import java.util.Scanner;

public class SimpleProblems {

public SimpleProblems() {}

public static int findMinimum(int[] arr, int n) {

return n == 1 ? arr[0] : Math.min(arr[n - 1], findMinimum(arr, n - 1));

}

public static double calculateAverage(int[] arr, int n) {

double sum = 0.0;

for (int i = 0; i < n; ++i) {

sum += (double) arr[i];

}

return sum / (double) n;

}

public static boolean isPrime(int num) {

if (num <= 1) {

return false;

} else {

for (int i = 2; i \* i <= num; ++i) {

if (num % i == 0) {

return false;

}

}

return true;

}

}

public static int calculateFactorial(int n) {

return n != 0 && n != 1 ? n \* calculateFactorial(n - 1) : 1;

}

public static int calculateFibonacci(int n) {

return n <= 1 ? n : calculateFibonacci(n - 1) + calculateFibonacci(n - 2);

}

public static int calculatePower(int a, int n) {

return n == 0 ? 1 : a \* calculatePower(a, n - 1);

}

public static void printPermutations(String str, String prefix) {

int length = str.length();

if (length == 0) {

System.out.println(prefix);

} else {

for (int i = 0; i < length; ++i) {

printPermutations(str.substring(0, i) + str.substring(i + 1, length), prefix + str.charAt(i));

}

}

}

public static boolean containsOnlyDigits(String s) {

char[] chars = s.toCharArray();

for (char c : chars) {

if (!Character.isDigit(c)) {

return false;

}

}

return true;

}

public static int calculateBinomialCoefficient(int n, int k) {

return k != 0 && k != n ? calculateBinomialCoefficient(n - 1, k - 1) + calculateBinomialCoefficient(n - 1, k) : 1;

}

public static int calculateGCD(int a, int b) {

return b == 0 ? a : calculateGCD(b, a % b);

}

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.println("Choose a problem to solve:");

System.out.println("1. Find minimum element");

System.out.println("2. Calculate average");

System.out.println("3. Check if a number is prime");

System.out.println("4. Find factorial");

System.out.println("5. Find nth Fibonacci number");

System.out.println("6. Calculate power");

System.out.println("7. Print all permutations of a string");

System.out.println("8. Check if a string consists of all digits");

System.out.println("9. Find binomial coefficient");

System.out.println("10. Find GCD");

int choice = scanner.nextInt();

switch (choice) {

case 1:

System.out.print("Enter the number of elements: ");

int n1 = scanner.nextInt();

int[] arr1 = new int[n1];

System.out.println("Enter the elements:");

for (int i = 0; i < n1; ++i) {

arr1[i] = scanner.nextInt();

}

int min = findMinimum(arr1, n1);

System.out.println("Minimum element: " + min);

break;

case 2:

System.out.print("Enter the number of elements: ");

int n2 = scanner.nextInt();

int[] arr2 = new int[n2];

System.out.println("Enter the elements:");

for (int i = 0; i < n2; ++i) {

arr2[i] = scanner.nextInt();

}

double average = calculateAverage(arr2, n2);

System.out.println("Average: " + average);

break;

case 3:

System.out.print("Enter a number: ");

int num = scanner.nextInt();

if (isPrime(num)) {

System.out.println("" + num + " is Prime");

} else {

System.out.println("" + num + " is Composite");

}

break;

case 4:

System.out.print("Enter a number: ");

int factNum = scanner.nextInt();

int result = calculateFactorial(factNum);

System.out.println("" + factNum + "! = " + result);

break;

case 5:

System.out.print("Enter a number: ");

int fibNum = scanner.nextInt();

int fibResult = calculateFibonacci(fibNum);

System.out.println("Fibonacci(" + fibNum + ") = " + fibResult);

break;

case 6:

System.out.print("Enter base (a): ");

int base = scanner.nextInt();

System.out.print("Enter exponent (n): ");

int exponent = scanner.nextInt();

int powerResult = calculatePower(base, exponent);

System.out.println("" + base + "^" + exponent + " = " + powerResult);

break;

case 7:

System.out.print("Enter a string: ");

String str = scanner.next();

printPermutations(str, "");

break;

case 8:

System.out.print("Enter a string: ");

String s = scanner.next();

if (containsOnlyDigits(s)) {

System.out.println("Yes");

} else {

System.out.println("No");

}

break;

case 9:

System.out.print("Enter n: ");

int n = scanner.nextInt();

System.out.print("Enter k: ");

int k = scanner.nextInt();

int binomialResult = calculateBinomialCoefficient(n, k);

System.out.println("C(" + n + ", " + k + ") = " + binomialResult);

break;

case 10:

System.out.print("Enter a: ");

int a = scanner.nextInt();

System.out.print("Enter b: ");

int b = scanner.nextInt();

int gcdResult = calculateGCD(a, b);

System.out.println("GCD(" + a + ", " + b + ") = " + gcdResult);

break;

default:

System.out.println("Please choose a valid number.");

}

scanner.close();

}

}