```java
package lab03;

import java.util.Scanner;

public class Lab03 {

    public static void main(String[] args) {
        int op1, op2, iResult;
        double dResult;

        for (;;) {
            displayMenu();
            switch (readInput("Selection: ")) {
            case 1 -> {
                op1 = readInput("Enter operand 1: ");
                op2 = readInput("Enter operand 2: ");
                displayResult(op1, op2, addition(op1, op2), "+");
            }
            case 2 -> {
                op1 = readInput("Enter operand 1: ");
                op2 = readInput("Enter operand 2: ");
                displayResult(op1, op2, subtraction(op1, op2), "-");
            }
            case 3 -> {
                op1 = readInput("Enter operand 1: ");
                op2 = readInput("Enter operand 2: ");
                displayResult(op1, op2, multiplication(op1, op2), "*");
            }
            case 4 -> {
                op1 = readInput("Enter operand 1: ");
                op2 = readInput("Enter operand 2 (/or%): ");

                displayResult(op1, op2, division(op1, op2), "/");
            }
            case 5 -> {
                op1 = readInput("Enter operand 1: ");
                op2 = readInput("Enter operand 2 (/or%): ");
                displayResult(op1, op2, modulo(op1, op2), "%");
            }
            case 6 -> {
                op1 = readInput("Enter operand 1: ");
                op2 = readInput("Enter operand 2: ");
                displayResult(op1, op2, additionShorthand(op1, op2), "+=");
            }
            case 7 -> {
                op1 = readInput("Enter operand 1: ");
                op2 = readInput("Enter operand 2: ");
                displayResult(op1, op2, subtractionShorthand(op1, op2), "-=");
            }
            case 8 -> {
                op1 = readInput("Enter operand 1: ");
                op2 = readInput("Enter operand 2: ");
                displayResult(op1, op2, multiplicationShorthand(op1, op2), "*=");
            }
            case 9 -> {
                op1 = readInput("Enter operand 1: ");
                op2 = readInput("Enter operand 2 (/or%): ");
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58                displayResult(op1, op2, divisionShorthand(op1, op2), "/=");
59            }
60            case 10 -> {
61                op1 = readInput("Enter operand 1: ");
62                op2 = readInput("Enter operand 2 (/or%): ");
63                displayResult(op1, op2, moduloShorthand(op1, op2), "%=");
64            }
65            case 11 -> quitApp();
66            }
67        }
68    }
69
70    public static void displayResult(int op1, int op2, double dResult, String operator) {
71        System.out.println(op1 + " " + operator + " " + op2 + " = " + dResult);
72    }
73
74    public static void displayResult(int op1, int op2, int iResult, String operator) {
75        System.out.println(op1 + " " + operator + " " + op2 + " = " + iResult);
76    }
77
78    public static void displayMenu() {
79        System.out.println("Enter 1. to perform addition using the + operator\r\n"
80                + "Enter 2. to perform subtraction  using the - operator\r\n"
81                + "Enter 3. to perform multiplication using the * operator\r\n"
82                + "Enter 4. to perform division  using the / operator\r\n"
83                + "Enter 5. to perform modulo using the % operator\r\n"
84                + "Enter 6. to perform addition using the shorthand += operator\r\n"
85                + "Enter 7. to perform subtraction  using the shorthand -= operator\r\n"
86                + "Enter 8. to perform multiplication using the shorthand *= operator\r\n"
87                + "Enter 9. to perform division  using the shorthand /= operator\r\n"
88                + "Enter 10. to perform modulo using the shorthand %= operator\r\n"
89                + "Enter 11. to QUIT the application");
90    }
91
92    public static int readInput(String message) {
93        Scanner input = new Scanner(System.in);
94
95        int num = 0;
96        if (message.equals("Selection: ")) {
97            do {
98                System.out.println(message);
99                num = input.nextInt();
100           } while (validate(num, message));
101           return num;
102       } else if (message.equals("Enter operand 2 (/or%): ")) {
103           do {
104               System.out.println(message);
105               num = input.nextInt();
106           } while (validate(num, message));
107           return num;
108       }
109       System.out.print(message);
110       return input.nextInt();
111   }
112
113   public static boolean validate(int num, String message) {
114
```

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115         if (message.equals("Enter operand 2 (/or%): ")) {
116             if (num == 0) {
117                 System.out.println("Zero is invalid try again.");
118                 return true;
119             } else
120                 return false;
121         } else {
122             if (num >= 1 && num <= 11) {
123                 return false;
124             } else {
125                 invalidChoice();
126                 return true;
127             }
128         }
129 
130     }
131 
132     public static void invalidChoice() {
133         System.out.println("Invalid choice, please select again...");
134         displayMenu();
135     }
136 
137     public static void quitApp() {
138         System.out.println("Goodbye!");
139         System.exit(0);
140     }
141 
142     public static int moduloShorthand(int op1, int op2) {
143         op1 %= op2;
144         return op1;
145     }
146 
147     public static double divisionShorthand(double op1, int op2) {
148         op1 /= op2;
149         return op1;
150     }
151 
152     public static int multiplicationShorthand(int op1, int op2) {
153         op1 *= op2;
154         return op1;
155     }
156 
157     public static int subtractionShorthand(int op1, int op2) {
158         op1 -= op2;
159         return op1;
160     }
161 
162     public static int additionShorthand(int op1, int op2) {
163         op1 += op2;
164         return op1;
165     }
166 
167     public static int modulo(int op1, int op2) {
168         return op1 % op2;
169     }
170 
171     public static double division(int op1, int op2) {
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172         return (double) op1 / op2;
173     }
174 
175     public static int multiplication(int op1, int op2) {
176         return op1 * op2;
177     }
178 
179     public static int subtraction(int op1, int op2) {
180         return op1 - op2;
181     }
182 
183     public static int addition(int op1, int op2) {
184         return op1 + op2;
185     }
186 
187 }
188 
```