

# Homework10

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文件

1.

在密码学发展历史上，“恺撒密码”（英语：Caesar cipher，或称恺撒变换、变换加密）是一种最简单且最广为人知的加密技术。它是一种替换加密的技术，明文中的所有字母都在字母表上向后（或向前）按照一个固定数目进行偏移后被替换成密文。

例如，当偏移量是3的时候，所有的字母A将被替换成D，B变成E，..，Z变为C。以此类推。

这个加密方法是以罗马共和时期恺撒的名字命名的，当年恺撒曾用此方法与其将军们进行联系。（具体方法可参考<https://baike.baidu.com/item/%E6%81%BA%E6%92%92%E5%AF%86%E7%A0%81/4905284>）

编写程序完成恺撒加密&解密。输入一个整数n并将其设为恺撒变换的偏移量，利用恺撒加密方法，将下面的文本文件 `secret.txt` 加密存储,覆盖掉原文内容。然后再次运行程序，输入-n，将密文进行解密并显示原文。 `secret.txt` 文件内容：（复制以下内并保存为文件“`secret.txt`”）

In physics, a quantum (plural quanta) is the minimum amount of any physical entity (physical property) involved in an interaction. The fundamental notion that a physical property can be "quantized" is referred to as "the hypothesis of quantization". This means that the magnitude of the physical property can take on only discrete values consisting of integer multiples of one quantum.

源码

```

#include <stdio.h>

int main()
{
    int n = 0, i = -1;
    char str[10000];
    FILE *fp, *fp1;
    printf("please enter n:\n");
    scanf("%d", &n);
    while (n >= 26)
    {
        n -= 26;
    }
    while (n < 0)
    {
        n += 26;
    }

    fp = fopen("secret.txt", "r");
    do
    {
        i++;
        str[i] = fgetc(fp);
    } while (str[i] != EOF);
    str[i] = '\0';
    for (i = 0; str[i] != '\0'; i++)
    {
        if (str[i] >= 'a' && str[i] <= 'z')
        {
            str[i] = 'a' + (str[i] - 'a' + n) % 26;
        }
        else if (str[i] >= 'A' && str[i] <= 'Z')
        {
            str[i] = 'A' + (str[i] - 'A' + n) % 26;
        }
        else
            continue;
    }
    fp1 = fopen("secret.txt", "w");
    fputs(str, (FILE *)fp1);
    fclose(fp1);
    return 0;
}

```

## 运行结果

明文:

In physics, a quantum (plural quanta) is the minimum amount of any physical entity (physical property) involved in an interaction. The fundamental notion that a physical property can be "quantized" is referred to as "the hypothesis of quantization". This means that the magnitude of the physical property can take on only discrete values consisting of integer multiples of one quantum.

## 密文 (n=2) :

Kp rjaukeu, c swcpvwo (rnwtcn swcpvc) ku vjg okpkowo coqwpv qh cpa rjaukecn gpvkva (rjaukecn rtqrgtva) kpxqnxgf kp cp kpvgtcevkqp. Vjg hwpfcogpvcn pqvkqp vjcv c rjaukecn rtqrgtva ecp dg "swcpvkbgbf" ku tghgttgf vq cu "vjg jarqvjguku qh swcpvkbcvkqp". Vjku ogcpu vjcv vjg ocipkvwfg qh vjg rjaukecn rtqrgtva ecp vcmg qp qpna fkuetgvg xcnwgu eqpukuvkpi qh kpvgigt ownvkrngu qh qpg swcpvwo.

## 解密 (输入n=-2) :

In physics, a quantum (plural quanta) is the minimum amount of any physical entity (physical property) involved in an interaction. The fundamental notion that a physical property can be "quantized" is referred to as "the hypothesis of quantization". This means that the magnitude of the physical property can take on only discrete values consisting of integer multiples of one quantum.

## 实验报告

合理利用模操作，将n替换到合适的大小进行加密与解密。

## 2.

有一个“乐谱”文件 `music.txt` 如下，请编程序演奏这个乐谱。(注：仅适用于 Windows 环境)

说明:文件每一行给出的是两个数据，分别表示一个声音的频率 (Hz) 和播放的时间长度 (ms.)。播放声音可以使用 `Beep()`函数。这个 WindowsAPI 函数原型为：

```
BOOL Beep(  
    DWORD dwFreq,  
    DWORD dwDuration  
);
```

这里 `DWORD` 类型即 `unsigned int`，参数 `dwFreq` 是频率值，取值范围是 37 到 32,767 (`0x25 - 0x7FFF`)。参数 `dwDuration` 是播放时长，单位毫秒。例如，`Beep(392,375)`；详见：<https://docs.microsoft.com/en-us/windows/win32/api/utilapi/set/nf-utilapi/set-beep>

## “乐谱”文件 MUSIC.TXT 内容:

```
392 375
392 125
440 500
392 500
523 500
494 1000
392 375
392 125
440 500
392 500
587 500
523 1000
392 375
392 125
784 500
659 500
523 500
494 500
440 1000
689 375
689 125
659 500
523 500
587 500
523 1000
```

## 源码

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

int main()
{
    FILE *fp;
    fp = fopen("music.txt", "r");
    int a, b;
    for (int i = 0; i < 25; i++)
    {
        fscanf(fp, "%d %d", &a, &b);
        Beep((unsigned int)a, (unsigned int)b);
    }
    fclose(fp);
    return 0;
}
```

## 运行结果

music.txt 文件是生日快乐歌

## 实验报告

简单的小实验，见识到c语言对硬件的使用