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Formative Assessment 2:

Systems Development 2A

2. import java.util.ArrayList;

import java.util.List;

public class PowerCalculator {

public static void main(String[] args) {

// Test the method with some examples

System.out.println(recursivePower(2, 3)); // Output: 8.0

System.out.println(recursivePower(2, -3)); // Output: 0.125

System.out.println(recursivePower(5, 0)); // Output: 1.0

System.out.println(recursivePower(3, -2)); // Output: 0.1111111111111111

}

public static <T extends Number> double recursivePower(T base, int exponent) {

List<Double> results = new ArrayList<>();

return powerHelper(base.doubleValue(), exponent, results);

}

private static double powerHelper(double base, int exponent, List<Double> results) {

// Base case: when exponent is 0

if (exponent == 0) {

return 1;

}

// Handle negative exponent

else if (exponent < 0) {

return 1.0 / powerHelper(base, -exponent, results);

}

// Recursive case for positive exponent

else {

double result = base \* powerHelper(base, exponent - 1, results);

results.add(result); // Store intermediate results (optional)

return result;

}

}

}