```
runner% cat caesar2.text
i returned, and saw under the sun, that the race is not to the swift,
nor the battle to the strong, neither yet bread to the wise, nor yet riches
to men of understanding, nor yet favour to men of skill; but time and chance
happeneth to them all.

runner% cat caesar.c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>

char rotate(char c, int key)
{
        int i = 0;
        char s[] = "abcdefghijklmnopqrstuvwxyz";
        if (!islower(c)) return(c);
        while (i < 26) {
                if (c == s[i]) return s[(i + key)%26];
                i++;
        }
}

void main(int argc, char *argv[])
{
        int encrypt;
        int key;
        char c;
        if (argc != 3) {
                fprintf(stderr, "Usage: caesar (-d | -e) key\n");
                exit(1);
        }
        if (strcmp(argv[1], "-e") == 0) encrypt = 1;
        else if (strcmp(argv[1], "-d") == 0) encrypt = 0;
        else {
                fprintf(stderr, "Usage: caesar (-d | -e) key\n");
                exit(1);
        }
        key = atoi(argv[2]);
        if (!encrypt) key = (-key + 26)%26;
        while ((c = getchar()) != EOF) {
                if (islower(c))
                        c = rotate(c, key);
                putchar(c);
        }
}

runner% caesar -d
Usage: caesar (-d | -e) key

runner% caesar -e 3 <caesar2.text
l uhwxuqhg, dqg vdz xqghu wkh vxq, wkdw wkh udfh lv qrw wr wkh vzliw,
qru wkh edwwoh wr wkh vwurqj, qhlwkhu bhw euhdg wr wkh zlvh, qru bhw ulfkhv
wr phq ri xqghuvwdqglqj, qru bhw idyrxu wr phq ri vnloo; exw wlph dqg fkdqfh
kdsshqhwk wr wkhp doo.

runner% caesar -e 3 <caesar2.text | caesar -d 3
i returned, and saw under the sun, that the race is not to the swift,
nor the battle to the strong, neither yet bread to the wise, nor yet riches
to men of understanding, nor yet favour to men of skill; but time and chance
happeneth to them all.
```

Note: rotate could have just contained:

```
                char s[] = "abcdefghijklmnopqrstuvwxyz";
                return s[(c - 'a' + key)%26];
```

or even just

```
                return (c - 'a' + key)%26 + 'a';
```

```
runner% cat beale.text
(same as the text for Caesar cipher)
runner% cat key.text
ddddddddddddddddddddddddddddddddddddddddddddddddd
ddddddddddddddddddddddddddddddddddddddddddddddddd
ddddddddddddddddddddddddddddddddddddddddddddddddd
(all d letters)
runner% cat beale.c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>
char rotate(char c, int key);
void main(int argc, char *argv[])
{
        FILE *keyfile;
        int direction = 1;
        char c, key_ch;
        if (argc != 2) {
                fprintf(stderr, "Usage: beale (-d | -e)\n");
                exit(1);
        }
        if (strcmp(argv[1], "-e") == 0) direction = 1;
        else if (strcmp(argv[1], "-d") == 0) direction = -1;
        else {
                fprintf(stderr, "Usage: beale (-d | -e)\n");
                exit(1);
        }
        keyfile = fopen("key.text", "r");
        if (keyfile == NULL) {
                printf("Couldn't open file\n");
                exit(1);
        }
        while ((c = getchar()) != EOF) {
                if (islower(c)) {
                        while (!islower(key_ch = fgetc(keyfile)))
                                ;
                        c = rotate(c, ((direction*(key_ch - 'a'))+26)%26);
                }
                putchar(c);
        }
}
char rotate(char c, int key)
{
        return (c - 'a' + key)%26 + 'a';
}
```

ENCRYPT beale.text, using the simple file of all d characters:

```
runner% beale -e <beale.text
l uhwxuqhg, dqg vdz xqghu wkh vxq, wkdw wkh udfh lv qrw wr wkh vzliw,
qru wkh edwwoh wr wkh vwurqj, qhlwkhu bhw euhdg wr wkh zlvh, qru bhw ulfkhv
wr phq ri xqghuvwdqglqj, qru bhw idyrxu wr phq ri vnloo; exw wlph dqg fkdqfh
kdsshqhwk wr wkhp doo.
```

ENCRYPT and then DECRYPT:

```
runner% beale -e <beale.text | beale -d
i returned, and saw under the sun, that the race is not to the swift,
nor the battle to the strong, neither yet bread to the wise, nor yet riches
to men of understanding, nor yet favour to men of skill; but time and chance
happeneth to them all.
```

Now use a different file as the key, not all the same character:

```
runner% cat key.text
A Golden Age, whether of art or music or science or peace or
plenty, is out of reach of our economic and governmental techniques.
something may be done by accident, as it has from time to time in the
past, but not by deliberate intent.  At this very moment enormous
numbers of intelligent men and women of good will are trying to build a
better world.  But problems are born faster than they can be solved.
```

ENCRYPT beale.text, using the the more complex file:

```
runner% beale -e < beale.text
w chxhxrak, egk wrk znuxf kty kcp, hysv blr teqv xw nqx hf isi fpgnl,
bik hmv favazj hi klg ggfavi, nrlzvzv prf fexao ms vor eymi, fgf kim yqpnqs
rp qhb bj vldgtaweawifo, gvr qjk tmowgv mc fmz sn fdppa; bmm ucfr oge akeykf
lrpiivrml gh taxt idg.
```

ENCRYPT and then DECRYPT:

```
runner% beale -e <beale.text | beale -d
i returned, and saw under the sun, that the race is not to the swift,
nor the battle to the strong, neither yet bread to the wise, nor yet riches
to men of understanding, nor yet favour to men of skill; but time and chance
happeneth to them all.
```