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I, ME AND MYSELF !!!

THURSDAY, JANUARY 13, 2011

Pollard's Rho in Java

This is a Pollard's Rho implementation in java. Not very fast, but works for uva online judge. The reason behind using java is the default support of the BigInteger class.

```
import java.math.BigInteger;
import java.security.SecureRandom;
import java.io.*;
import java.util.*;

public class PollardRho {

    private final static BigInteger ZERO = new BigInteger("0");
    private final static BigInteger ONE  = new BigInteger("1");
    private final static BigInteger TWO  = new BigInteger("2");
    private final static SecureRandom random = new SecureRandom();

    static Vector<BigInteger> v = new Vector<BigInteger>();

    public static BigInteger rho(BigInteger N) {

        BigInteger divisor;
        BigInteger c  = new BigInteger(N.bitLength(), random);
        BigInteger x  = new BigInteger(N.bitLength(), random);
        BigInteger xx = x;

        if (N.mod(TWO).compareTo(ZERO) == 0) return TWO;

        do {
            x  =  x.multiply(x).mod(N).add(c).mod(N);
            xx = xx.multiply(xx).mod(N).add(c).mod(N);
            xx = xx.multiply(xx).mod(N).add(c).mod(N);
            divisor = x.subtract(xx).gcd(N);
        } while((divisor.compareTo(ONE)) == 0);

        return divisor;
    }

    public static void factor(BigInteger N) {

        if (N.compareTo(ONE) == 0) return;

        if (N.isProbablePrime(20)) {
            v.add(N);
            return;
        }

        BigInteger divisor = rho(N);
        factor(divisor);
        factor(N.divide(divisor));
    }

    public static void main(String[] args) throws Exception {

        String string = "";
        InputStreamReader input = new InputStreamReader(System.in);
        BufferedReader reader = new BufferedReader(input);
```

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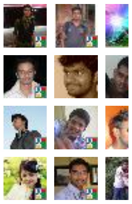

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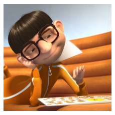

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```
        while(null != (string = reader.readLine())) {
            BigInteger N = new BigInteger(string);
            v.clear();
            factor(N);
            Collections.sort(v);
            for(int i = 0; i < v.size(); i++) System.out.println(v.get(i));
            System.out.println();
        }
    }
}
```

I have seen this piece of code years ago somewhere in the internet, but can't remember exactly where. So, I will be glad if anyone can comment/mail me the original source. However, for spoj, I need to write a much much better version of this in C++ :(Exam sucks life...

Posted by Zobayer Hasan at 3:41 AM

3 comments:

Masum February 28, 2012 at 2:33 PM

I think by this time a C++ code should be posted. :)

Reply

Anonymous September 3, 2012 at 2:16 AM

this is the code from Robert Sedgewick's page "intro to cs".

Reply

Replies

Zobayer Hasan September 3, 2012 at 3:44 AM

Haven't read that book yet, but thanks for the info :)

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I am only one, but still I am one.
I cannot do everything, but still I can do something.
And because I cannot do everything I will not refuse to do the something that I can do.
{Helen Keller}

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