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using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace HeMatMaDoiXung.GiaiThuat
{
    public class Affine
    {
        public static string nguon = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";
        public static char[] P = nguon.ToCharArray();
        public static string Mahoa(string s, int a,int b)
        {
            int mahoa_local = 0;
            char[] vanban = s.ToCharArray();
            int l = vanban.Length;
            char[] tmp_text = new char[l];
            int[] tmp_local = new int[l];
            int j = 0;
            while (j < l)
            {
                for (int i = 0; i < P.Length; i++)
                {
                    if (P[i] == vanban[j])
                    {
                        tmp_local[j] = i;
                        mahoa_local = (tmp_local[j] * a + b) % P.Length;
                        tmp_text[j] = P[mahoa_local];
                    }
                }
                j++;
            }

            return new string(tmp_text);
        }
        public static string GiaiMa(string s, int a, int b)
        {
            int mahoa_local = 0;
            char[] vanban = s.ToCharArray();
            int l = vanban.Length;
            char[] tmp_text = new char[l];
            int[] tmp_local = new int[l];
            int j = 0;
            int mod = TimNghichDao(a, P.Length);
            while (j < l)
            {
                for (int i = 0; i < P.Length; i++)
                {
                    if (P[i] == vanban[j])
                    {
                        tmp_local[j] = i;
                        mahoa_local = ((mod+ P.Length) * (tmp_local[j]-b + P.Length))%
P.Length;
                        tmp_text[j] = P[mahoa_local];
                    }
                }
                j++;
```

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            }

            return new string(tmp_text);
        }
        public static int TimNghichDao(int x1,int x2) // Tìm nghịch đảo a-1
        {
            int b = 0, b0 = 0, b1 = 1, result = 0;
            while (x1 > 0)
            {
                int x = x2 % x1;
                if (x == 0)
                    break;
                int y = x2 / x1;
                b = b0 - (b1 * y);
                x2 = x1;
                x1 = x;
                b0 = b1;
                b1 = b;
            }
            if (x1 == 1) result = ((b + P.Length) % P.Length);
            return result;
        }
        public static int USCLN(int a, int b) //Tinh uoc so chung lon nhat
        {
            a = Math.Abs(a);
            b = Math.Abs(b);
            if (a == 0 || b == 0)
                return a + b;
            while (a != b)
            {
                if (a > b)
                    a = a - b;
                else
                    b = b - a;
            }
            return a;
        }
    }
}
```