Title: CODEON

Author: Sankalp Chakre

Difficulty: Easy

Domain: Cryptography

DESCRIPTION:

My biochemist friend has doubt that his phone is used by others for calling without knowing him. So, he wants me to find some information related to it, that's why he sent me some information related to it, also he uses one word short-forms mostly. But I am unable to understand sent data, can you help me?

Flag format: VishwaCTF{} (flag letters must be capital)

Txt file: codon.txt

RSC BGT FFH HFT TPD WMA OCZ CCD DCZ ZVA

He gave me some instructions related to it:

1)He told me he saw some names in call logs those are:

Felix Delastelle, Dmitri Mendeleev.

2)He also gave me 2 matrices A and B and told to perform same operation on matrix A and B as of performed on matrix P and Q. Find something related to biochemistry to crack my phone password.

Matrix A = 45 35 93 95 24 65
25 15 55 64 36 45
15 65 62 16 65 38
19 64 35 69 65 63
47 67 48 60 39 27
66 48 77 22 10 69

Matrix B = 33 25 30 11 68 65
83 36 19 33 55 51
20 16 48 63 41 71
30 42 12 25 31 37
51 03 44 23 43 85
20 39 28 41 01 70

Matrix P= 13 81 60

40 99 88

39 87 92

Matrix Q= $\begin{pmatrix} 50 & 52 & 36 \\ 90 & 75 & 28 \\ 80 & 9 & 18 \end{pmatrix}$

Result Matrix = $\begin{pmatrix} 60 & 82 & 36 \\ 60 & 109 & 104 \\ 52 & 75 & 4 \end{pmatrix}$

Solution:

BIFID CIPHER encoded:

RSC BGT FFH HFT TPD WMA OCZ CCD DCZ ZVA

For key :

To find key multiply elements of matrix A (A[i][j]) with element of matrix B (B[i][j]) then take mod of matrix elements of result matrix, compare numbers of result matrix with periodic table then replace numbers with element notation and try to find key which is related to biochemistry.

Matrix A = $\begin{pmatrix} 45 & 35 & 93 & 95 & 24 & 65 \\ 25 & 15 & 55 & 64 & 36 & 45 \\ 15 & 65 & 62 & 16 & 65 & 38 \\ 19 & 64 & 35 & 69 & 65 & 63 \\ 47 & 67 & 48 & 60 & 39 & 27 \\ 66 & 48 & 77 & 22 & 10 & 60 \end{pmatrix}$

Matrix B = $\begin{pmatrix} 33 & 25 & 30 & 11 & 68 & 65 \\ 83 & 36 & 19 & 33 & 55 & 51 \\ 20 & 16 & 48 & 63 & 41 & 71 \\ 30 & 42 & 12 & 25 & 31 & 37 \\ 51 & 03 & 44 & 23 & 43 & 85 \\ 20 & 39 & 28 & 41 & 01 & 70 \end{pmatrix}$

```
#include <iostream>
```

```cpp
using namespace std;
int main()
{
    int a[6][6] = {
        {45, 35, 93, 95, 24, 65},
        {25, 15, 55, 64, 36, 45},
        {15, 65, 62, 16, 65, 38},
        {19, 64, 35, 69, 65, 63},
        {47, 67, 48, 60, 39, 27},
        {66, 48, 77, 22, 10, 69}};

    int b[6][6] = {
        {33, 25, 30, 11, 68, 65},
        {83, 36, 19, 33, 55, 51},
        {20, 16, 48, 63, 41, 71},
        {30, 42, 12, 25, 31, 37},
        {51, 03, 44, 23, 43, 85},
        {20, 39, 28, 41, 01, 70}

    };

    for (int i = 0; i < 6; i++)
    {
        for (int j = 0; j < 6; j++)
        {
            cout << (a[i][j] * b[i][j]) % 118 << " ";
        }
        cout << endl;
    }
}
```

Result Matrix =

$$\begin{pmatrix} 69 & 49 & 76 & 101 & 98 & 95 \\ 69 & 68 & 101 & 106 & 92 & 53 \\ 64 & 96 & 26 & 64 & 69 & 102 \\ 98 & 92 & 66 & 73 & 9 & 89 \\ 37 & 83 & 106 & 82 & 25 & 53 \\ 22 & 102 & 32 & 76 & 10 & 110 \end{pmatrix}$$

Corresponding Element =

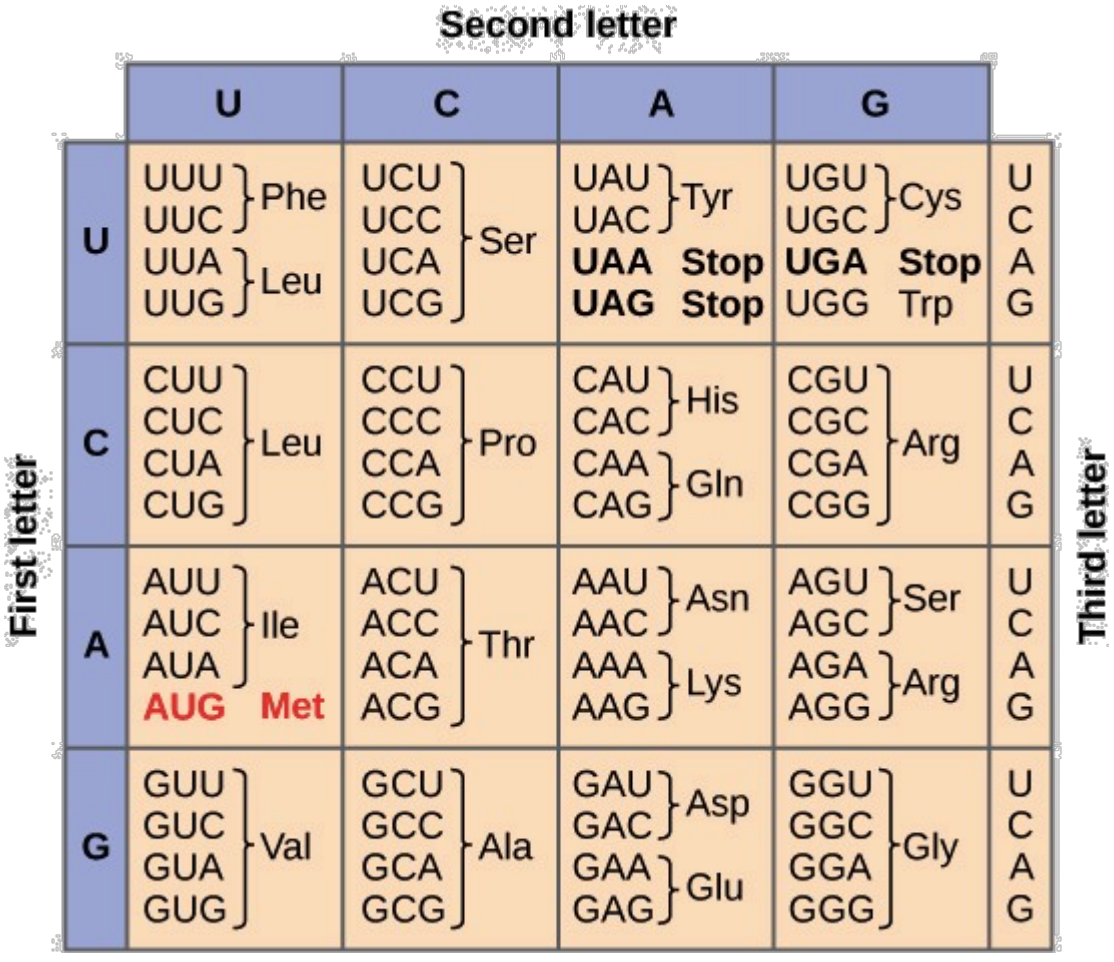
Tm	In	Os	Md	Cf	Am
Tm	Er	Md	Sg	U	I
Gd	Cm	Fe	Gd	Tm	No
Cf	U	Dy	Ta	F	Ac
Rb	Bi	Sg	Pb	Mn	I
Ti	No	Ge	Os	Ne	Ds

Key-“aminoacids”

DECODED CODON SEQUENCE:

UGC GCA CUG CUU GAG AGG GGG AUU UUU ACC

C A L L E R G I F T (RESP. SEQUENCE WITH ACID NOTATION)



Amino Acid	Three Letter Code	One Letter Code
Alanine	Ala	A
Arginine	Arg	R
Aspartic Acid	Asp	D
Asparagine	Asn	N
Cysteine	Cys	C
Glutamic Acid	Glu	E
Glutamine	Gln	Q
Glycine	Gly	G
Histidine	His	H
Isoleucine	Ile	I
Leucine	Leu	L
Lysine	Lys	K
Methionine	Met	M
Phenylalanine	Phe	F
Proline	Pro	P
Serine	Ser	S
Threonine	Thr	T
Tryptophan	Trp	W
Tyrosine	Tyr	Y
Valine	Val	V

Flag: VishwaCTF{CALLERGIFT}