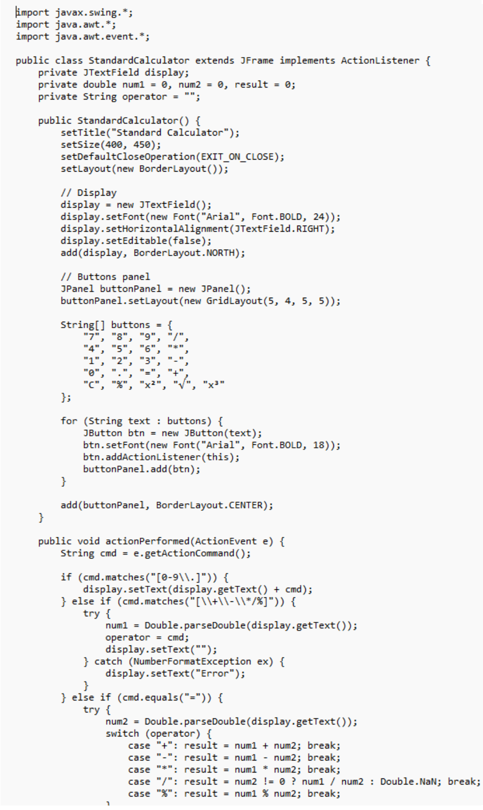
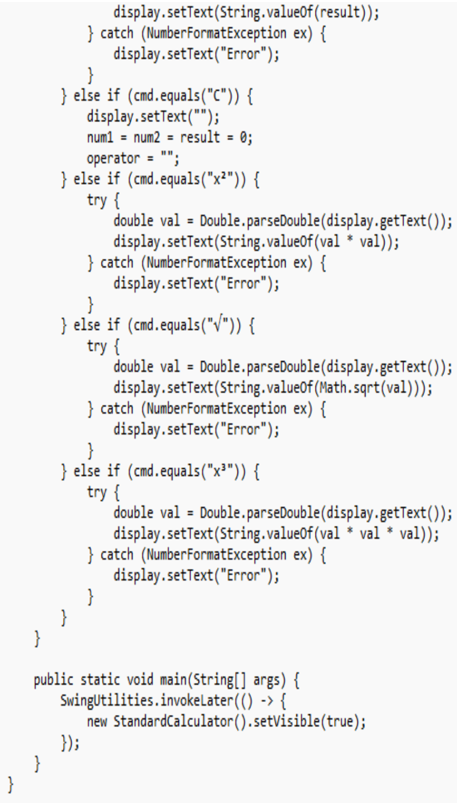
1. Design a standard calculator using Swing components that supports basic operations (Addition, Subtraction, Multiplication, and Division). Implement this with Intellij IDEA Implementation Guidelines: ○ Use JTextField to display input/output. ○ Use JButton for digits (0-9) and operations (+, -, *, /, =, %, square, square-root, cube, C, etc.). ○ Implement event handling for button clicks. ○ Display results in the text field.

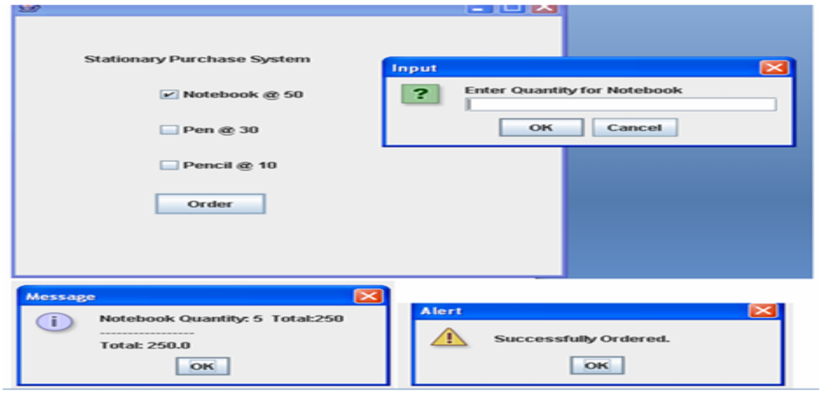


```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

public class StandardCalculator extends JFrame implements ActionListener {
    private JTextField display;
    private double num1 = 0, num2 = 0, result = 0;
    private String operator = "";

    public StandardCalculator() {
        setTitle("Standard Calculator");
        setSize(400, 450);
        setDefaultCloseOperation(EXIT_ON_CLOSE);
        setLayout(new BorderLayout());

        // Display
        display = new JTextField();
        display.setFont(new Font("Arial", Font.BOLD, 24));
        display.setHorizontalAlignment(JTextField.RIGHT);
        display.setEditable(false);
        add(display, BorderLayout.NORTH);

        // Buttons panel
        JPanel buttonPanel = new JPanel();
        buttonPanel.setLayout(new GridLayout(5, 4, 5, 5));

        String[] buttons = {
            "7", "8", "9", "/",
            "4", "5", "6", "*",
            "1", "2", "3", "-",
            "0", ".", "=", "+",
            "C", "%", "x²", "√", "x³"
        };

        for (String text : buttons) {
            JButton btn = new JButton(text);
            btn.setFont(new Font("Arial", Font.BOLD, 18));
            btn.addActionListener(this);
            buttonPanel.add(btn);
        }

        add(buttonPanel, BorderLayout.CENTER);
    }

    public void actionPerformed(ActionEvent e) {
        String cmd = e.getActionCommand();

        if (cmd.matches("[0-9\\.]")) {
            display.setText(display.getText() + cmd);
        } else if (cmd.matches("[\\+\\-\\*/%]")) {
            try {
                num1 = Double.parseDouble(display.getText());
                operator = cmd;
                display.setText("");
            } catch (NumberFormatException ex) {
                display.setText("Error");
            }
        } else if (cmd.equals("=")) {
            try {
                num2 = Double.parseDouble(display.getText());
                switch (operator) {
                    case "+": result = num1 + num2; break;
                    case "-": result = num1 - num2; break;
                    case "*": result = num1 * num2; break;
                    case "/": result = num2 != 0 ? num1 / num2 : Double.NaN; break;
                    case "%": result = num1 % num2; break;
```



```
                display.setText(String.valueOf(result));
            } catch (NumberFormatException ex) {
                display.setText("Error");
            }
        } else if (cmd.equals("C")) {
            display.setText("");
            num1 = num2 = result = 0;
            operator = "";
        } else if (cmd.equals("x²")) {
            try {
                double val = Double.parseDouble(display.getText());
                display.setText(String.valueOf(val * val));
            } catch (NumberFormatException ex) {
                display.setText("Error");
            }
        } else if (cmd.equals("√")) {
            try {
                double val = Double.parseDouble(display.getText());
                display.setText(String.valueOf(Math.sqrt(val)));
            } catch (NumberFormatException ex) {
                display.setText("Error");
            }
        } else if (cmd.equals("x³")) {
            try {
                double val = Double.parseDouble(display.getText());
                display.setText(String.valueOf(val * val * val));
            } catch (NumberFormatException ex) {
                display.setText("Error");
            }
        }
    }

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

2. Implement the following problem statement using Intellij IDEA.

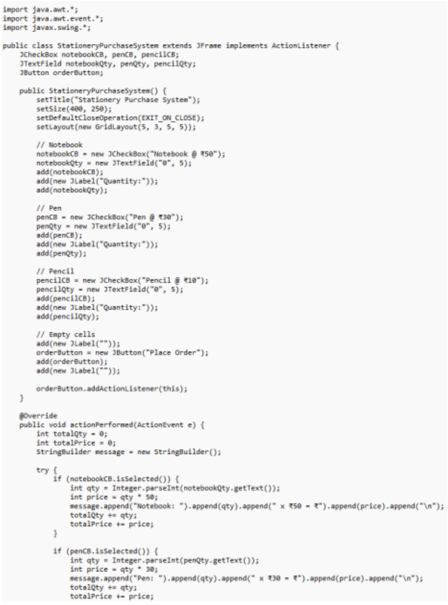


Enter Quantity for Notebook

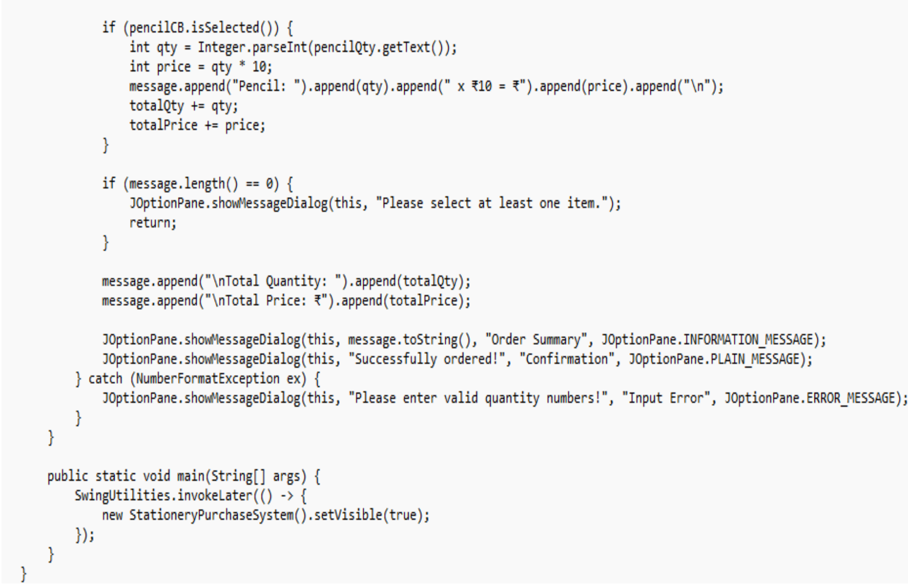
Notebook Quantity: 5 Total:250

Total: 250.0

Successfully Ordered.



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

public class StationeryPurchaseSystem extends JFrame implements ActionListener {
    JCheckBox notebookCB, penCB, pencilCB;
    JTextField notebookQty, penQty, pencilQty;
    JButton orderButton;

    public StationeryPurchaseSystem() {
        setTitle("Stationery Purchase System");
        setSize(400, 250);
        setDefaultCloseOperation(EXIT_ON_CLOSE);
        setLayout(new GridLayout(5, 3, 5, 5));

        // Notebook
        notebookCB = new JCheckBox("Notebook @ ₹50");
        notebookQty = new JTextField("0", 5);
        add(notebookCB);
        add(new JLabel("Quantity:"));
        add(notebookQty);

        // Pen
        penCB = new JCheckBox("Pen @ ₹30");
        penQty = new JTextField("0", 5);
        add(penCB);
        add(new JLabel("Quantity:"));
        add(penQty);

        // Pencil
        pencilCB = new JCheckBox("Pencil @ ₹10");
        pencilQty = new JTextField("0", 5);
        add(pencilCB);
        add(new JLabel("Quantity:"));
        add(pencilQty);

        // Empty cells
        add(new JLabel(""));
        orderButton = new JButton("Place Order");
        add(orderButton);
        add(new JLabel(""));

        orderButton.addActionListener(this);
    }

    @Override
    public void actionPerformed(ActionEvent e) {
        int totalQty = 0;
        int totalPrice = 0;
        StringBuilder message = new StringBuilder();

        try {
            if (notebookCB.isSelected()) {
                int qty = Integer.parseInt(notebookQty.getText());
                int price = qty * 50;
                message.append("Notebook: ").append(qty).append(" x ₹50 = ₹").append(price).append("\n");
                totalQty += qty;
                totalPrice += price;
            }

            if (penCB.isSelected()) {
                int qty = Integer.parseInt(penQty.getText());
                int price = qty * 30;
                message.append("Pen: ").append(qty).append(" x ₹30 = ₹").append(price).append("\n");
                totalQty += qty;
                totalPrice += price;
```



```
            if (pencilCB.isSelected()) {
                int qty = Integer.parseInt(pencilQty.getText());
                int price = qty * 10;
                message.append("Pencil: ").append(qty).append(" x ₹10 = ₹").append(price).append("\n");
                totalQty += qty;
                totalPrice += price;
            }

            if (message.length() == 0) {
                JOptionPane.showMessageDialog(this, "Please select at least one item.");
                return;
            }

            message.append("\nTotal Quantity: ").append(totalQty);
            message.append("\nTotal Price: ₹").append(totalPrice);

            JOptionPane.showMessageDialog(this, message.toString(), "Order Summary", JOptionPane.INFORMATION_MESSAGE);
            JOptionPane.showMessageDialog(this, "Successfully ordered!", "Confirmation", JOptionPane.PLAIN_MESSAGE);
        } catch (NumberFormatException ex) {
            JOptionPane.showMessageDialog(this, "Please enter valid quantity numbers!", "Input Error", JOptionPane.ERROR_MESSAGE);
        }
    }

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