```java
1 /*
2  * Written by JJ Shepherd
3  */
4 import java.util.Scanner;
5
6 public class Calculator
7 {
8      private double result;
9      public static final double PRECISION = 0.0001;
10
11     public static void main(String[] args)
12     {
13         Calculator calc = new Calculator( );
14         System.out.println("Welcome to the calculator!");
15         System.out.print("Format of each line: ");
16         System.out.println("<<operator>> <<number>>");
17         System.out.println("For example: + 3");
18         System.out.println("To quit, enter the letter e.");
19         calc.runCalculator();
20         System.out.println("Goodbye");
21     }
22     public void runCalculator()
23     {
24         Scanner keyboard = new Scanner(System.in);
25
26         boolean done = false;
27         result = 0.0;
28         System.out.println("result = " + result);
29         while (!done)
30         {
31            char nextOp = (keyboard.next()).charAt(0);
32             if ((nextOp == 'e') || (nextOp == 'E'))
33                 done = true;
34             else
35             {
36                 try
37                 {
38                     double nextNumber = keyboard.nextDouble();
39                     result = evaluate(nextOp,result,nextNumber);
40                     System.out.println("result " + nextOp + " " + nextNumber);
41                 }
42                 catch(DivideByZeroException e)
43                 {
44                     e.printStackTrace();
45                 }
46                 catch(UnknownOpException e)
47                 {
48                     e.printStackTrace();
49                 }
50                 catch(Exception e)
51                 {
52                     e.printStackTrace();
53                 }
54                 finally
55                 {
56                     keyboard.nextLine();
57                     System.out.println("result = " + result);
```

```java
58                    }
59                }
60            }
61        }
62        public double evaluate(char op, double n1, double n2)
63        throws DivideByZeroException, UnknownOpException
64        {
65            double answer = 0.0;
66            switch(op)
67            {
68            case '+':
69                answer = n1 + n2;
70                break;
71            case '-':
72                answer = n1 - n2;
73                break;
74            case '*':
75                answer = n1 * n2;
76                break;
77            case '/':
78                if((-PRECISION < n2) && (n2 < PRECISION))
79                    throw new DivideByZeroException();
80                answer = n1 / n2;
81                break;
82            default:
83                throw new UnknownOpException(op+" was used");
84            }
85            return answer;
86        }
87
88 }
89
```