import java.math.\*;

//import java.util.\*;

public class Karatsuba

{

/\*\* Function to multiply two numbers \*\*/

public BigInteger multiply(BigInteger x, BigInteger y)

{

BigInteger size1 =new BigInteger("2");

// BigInteger size2 = getSize(y);

/\*\* Maximum of lengths of number \*\*/

int N =getSize(x),q=2;

/\*\* for small values directly multiply \*\*/

if (N < 10)

return x.multiply(y);

/\*\* max length divided, rounded up \*\*/

N = (N / 2) + (N % 2);

/\*\* multiplier \*\*/

BigInteger n=new BigInteger("10");

BigInteger m =n.pow(N);

BigInteger size2 =size1.multiply(BigInteger.valueOf(N));

BigInteger size3=n.pow(2);

/\*\* compute sub expressions \*\*/

BigInteger b = x.divide(m);

BigInteger a = x.subtract(b.multiply(m));

BigInteger d = y.divide(m);

BigInteger c = y.subtract(b.multiply(m));

/\*\* compute sub expressions \*\*/

BigInteger z0 = multiply(a,c);

BigInteger z1 = multiply(a.add(b), c.add(d));

BigInteger z2 = multiply(b, d);

return (z0.add((z1.subtract(z0.subtract(z2))).multiply(m))).add(z2.multiply(size3));

}

/\*\* Function to calculate length or number of digits in a number \*\*/

public int getSize(BigInteger num)

{

int ctr = 0;

BigInteger i=new BigInteger("10");

while (num.equals(0))

{

ctr++;

num=num.divide(i);

}

return ctr;

}

/\*\* Main function \*\*/

public static void main (String[] args)

{

// Scanner scan = new Scanner(System.in);

System.out.println("Karatsuba Multiplication Algorithm Test\n");

/\*\* Make an object of Karatsuba class \*\*/

Karatsuba kts = new Karatsuba();

/\*\* Accept two integers \*\*/

System.out.println("Enter two integer numbers\n");

BigInteger n1 = new BigInteger("3141592653589793238462643383279502884197169399375105820974944592");

BigInteger n2 = new BigInteger("2718281828459045235360287471352662497757247093699959574966967627");

/\*\* Call function multiply of class Karatsuba \*\*/

BigInteger product = kts.multiply(n1, n2);

System.out.println("\nProduct : "+ product);

}

}

Output:

8539734222673567065463550869546574495034888535765114961879601127067743044893204848617875072216249073013374895871952806582723184