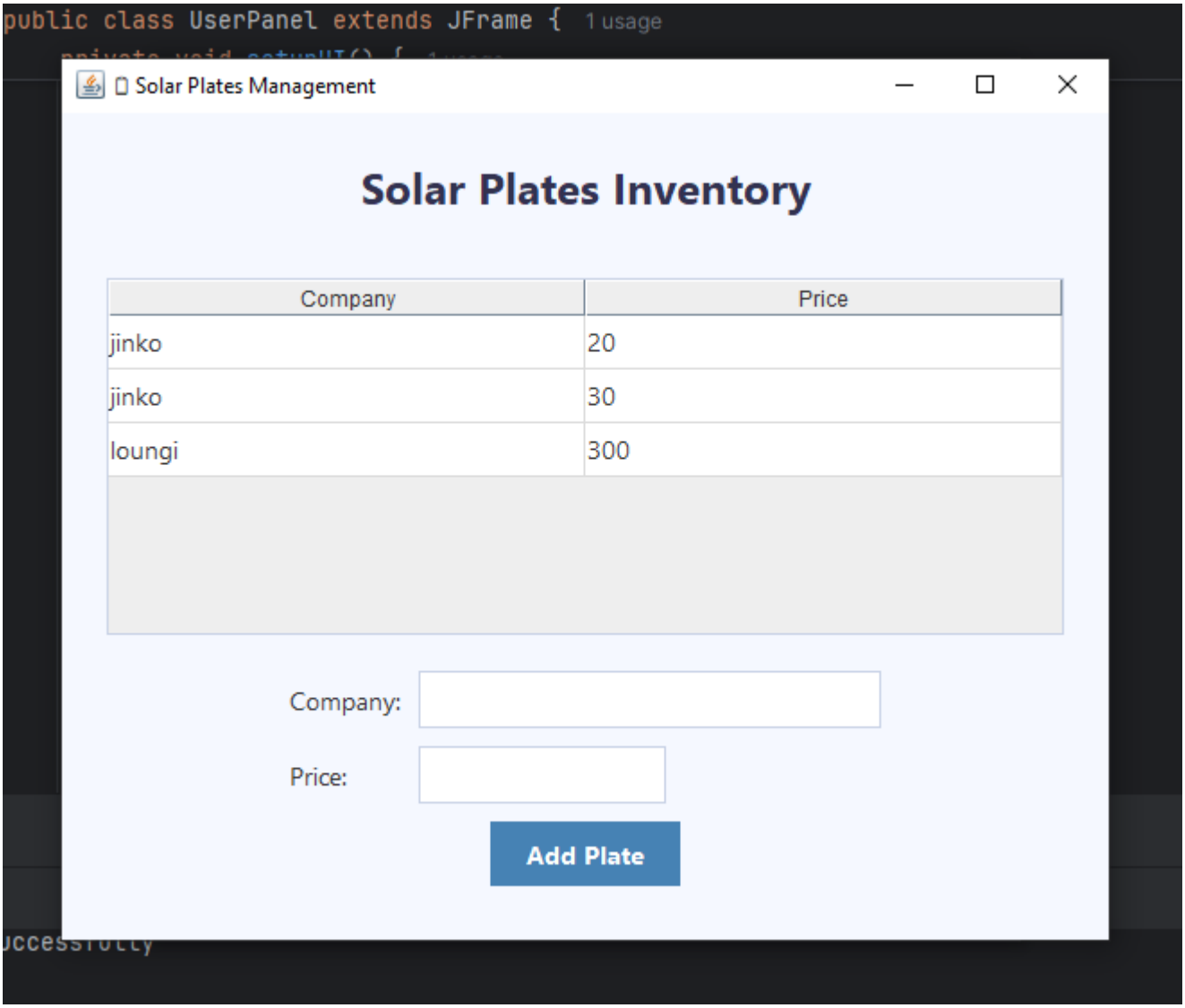
```java
import javax.swing.*;
import javax.swing.table.DefaultTableModel;
import java.awt.*;
import java.sql.*;

public class SolarPlatesInfo extends JFrame {
    private DefaultTableModel tableModel;
    private Database database;

    public SolarPlatesInfo() {
        database = new Database();
        if (!database.isConnected()) {
            JOptionPane.showMessageDialog(this,
                    "Failed to connect to database. Some features may not work.",
                    "Database Error",
                    JOptionPane.ERROR_MESSAGE);
        }

        setupUI();
    }

    private void setupUI() {
```

```
        setTitle("🔋 Solar Plates Management");
        setSize(600, 500);
        setLocationRelativeTo(null);
        setDefaultCloseOperation(DISPOSE_ON_CLOSE);

        JPanel mainPanel = new JPanel(new BorderLayout(15, 15));
        mainPanel.setBackground(new Color(245, 248, 255));
        mainPanel.setBorder(BorderFactory.createEmptyBorder(25, 25, 25, 25));

        JLabel title = new JLabel("Solar Plates Inventory", SwingConstants.CENTER);
        title.setFont(new Font("Segoe UI", Font.BOLD, 24));
        title.setForeground(new Color(50, 50, 80));
        title.setBorder(BorderFactory.createEmptyBorder(0, 0, 20, 0));
        mainPanel.add(title, BorderLayout.NORTH);

        String[] columns = {"Company", "Price"};
        tableModel = new DefaultTableModel(columns, 0) {
            @Override
            public boolean isCellEditable(int row, int column) {
                return false;
            }
        };

        JTable table = new JTable(tableModel);
        table.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        table.setRowHeight(30);
        table.setSelectionBackground(new Color(200, 220, 255));
        table.setSelectionForeground(Color.BLACK);
        table.setGridColor(new Color(220, 220, 220));

        JScrollPane scrollPane = new JScrollPane(table);
        scrollPane.setBorder(BorderFactory.createLineBorder(new Color(200, 210, 230)));
        mainPanel.add(scrollPane, BorderLayout.CENTER);

        JPanel inputPanel = new JPanel(new GridBagLayout());
        inputPanel.setBackground(new Color(245, 248, 255));
        GridBagConstraints gbc = new GridBagConstraints();
        gbc.insets = new Insets(5, 5, 5, 5);
        gbc.anchor = GridBagConstraints.WEST;

        gbc.gridx = 0;
        gbc.gridy = 0;
        JLabel companyLabel = new JLabel("Company:");
        companyLabel.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        inputPanel.add(companyLabel, gbc);

        gbc.gridx = 1;
        JTextField nameField = new JTextField(20);
        nameField.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        nameField.setBorder(BorderFactory.createCompoundBorder(
                BorderFactory.createLineBorder(new Color(200, 210, 230)),
                BorderFactory.createEmptyBorder(5, 8, 5, 8)
        ));
        inputPanel.add(nameField, gbc);

        gbc.gridx = 0;
        gbc.gridy = 1;
        JLabel priceLabel = new JLabel("Price:");
        priceLabel.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        inputPanel.add(priceLabel, gbc);

        gbc.gridx = 1;
        JTextField priceField = new JTextField(10);
```

```
        priceField.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        priceField.setBorder(BorderFactory.createCompoundBorder(
                BorderFactory.createLineBorder(new Color(200, 210, 230)),
                BorderFactory.createEmptyBorder(5, 8, 5, 8)
        ));
        inputPanel.add(priceField, gbc);

        gbc.gridx = 0;
        gbc.gridy = 2;
        gbc.gridwidth = 2;
        gbc.anchor = GridBagConstraints.CENTER;

        JButton addButton = new JButton("Add Plate");
        addButton.setFont(new Font("Segoe UI", Font.BOLD, 14));
        addButton.setBackground(new Color(70, 130, 180));
        addButton.setForeground(Color.WHITE);
        addButton.setFocusPainted(false);
        addButton.setBorder(BorderFactory.createEmptyBorder(8, 20, 8, 20));

        addButton.addMouseListener(new java.awt.event.MouseAdapter() {
            public void mouseEntered(java.awt.event.MouseEvent evt) {
                addButton.setBackground(new Color(90, 150, 200));
            }
            public void mouseExited(java.awt.event.MouseEvent evt) {
                addButton.setBackground(new Color(70, 130, 180));
            }
        });

        addButton.addActionListener(e -> {
            String name = nameField.getText().trim();
            String price = priceField.getText().trim();

            if (!name.isEmpty() && !price.isEmpty()) {
                if (addSolarPlateToDatabase(name, price)) {
                    addSolarPlateToTable(name, price);
                    nameField.setText("");
                    priceField.setText("");
                }
            } else {
                JOptionPane.showMessageDialog(this,
                        "Please fill in both fields.",
                        "Input Error",
                        JOptionPane.WARNING_MESSAGE);
            }
        });

        inputPanel.add(addButton, gbc);
        mainPanel.add(inputPanel, BorderLayout.SOUTH);
        add(mainPanel);
        loadExistingPlates();
    }

    private boolean addSolarPlateToDatabase(String name, String price) {
        if (!database.isConnected()) {
            JOptionPane.showMessageDialog(this,
                    "Not connected to database. Data will not be saved.",
                    "Database Error",
                    JOptionPane.WARNING_MESSAGE);
            return true;
        }

        String sql = "INSERT INTO plates (Company, Price) VALUES (?, ?)";
```

```
        try (PreparedStatement pstmt = database.getConnection().prepareStatement(sql)) {
            pstmt.setString(1, name);
            pstmt.setString(2, price);
            pstmt.executeUpdate();
            return true;
        } catch (SQLException ex) {
            JOptionPane.showMessageDialog(this,
                    "Error saving to database: " + ex.getMessage(),
                    "Database Error",
                    JOptionPane.ERROR_MESSAGE);
            return false;
        }
    }

    private void addSolarPlateToTable(String name, String price) {
        tableModel.addRow(new Object[]{name, price});
    }

    private void loadExistingPlates() {
        if (!database.isConnected()) return;

        String sql = "SELECT Company, Price FROM plates";

        try (Statement stmt = database.getConnection().createStatement();
             ResultSet rs = stmt.executeQuery(sql)) {

            while (rs.next()) {
                String name = rs.getString("Company");
                String price = rs.getString("Price");
                tableModel.addRow(new Object[]{name, price});
            }
        } catch (SQLException ex) {
            JOptionPane.showMessageDialog(this,
                    "Error loading existing plates: " + ex.getMessage(),
                    "Database Error",
                    JOptionPane.ERROR_MESSAGE);
        }
    }

    @Override
    public void dispose() {
        if (database != null) {
            database.close();
        }
        super.dispose();
    }
}
```

Output:



Solar inverter info:

```
import javax.swing.*;
import javax.swing.table.DefaultTableModel;
import java.awt.*;
import java.sql.*;

public class SolarInverterInfo extends JFrame {
    private final DefaultTableModel tableModel;
    private final Database database;
    private final JTextField nameField;
    private final JTextField priceField;

    public SolarInverterInfo() {
        database = new Database();
        verifyDatabaseConnection();
        nameField = createTextField(20);
        priceField = createTextField(10);
        tableModel = createTableModel();

        setupUI();
        loadExistingInverters();
    }

    private void verifyDatabaseConnection() {
```

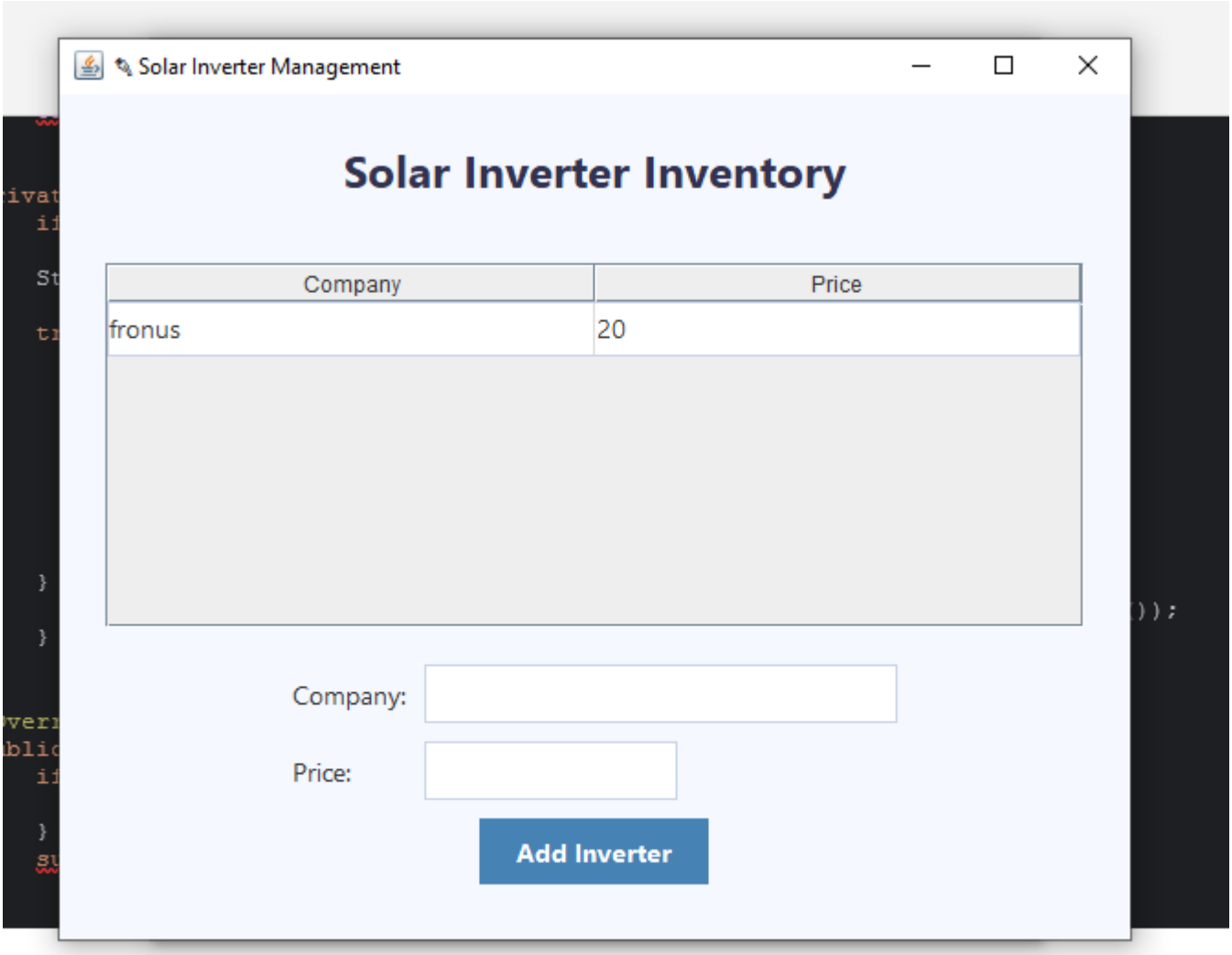
```
        if (!database.isConnected()) {
            JOptionPane.showMessageDialog(this,
                    "Failed to connect to database. Some features may not work.",
                    "Database Error",
                    JOptionPane.ERROR_MESSAGE);
        }
    }

    private void setupUI() {
        configureMainFrame();
        JPanel mainPanel = createMainPanel();
        add(mainPanel);
    }

    private void configureMainFrame() {
        setTitle("✒ Solar Inverter Management");
        setSize(600, 500);
        setLocationRelativeTo(null);
        setDefaultCloseOperation(DISPOSE_ON_CLOSE);
    }

    private JPanel createMainPanel() {
        JPanel panel = new JPanel(new BorderLayout(15, 15));
        panel.setBackground(new Color(245, 248, 255));
        panel.setBorder(BorderFactory.createEmptyBorder(25, 25, 25, 25));

        panel.add(createTitleLabel(), BorderLayout.NORTH);
        panel.add(createTableScrollPane(), BorderLayout.CENTER);
        panel.add(createInputPanel(), BorderLayout.SOUTH);

        return panel;
    }

    private JLabel createTitleLabel() {
        JLabel title = new JLabel("Solar Inverter Inventory", SwingConstants.CENTER);
        title.setFont(new Font("Segoe UI", Font.BOLD, 24));
        title.setForeground(new Color(50, 50, 80));
        title.setBorder(BorderFactory.createEmptyBorder(0, 0, 20, 0));
        return title;
    }

    private JScrollPane createTableScrollPane() {
        JTable table = new JTable(tableModel);
        styleTable(table);
        return new JScrollPane(table);
    }

    private void styleTable(JTable table) {
        table.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        table.setRowHeight(30);
        table.setSelectionBackground(new Color(200, 220, 255));
        table.setSelectionForeground(Color.BLACK);
        table.setGridColor(new Color(220, 220, 220));
        table.setBorder(BorderFactory.createLineBorder(new Color(200, 210, 230)));
    }

    private DefaultTableModel createTableModel() {
        String[] columns = {"Company", "Price"};
        return new DefaultTableModel(columns, 0) {
            @Override
            public boolean isCellEditable(int row, int column) {
                return false;
            }
```

```
        };
    }

    private JPanel createInputPanel() {
        JPanel panel = new JPanel(new GridBagLayout());
        panel.setBackground(new Color(245, 248, 255));

        GridBagConstraints gbc = new GridBagConstraints();
        gbc.insets = new Insets(5, 5, 5, 5);
        gbc.anchor = GridBagConstraints.WEST;

        addInputComponents(panel, gbc);
        panel.add(createAddButton(), gbc);

        return panel;
    }

    private void addInputComponents(JPanel panel, GridBagConstraints gbc) {
        gbc.gridx = 0;
        gbc.gridy = 0;
        panel.add(createLabel("Company:"), gbc);

        gbc.gridx = 1;
        panel.add(nameField, gbc);

        gbc.gridx = 0;
        gbc.gridy = 1;
        panel.add(createLabel("Price:"), gbc);

        gbc.gridx = 1;
        panel.add(priceField, gbc);

        gbc.gridx = 0;
        gbc.gridy = 2;
        gbc.gridwidth = 2;
        gbc.anchor = GridBagConstraints.CENTER;
    }

    private JLabel createLabel(String text) {
        JLabel label = new JLabel(text);
        label.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        return label;
    }

    private JTextField createTextField(int columns) {
        JTextField field = new JTextField(columns);
        field.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        field.setBorder(BorderFactory.createCompoundBorder(
                BorderFactory.createLineBorder(new Color(200, 210, 230)),
                BorderFactory.createEmptyBorder(5, 8, 5, 8)
        ));
        return field;
    }

    private JButton createAddButton() {
        JButton button = new JButton("Add Inverter");
        button.setFont(new Font("Segoe UI", Font.BOLD, 14));
        button.setBackground(new Color(70, 130, 180));
        button.setForeground(Color.WHITE);
        button.setFocusPainted(false);
        button.setBorder(BorderFactory.createEmptyBorder(8, 20, 8, 20));

        button.addMouseListener(new java.awt.event.MouseAdapter() {
```

```
            public void mouseEntered(java.awt.event.MouseEvent evt) {
                button.setBackground(new Color(90, 150, 200));
            }
            public void mouseExited(java.awt.event.MouseEvent evt) {
                button.setBackground(new Color(70, 130, 180));
            }
        });

        button.addActionListener(e -> handleAddInverter());
        return button;
    }

    private void handleAddInverter() {
        String name = nameField.getText().trim();
        String price = priceField.getText().trim();

        if (validateInput(name, price)) {
            if (addInverterToDatabase(name, price)) {
                addInverterToTable(name, price);
                clearInputFields();
            }
        }
    }

    private boolean validateInput(String name, String price) {
        if (name.isEmpty() || price.isEmpty()) {
            JOptionPane.showMessageDialog(this,
                    "Please enter both company and price.",
                    "Input Error",
                    JOptionPane.WARNING_MESSAGE);
            return false;
        }
        return true;
    }

    private void clearInputFields() {
        nameField.setText("");
        priceField.setText("");
    }

    private boolean addInverterToDatabase(String name, String price) {
        if (!database.isConnected()) {
            showDatabaseWarning();
            return true;
        }

        String sql = "INSERT INTO inverter (Company, Price) VALUES (?, ?)";

        try (PreparedStatement pstmt = database.getConnection().prepareStatement(sql)) {
            pstmt.setString(1, name);
            pstmt.setString(2, price);
            pstmt.executeUpdate();
            return true;
        } catch (SQLException ex) {
            showDatabaseError("Error saving to database: " + ex.getMessage());
            return false;
        }
    }

    private void showDatabaseWarning() {
        JOptionPane.showMessageDialog(this,
                "Not connected to database. Data will not be saved.",
                "Database Error",
```

```
                JOptionPane.WARNING_MESSAGE);
    }

    private void showDatabaseError(String message) {
        JOptionPane.showMessageDialog(this,
                message,
                "Database Error",
                JOptionPane.ERROR_MESSAGE);
    }

    private void addInverterToTable(String name, String price) {
        tableModel.addRow(new Object[]{name, price});
    }

    private void loadExistingInverters() {
        if (!database.isConnected()) return;

        String sql = "SELECT Company, Price FROM inverter";

        try (Statement stmt = database.getConnection().createStatement();
             ResultSet rs = stmt.executeQuery(sql)) {

            while (rs.next()) {
                tableModel.addRow(new Object[]{
                        rs.getString("Company"),
                        rs.getString("Price")
                });
            }
        } catch (SQLException ex) {
            showDatabaseError("Error loading existing inverters: " + ex.getMessage());
        }
    }

    @Override
    public void dispose() {
        if (database != null) {
            database.close();
        }
        super.dispose();
    }
}
```

Output:



Show customer bill.java:

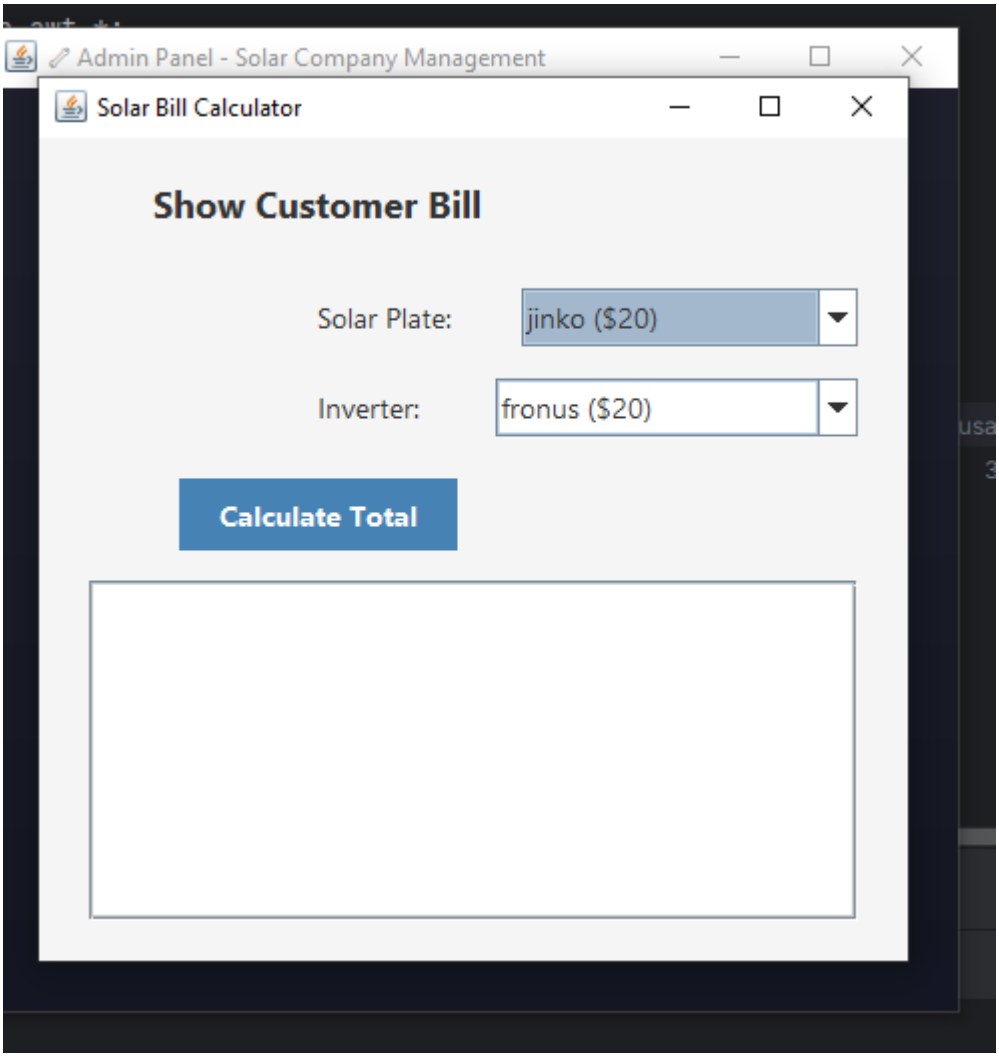
```
import javax.swing.*;
import java.awt.*;
import java.sql.*;
import java.util.HashMap;

public class ShowCustomerBill extends JFrame {
    private JComboBox<String> plateComboBox, inverterComboBox;
    private JTextArea billArea;
    private JButton calculateButton;

    private HashMap<String, Integer> platePrices = new HashMap<>();
    private HashMap<String, Integer> inverterPrices = new HashMap<>();

    public ShowCustomerBill() {
        setTitle("Solar Bill Calculator");
        setSize(450, 450);
        setLocationRelativeTo(null);
        setDefaultCloseOperation(JFrame.DISPOSE_ON_CLOSE);

        JPanel mainPanel = new JPanel();
        mainPanel.setLayout(new BoxLayout(mainPanel, BoxLayout.Y_AXIS));
        mainPanel.setBorder(BorderFactory.createEmptyBorder(20, 25, 20, 25));
```

```
        mainPanel.setBackground(new Color(245, 245, 245));

        JLabel titleLabel = new JLabel("Show Customer Bill");
        titleLabel.setFont(new Font("Segoe UI", Font.BOLD, 18));
        titleLabel.setAlignmentX(Component.CENTER_ALIGNMENT);
        titleLabel.setBorder(BorderFactory.createEmptyBorder(0, 0, 15, 0));

        plateComboBox = new JComboBox<>();
        inverterComboBox = new JComboBox<>();

        JPanel platePanel = createProductPanel("Solar Plate:", plateComboBox);
        JPanel inverterPanel = createProductPanel("Inverter:", inverterComboBox);

        billArea = new JTextArea();
        billArea.setEditable(false);
        billArea.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        billArea.setBackground(Color.WHITE);
        billArea.setBorder(BorderFactory.createCompoundBorder(
                BorderFactory.createLineBorder(new Color(200, 200, 200)),
                BorderFactory.createEmptyBorder(8, 8, 8, 8)));
        JScrollPane scrollPane = new JScrollPane(billArea);
        scrollPane.setPreferredSize(new Dimension(350, 150));

        calculateButton = new JButton("Calculate Total");
        styleButton(calculateButton, new Color(70, 130, 180));
        calculateButton.addActionListener(e -> calculateAndSaveBill());

        mainPanel.add(titleLabel);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 15)));
        mainPanel.add(platePanel);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 15)));
        mainPanel.add(inverterPanel);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 20)));
        mainPanel.add(calculateButton);
        mainPanel.add(Box.createRigidArea(new Dimension(0, 15)));
        mainPanel.add(scrollPane);

        add(mainPanel);

        loadProductsFromDatabase(); // Auto-load on startup
    }

    private void loadProductsFromDatabase() {
        platePrices.clear();
        inverterPrices.clear();
        plateComboBox.removeAllItems();
        inverterComboBox.removeAllItems();

        loadProductData("plates", plateComboBox, platePrices);
        loadProductData("inverter", inverterComboBox, inverterPrices);

        if (plateComboBox.getItemCount() > 0 && inverterComboBox.getItemCount() > 0) {
            billArea.setText("");
        } else {
            billArea.setText("Error loading product data.");
        }
    }

    private void loadProductData(String tableName, JComboBox<String> comboBox,
HashMap<String, Integer> priceMap) {
        Database db = new Database();
        try {
            ResultSet rs = db.executeQuery("SELECT Company, Price FROM " + tableName);
```

```
            while (rs.next()) {
                String name = rs.getString("Company");
                int price = rs.getInt("Price");
                String displayName = name + " ($" + price + ")";
                comboBox.addItem(displayName);
                priceMap.put(displayName, price);
            }
        } catch (SQLException e) {
            JOptionPane.showMessageDialog(this,
                    "Error loading data from table '" + tableName + "': " +
e.getMessage(),
                    "Database Error",
                    JOptionPane.ERROR_MESSAGE);
        } finally {
            db.close();
        }
    }

    private void calculateAndSaveBill() {
        String selectedPlate = (String) plateComboBox.getSelectedItem();
        String selectedInverter = (String) inverterComboBox.getSelectedItem();

        if (selectedPlate == null || selectedInverter == null) {
            billArea.setText("Please select both a plate and an inverter.");
            return;
        }

        int platePrice = platePrices.getOrDefault(selectedPlate, 0);
        int inverterPrice = inverterPrices.getOrDefault(selectedInverter, 0);
        int total = platePrice + inverterPrice;
        String customerIdStr = JOptionPane.showInputDialog(this, "Enter Customer ID:");
        if (customerIdStr == null || customerIdStr.trim().isEmpty()) return;

        String customerName = JOptionPane.showInputDialog(this, "Enter Customer Name:");
        if (customerName == null || customerName.trim().isEmpty()) return;

        try {
            int customerId = Integer.parseInt(customerIdStr.trim());

            // Save to database
            Database db = new Database();
            String query = "INSERT INTO savebill (Name, id, plate, plateprice, inverter,
inverterprice, total) VALUES (?, ?, ?, ?, ?, ?, ?)";
            PreparedStatement pst = db.getConnection().prepareStatement(query);
            pst.setString(1, customerName);
            pst.setInt(2, customerId);
            pst.setString(3, selectedPlate);
            pst.setInt(4, platePrice);
            pst.setString(5, selectedInverter);
            pst.setInt(6, inverterPrice);
            pst.setInt(7, total);
            pst.executeUpdate();
            db.close();

            billArea.setText("Selected items:\n" +
                    "Plate: " + selectedPlate + "\n" +
                    "Inverter: " + selectedInverter + "\n\n" +
                    "Customer ID: " + customerId + "\n" +
                    "Customer Name: " + customerName + "\n" +
                    "Total Bill: $" + total + "\n\n" +
                    "✅ Bill saved to database!");

        } catch (NumberFormatException e) {
```

```
            JOptionPane.showMessageDialog(this, "Invalid ID. Please enter a valid
number.");
        } catch (SQLException e) {
            JOptionPane.showMessageDialog(this, "Error saving bill: " + e.getMessage(),
"Database Error", JOptionPane.ERROR_MESSAGE);
        }
    }
    private JPanel createProductPanel(String labelText, JComboBox<String> comboBox) {
        JPanel panel = new JPanel();
        panel.setLayout(new BoxLayout(panel, BoxLayout.X_AXIS));
        panel.setBackground(new Color(245, 245, 245));
        panel.setAlignmentX(Component.LEFT_ALIGNMENT);
        JLabel label = new JLabel(labelText);
        label.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        label.setPreferredSize(new Dimension(100, 30));
        comboBox.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        comboBox.setMaximumSize(new Dimension(250, 30));
        comboBox.setBackground(Color.white);
        panel.add(label);
        panel.add(Box.createRigidArea(new Dimension(15, 0)));
        panel.add(comboBox);

        return panel;
    }

    private void styleButton(JButton button, Color bgColor) {
        button.setFont(new Font("Segoe UI", Font.BOLD, 14));
        button.setBackground(bgColor);
        button.setForeground(Color.WHITE);
        button.setFocusPainted(false);
        button.setBorder(BorderFactory.createEmptyBorder(8, 20, 8, 20));
        button.setAlignmentX(Component.CENTER_ALIGNMENT);
        button.setCursor(new Cursor(Cursor.HAND_CURSOR));
    }
}
```

Output:



User signup:

```
import javax.swing.*;
import java.awt.*;
import java.sql.*;

public class UserSignup extends JFrame {
    private JFrame parent;
    private Database database;

    public UserSignup(JFrame parent) {
        this.parent = parent;
        this.database = new Database();

        if (!database.isConnected()) {
            JOptionPane.showMessageDialog(this,
                    "Database connection failed. Please try again later.",
                    "Warning",
                    JOptionPane.WARNING_MESSAGE);
        }

        setupUI();
    }

    private void setupUI() {
        setTitle("User Signup");
```

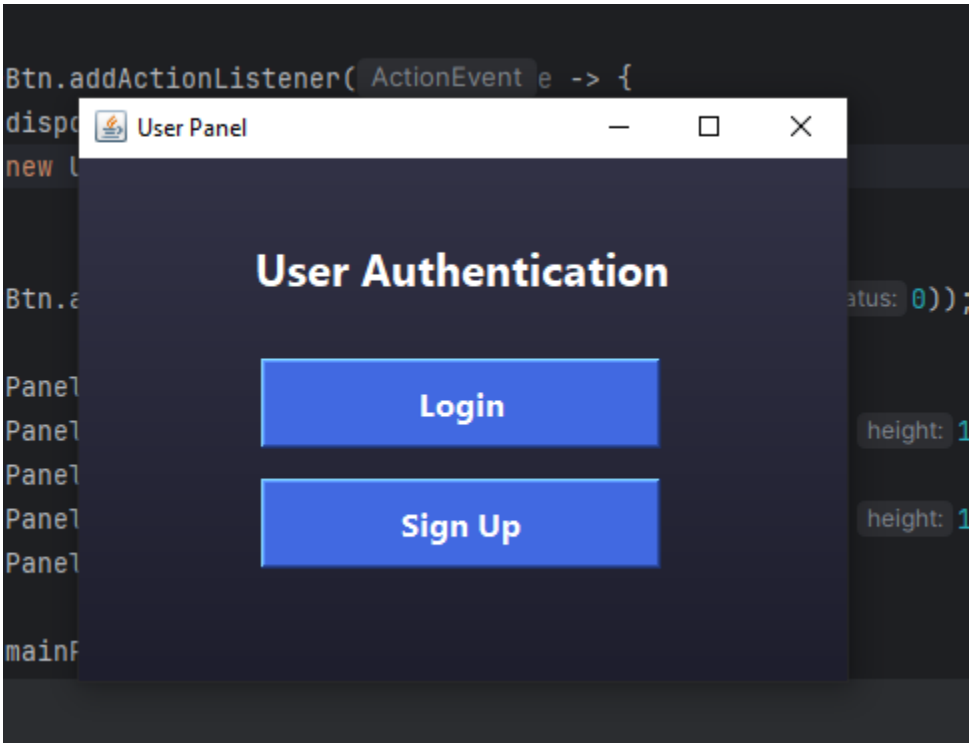
```
        setSize(400, 350);
        setDefaultCloseOperation(DISPOSE_ON_CLOSE);
        setLocationRelativeTo(null);

        JPanel panel = new JPanel() {
            @Override
            protected void paintComponent(Graphics g) {
                super.paintComponent(g);
                Graphics2D g2d = (Graphics2D) g;
                Color color1 = new Color(50, 50, 70);
                Color color2 = new Color(30, 30, 45);
                GradientPaint gp = new GradientPaint(0, 0, color1, 0, getHeight(),
color2);
                g2d.setPaint(gp);
                g2d.fillRect(0, 0, getWidth(), getHeight());
            }
        };

        panel.setLayout(new BoxLayout(panel, BoxLayout.Y_AXIS));
        panel.setBorder(BorderFactory.createEmptyBorder(30, 40, 30, 40));

        JLabel titleLabel = new JLabel("User Signup", SwingConstants.CENTER);
        titleLabel.setFont(new Font("Segoe UI", Font.BOLD, 22));
        titleLabel.setForeground(Color.WHITE);
        titleLabel.setAlignmentX(Component.CENTER_ALIGNMENT);
        panel.add(titleLabel);
        panel.add(Box.createRigidArea(new Dimension(0, 20)));

        // Create text fields with placeholder text
        JTextField usernameField = createTextFieldWithPlaceholder("Username");
        JPasswordField passwordField = createPasswordFieldWithPlaceholder("Password");
        JPasswordField confirmPasswordField = createPasswordFieldWithPlaceholder("Confirm
Password");

        panel.add(usernameField);
        panel.add(Box.createRigidArea(new Dimension(0, 10)));
        panel.add(passwordField);
        panel.add(Box.createRigidArea(new Dimension(0, 10)));
        panel.add(confirmPasswordField);
        panel.add(Box.createRigidArea(new Dimension(0, 20)));

        JButton signupBtn = new JButton("Sign Up");
        signupBtn.setAlignmentX(Component.CENTER_ALIGNMENT);
        signupBtn.setPreferredSize(new Dimension(100, 40));
        signupBtn.setFont(new Font("Segoe UI", Font.BOLD, 14));
        signupBtn.setFocusPainted(false);
        signupBtn.setBackground(new Color(65, 105, 225));
        signupBtn.setForeground(Color.WHITE);
        signupBtn.setCursor(new Cursor(Cursor.HAND_CURSOR));

        signupBtn.addActionListener(e -> {
            String username = usernameField.getText().trim();
            String password = new String(passwordField.getPassword()).trim();
            String confirmPassword = new
String(confirmPasswordField.getPassword()).trim();

            if (validateSignup(username, password, confirmPassword)) {
                if (registerUser(username, password)) {
                    JOptionPane.showMessageDialog(this, "Registration successful!",
"Success", JOptionPane.INFORMATION_MESSAGE);
                    dispose();
                    if (parent != null) parent.dispose();
                }
```

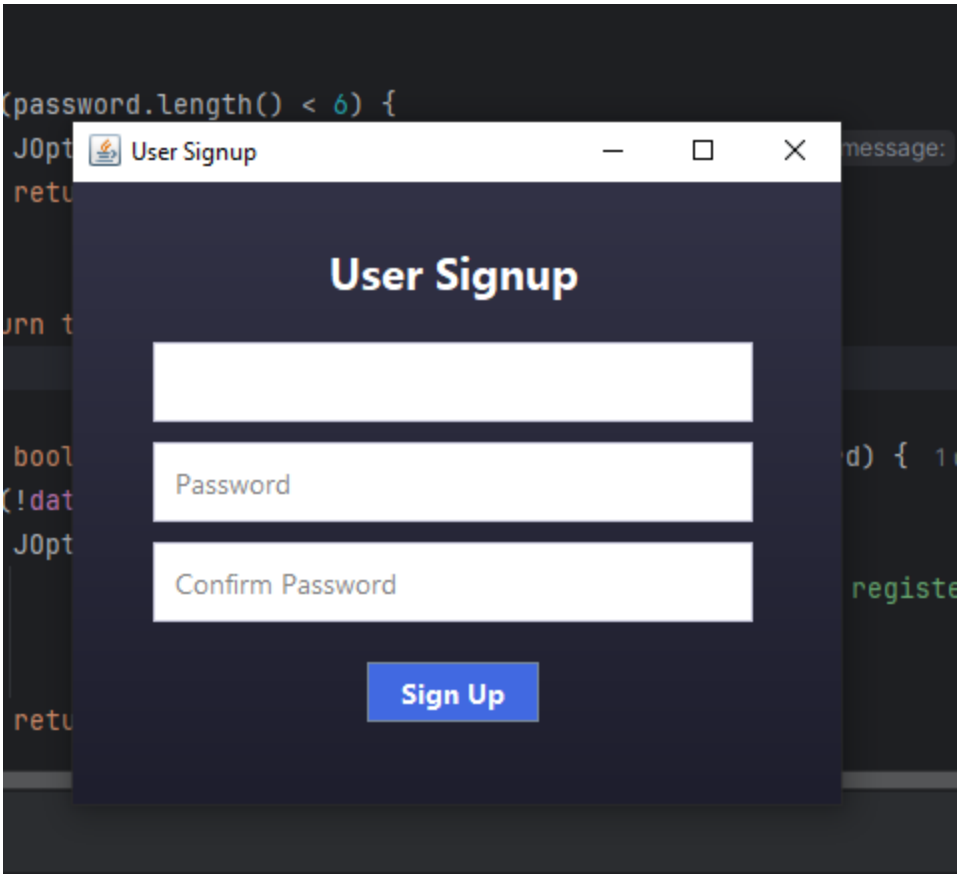
```
            }
        });

        panel.add(signupBtn);
        add(panel);
    }

    private JTextField createTextFieldWithPlaceholder(String placeholder) {
        JTextField textField = new JTextField();
        textField.setMaximumSize(new Dimension(300, 40));
        textField.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        textField.setBorder(BorderFactory.createCompoundBorder(
                BorderFactory.createLineBorder(new Color(200, 200, 220)),
                BorderFactory.createEmptyBorder(5, 10, 5, 10)));
        textField.setForeground(Color.GRAY);
        textField.setText(placeholder);
        textField.addFocusListener(new java.awt.event.FocusAdapter() {
            public void focusGained(java.awt.event.FocusEvent evt) {
                if (textField.getText().equals(placeholder)) {
                    textField.setText("");
                    textField.setForeground(Color.BLACK);
                }
            }
            public void focusLost(java.awt.event.FocusEvent evt) {
                if (textField.getText().isEmpty()) {
                    textField.setForeground(Color.GRAY);
                    textField.setText(placeholder);
                }
            }
        });
        return textField;
    }

    private JPasswordField createPasswordFieldWithPlaceholder(String placeholder) {
        JPasswordField passwordField = new JPasswordField();
        passwordField.setMaximumSize(new Dimension(300, 40));
        passwordField.setFont(new Font("Segoe UI", Font.PLAIN, 14));
        passwordField.setBorder(BorderFactory.createCompoundBorder(
                BorderFactory.createLineBorder(new Color(200, 200, 220)),
                BorderFactory.createEmptyBorder(5, 10, 5, 10)));
        passwordField.setForeground(Color.GRAY);
        passwordField.setEchoChar((char)0); // Show plain text for placeholder
        passwordField.setText(placeholder);
        passwordField.addFocusListener(new java.awt.event.FocusAdapter() {
            public void focusGained(java.awt.event.FocusEvent evt) {
                if (String.valueOf(passwordField.getPassword()).equals(placeholder)) {
                    passwordField.setText("");
                    passwordField.setForeground(Color.BLACK);
                    passwordField.setEchoChar('•'); // Show password characters
                }
            }
            public void focusLost(java.awt.event.FocusEvent evt) {
                if (passwordField.getPassword().length == 0) {
                    passwordField.setForeground(Color.GRAY);
                    passwordField.setEchoChar((char)0);
                    passwordField.setText(placeholder);
                }
            }
        });
        return passwordField;
    }

    // Rest of the methods remain the same (validateSignup, registerUser, dispose)
```

```
    private boolean validateSignup(String username, String password, String
confirmPassword) {
        if (username.isEmpty() || username.equals("Username") || password.isEmpty() ||
password.equals("Password")) {
            JOptionPane.showMessageDialog(this, "Username and password cannot be empty!",
"Error", JOptionPane.ERROR_MESSAGE);
            return false;
        }

        if (!password.equals(confirmPassword)) {
            JOptionPane.showMessageDialog(this, "Passwords do not match!", "Error",
JOptionPane.ERROR_MESSAGE);
            return false;
        }

        if (password.length() < 6) {
            JOptionPane.showMessageDialog(this, "Password must be at least 6
characters!", "Error", JOptionPane.ERROR_MESSAGE);
            return false;
        }

        return true;
    }

    private boolean registerUser(String username, String password) {
        if (!database.isConnected()) {
            JOptionPane.showMessageDialog(this,
                    "Database connection failed. Cannot register user.",
                    "Error",
                    JOptionPane.ERROR_MESSAGE);
            return false;
        }

        String checkSql = "SELECT * FROM usersignup WHERE username = ?";
        String insertSql = "INSERT INTO usersignup (username, password) VALUES (?, ?)";

        try {
            try (PreparedStatement checkStmt =
database.getConnection().prepareStatement(checkSql)) {
                checkStmt.setString(1, username);
                try (ResultSet rs = checkStmt.executeQuery()) {
                    if (rs.next()) {
                        JOptionPane.showMessageDialog(this,
                                "Username already exists!",
                                "Error",
                                JOptionPane.ERROR_MESSAGE);
                        return false;
                    }
                }
            }

            try (PreparedStatement insertStmt =
database.getConnection().prepareStatement(insertSql)) {
                insertStmt.setString(1, username);
                insertStmt.setString(2, password);
                int affectedRows = insertStmt.executeUpdate();
                return affectedRows > 0;
            }
        } catch (SQLException ex) {
            JOptionPane.showMessageDialog(this,
                    "Error during registration: " + ex.getMessage(),
                    "Database Error",
                    JOptionPane.ERROR_MESSAGE);
```

```
            return false;
        }
    }

    @Override
    public void dispose() {
        if (database != null) {
            database.close();
        }
        super.dispose();
    }
}
```

Output:



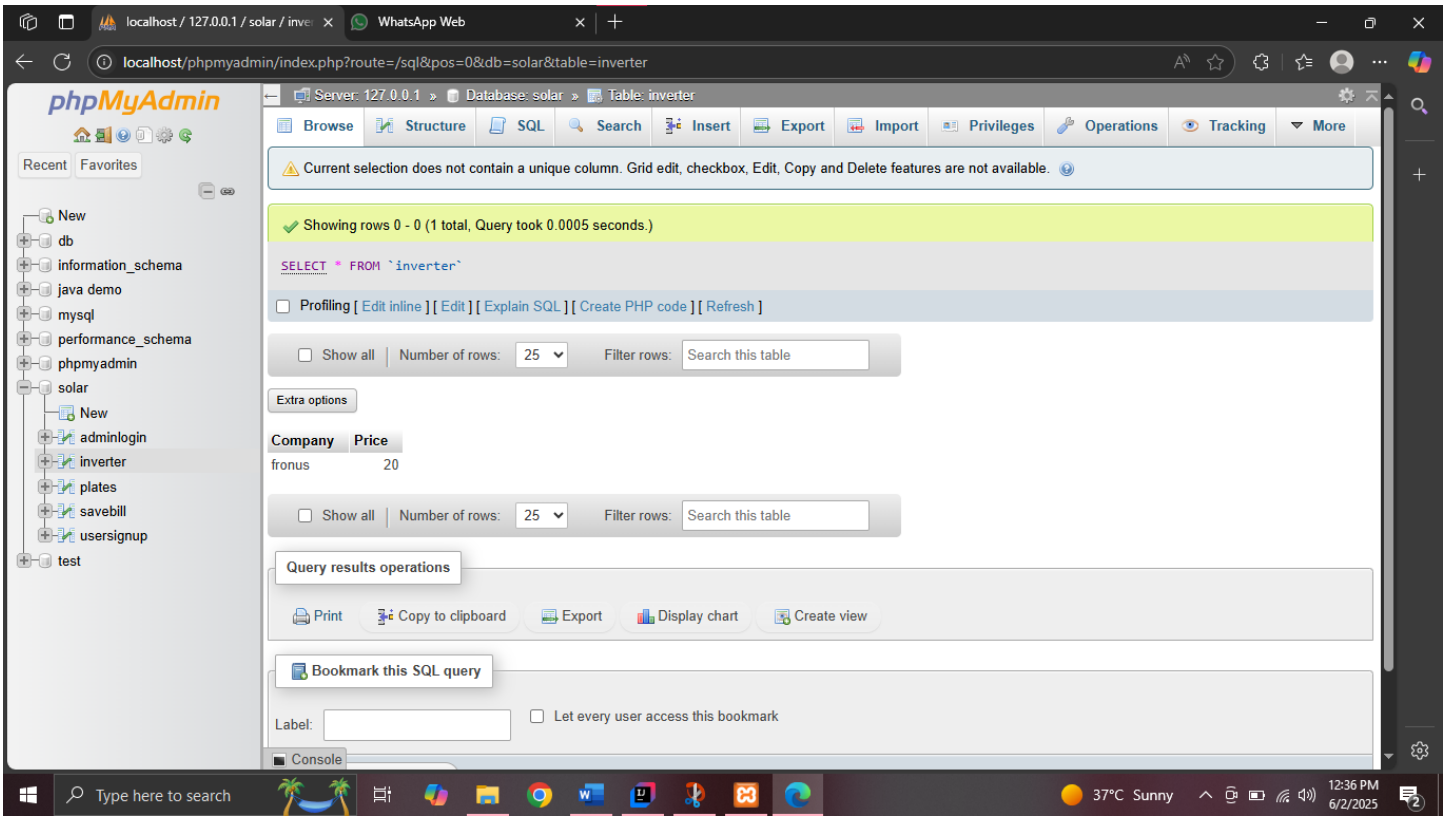


Database:

```
import java.sql.*;
import javax.swing.*;

public class Database {
    private static final String URL = "jdbc:mysql://localhost:3306/solar";
    private static final String USERNAME = "root";
    private static final String PASSWORD = "";

    private Connection connection;
    private boolean isConnected = false;

    public Database() {
        initializeConnection();
    }

    private void initializeConnection() {
        try {
            Class.forName("com.mysql.cj.jdbc.Driver");


            connection = DriverManager.getConnection(URL, USERNAME, PASSWORD);
            isConnected = true;


            if (connection.isValid(2)) {
                System.out.println("Database connection established successfully");
            }
        } catch (ClassNotFoundException e) {
```

```
            showError("JDBC Driver not found: " + e.getMessage());
            isConnected = false;
        } catch (SQLException e) {
            showError("Connection failed: " + e.getMessage());
            isConnected = false;
        }
    }

    public boolean isConnected() {
        return isConnected;
    }

    public Connection getConnection() {
        if (!isConnected) {
            showError("No active database connection");
            return null;
        }
        return connection;
    }

    public void close() {
        try {
            if (connection != null && !connection.isClosed()) {
                connection.close();
                isConnected = false;
                System.out.println("Database connection closed");
            }
        } catch (SQLException e) {
            showError("Error closing connection: " + e.getMessage());
        }
    }

    private void showError(String message) {
        JOptionPane.showMessageDialog(null,
                message,
                "Database Error",
                JOptionPane.ERROR_MESSAGE);
    }

    public ResultSet executeQuery(String sql) throws SQLException {
        if (!isConnected) throw new SQLException("No database connection");
        Statement stmt = connection.createStatement();
        return stmt.executeQuery(sql);
    }


    public int executeUpdate(String sql) throws SQLException {
        if (!isConnected) throw new SQLException("No database connection");
        Statement stmt = connection.createStatement();
        return stmt.executeUpdate(sql);
    }
}
```

Output:


localhost / 127.0.0.1 / solar / inver
WhatsApp Web
localhost/phpmyadmin/index.php?route=/sql&pos=0&db=solar&table=inverter
phpMyAdmin
Recent
Favorites
New
db
information_schema
java demo
mysql
performance_schema
phpmyadmin
solar
New
adminlogin
inverter
plates
savebill
usersignup
test
Server: 127.0.0.1 » Database: solar » Table: inverter
Browse
Structure
SQL
Search
Insert
Export
Import
Privileges
Operations
Tracking
More
Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.
Showing rows 0 - 0 (1 total, Query took 0.0005 seconds.)
SELECT * FROM `inverter`
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]
Show all | Number of rows: 25 Filter rows: Search this table
Extra options
Company Price
fronus 20
Show all | Number of rows: 25 Filter rows: Search this table
Query results operations
Print
Copy to clipboard
Export
Display chart
Create view
Bookmark this SQL query
Label:
Let every user access this bookmark
Console
Type here to search
37°C Sunny
12:36 PM
6/2/2025