Calculator Challenge

Solution by Ron Ruffin

I implemented this challenge by creating an ExponentHandler class Calculator class with a conditionally instantiated ExponentHandler object, and a SciCalculator class which extends Calculator class. To test my solution, I created the CalcChallenge class as my main application.

# ExponentHandler

package calcchallenge;

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\* @author RonRuffin

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public class ExponentHandler {

public double pow(double value, double exp) {

double result = Math.pow(value, exp);

return result;

}

public double multiplyExps(double[] firstValue, double[] secondValue) {

if ((firstValue.length == 2) && (secondValue.length == 2)) {

double value1 = pow(firstValue[0], firstValue[1]);

double value2 = pow(secondValue[0], secondValue[1]);

double result = value1 \* value2;

return result;

}

else throw new IllegalArgumentException("Incorrect number of arguments.");

}

public double divideExps(double[] firstValue, double[] secondValue) {

if ((firstValue.length == 2) && (secondValue.length == 2)) {

double value1 = pow(firstValue[0], firstValue[1]);

double value2 = pow(secondValue[0], secondValue[1]);

if (value2 != 0) {

double result = value1 / value2;

return result;

}

else throw new IllegalArgumentException("Incorrect number of arguments.");

}

else throw new IllegalArgumentException("Cannot divide by zero.");

}

}

# Calculator

package calcchallenge;

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\* @author RonRuffin

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public class Calculator {

ExponentHandler exponents = null;

public Calculator() {

this(false);

}

public Calculator(boolean handleExponents) {

if (handleExponents) {

exponents = new ExponentHandler();

}

}

public double add(double firstVal, double secondVal) {

double result = firstVal + secondVal;

return result;

}

public double subtract(double firstVal, double secondVal) {

double result = firstVal - secondVal;

return result;

}

public double multiply(double firstVal, double secondVal) {

double result = firstVal \* secondVal;

return result;

}

public double divide(double firstVal, double secondVal) {

if (secondVal != 0) {

double result = firstVal / secondVal;

return result;

}

else throw new IllegalArgumentException("Cannot divide by zero.");

}

public double pow(double firstValue, double secondValue) throws Exception {

if (exponents != null) {

double result = exponents.pow(firstValue, secondValue);

return result;

}

else {

throw new Exception("ExponentHandler not instantiated.");

}

}

public double multiplyExps(double[] firstValue, double[] secondValue) throws Exception {

if (exponents != null) {

try {

double result = exponents.multiplyExps(firstValue, secondValue);

return result;

}

catch (IllegalArgumentException e) {

throw e;

}

}

else {

throw new Exception("ExponentHandler not instantiated.");

}

}

public double divideExps(double[] firstValue, double[] secondValue) throws Exception {

if (exponents != null) {

try {

double result = exponents.divideExps(firstValue, secondValue);

return result;

}

catch (IllegalArgumentException e) {

throw e;

}

}

else {

throw new Exception("ExponentHandler not instantiated.");

}

}

}

# SciCalculator

package calcchallenge;

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\* @author RonRuffin

\*/

public class SciCalculator extends Calculator {

public double sin(int value) {

double result = Math.sin(value);

return result;

}

public double cos(int value) {

double result = Math.cos(value);

return result;

}

public double tan(int value) {

double result = Math.tan(value);

return result;

}

public double log(int value) {

double result = Math.log(value);

return result;

}

}

# CalcChallenge

package calcchallenge;

/\*\*

\*

\* @author RonRuffin

\*/

public class CalcChallenge {

/\*\*

\* @param args the command line arguments

\*/

public static void main(String[] args) {

Calculator calc = new Calculator();

//Calculator calc = new Calculator(true);

double sum = calc.add(1, 3);

double difference = calc.subtract(10, 3);

double product = calc.multiply(12, 2);

double quotient = calc.divide(80, 4);

System.out.println("Sum = " + sum + ".");

System.out.println("Difference = " + difference + ".");

System.out.println("Product = " + product + ".");

System.out.println("Quotient = " + quotient + ".");

try {

double exp = calc.pow(2, 3);

System.out.println("Pow = " + exp + ".");

}

catch (Exception e) {

System.err.println(e.getMessage());

}

try {

double[] value1 = {2, 3};

double[] value2 = {2, 4};

double multiplyExps = calc.multiplyExps(value1, value2);

System.out.println("multiplyExps = " + multiplyExps + ".");

}

catch (Exception e) {

System.err.println(e.getMessage());

}

try {

double[] value1 = {2, 3};

double[] value2 = {2, 5};

double divideExps = calc.divideExps(value1, value2);

System.out.println("divideExps = " + divideExps + ".");

}

catch (Exception e) {

System.err.println(e.getMessage());

}

}

}