

ANSI C Solution for Problem #4

```
#include <stdio.h>
#include <string.h>

#define FALSE 0
#define TRUE 1

int degree;
long matrix[ 10 ][ 10 ], code[ 10 ];
char msg[ 11 ];
FILE *in, *out;

/* ===== */

int getmatrix( void ) {

    int i, j;

    fscanf( in, "%d\n", &degree );
    if (!degree) return FALSE;
    for (i = 0; i < degree; i++)
        for (j = 0; j < degree; j++)
            fscanf( in, "%ld", &matrix[ i ][ j ] );
    fscanf( in, "\n" );
    return TRUE;
}

/* ===== */

int getmessage( void ) {

    static int done = FALSE;
    int i;

    if (done) { done = FALSE; return FALSE; }
    fgets( msg, degree + 1, in );
    if (msg[ 0 ] == '\n') return FALSE;
    if (msg[ strlen( msg ) - 1 ] == '\n') {
        msg[ strlen( msg ) - 1 ] = '\0';
        for (i = strlen( msg ); i < degree; i++) msg[ i ] = ' ';
        msg[ degree ] = '\0';
        done = TRUE;
    }
    return TRUE;
}
```

```
}
```

```
/* ===== */
```

```
void encode( void ) {
```

```
    int i, j;
```

```
    for (i = 0; i < degree; i++) {
```

```
        if (msg[ i ] == ' ')
```

```
            msg[ i ] = 27;
```

```
        else if (msg[ i ] == ',')
```

```
            msg[ i ] = 28;
```

```
        else if (msg[ i ] == '.')
```

```
            msg[ i ] = 29;
```

```
        else if (msg[ i ] == '?')
```

```
            msg[ i ] = 30;
```

```
        else
```

```
            msg[ i ] = msg[ i ] - 'A' + 1;
```

```
    }
```

```
    for (i = 0; i < degree; i++) {
```

```
        code[ i ] = 0;
```

```
        for (j = 0; j < degree; j++) code[ i ] += matrix[ i ][ j ] * msg[ j ];
```

```
    }
```

```
    for (i = 0; i < degree; i++) {
```

```
        code[ i ] = code[ i ] % 30;
```

```
        if (code[ i ] < 1) code[ i ] += 30;
```

```
    }
```

```
}
```

```
/* ===== */
```

```
void printcode( void ) {
```

```
    int i;
```

```
    for (i = 0; i < degree; i++) {
```

```
        if (code[ i ] == 27)
```

```
            code[ i ] = ' ';
```

```
        else if (code[ i ] == 28)
```

```
            code[ i ] = ',';
```

```
        else if (code[ i ] == 29)
```

```
            code[ i ] = '.';
```

```
        else if (code[ i ] == 30)
```

```
            code[ i ] = '?';
```

```

        else
            code[ i ] = 'A' + code[ i ] - 1;
        fprintf( out, "%c", (char)code[ i ] );
    }
}

```

```

/* ===== */

```

```

int main( void ) {

    in = fopen( "encrypt.in", "r" );
    out = fopen( "encrypt.out", "w" );
    while (getmatrix()) {
        fprintf( out, "" );
        while (getmessage()) {
            encode();
            printcode();
        }
        fprintf( out, "" );
    }
    fcloseall();
    return 0;
}

```