import java.io.FileWriter;

import java.io.IOException;

import java.util.HashMap;

import java.util.List;

/\*\*

\* File Name: AmicablePair.java

\*

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\* @year 2018

\*

\* To compile: RandomInt.java IntUtil.java AmicablePair.java

\*/

public class AmicablePair{

private int max ;

//YOU CAN HAVE ANY NUMBER OF PRIVATE VARIABLES HERE

static IntUtil u = new IntUtil() ;

/\*

\* Constructor

\*/

AmicablePair(int n) {

max = n ;

factorsSum(n); **// implement the method**

/\* You can initialize any variables here \*/

/\* you can call any private functions here \*/

}

/\*

\* WRITE YOUR CODE BELOW

\* MUST SOLVE FROM FUNDAMENTALS

\* CANNOT USE SOME WEIRD FORMULAS FROM INTERNET

\*/

**//AmicablePair sum compute method**

private int factorsSum(int n) {

long startTime = System.nanoTime();**//Time count**

int j, sum = 0, num = 0;

int[] sums = new int [n+1];

for (int i = 1; i <=n/2; i++) {

j = i\*2;

while (j <= n) {

sums[j] = sums[j]+i; **// add factor i to every sums in the list**

j = j+i;

}

}

for (int i = 2; i <= n; i++) {

sum = sums[i];

if (sum > n || sum <= i)**// avoid sum out of n and delete repeating such as "284-220"** from"220-284 "

continue;

else {

if (sums[sum] == i) {**// Judge Amicable Pair**

System.out.println(num+": "+i+" and "+sum); **//output Amicable Pair**

num++;

}

}

}

long endTime = System.nanoTime();// Time count

double d2 = u.timeInSec(endTime,startTime) ;// Time count

System.out.println("AmicablePair " + " CPU time = " + d2 + " seconds"); **// Time count**

return num;

}

/\*

\* NOTHING CAN BE CHANGED BELOW

\*/

private static void test() {

int n = 100000000;

AmicablePair a = new AmicablePair(n) ;

}

public static void main(String[] args) {

System.out.println("AmicablePair.java starts") ;

test() ;

System.out.println("If you can do in less than 20 secs, you will get FULL points") ;

System.out.println("Attach AmicablePair.java, output of your program as a pdf file") ;

System.out.println("Attach a word file, explaining why your method is fast") ;

System.out.println("AmicablePair.java ends") ;

}

}