Tugas Kecil 1 IF2211 Strategi Algoritma

Penyelesaian Word Search Puzzle dengan Algoritma Brute Force

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A. Algoritma *Brute Force*

Brute force adalah sebuah pendekatan yang lempang (*straightforward*) untuk menyelesaikan suatu masalah berdasarkan pernyataan masalah dan definisi konsep yang dilibatkan. Algoritma *brute force* memecahkan masalah dengan sangat sederhana, langsung, dan dengan cara yang jelas (*obvious way*).

Word search puzzle adalah permainan kata dimana pemain harus menemukan beberapa kata tersembunyi dalam kumpulan huruf acak. Kumpulan huruf tersebut biasa diletakkan pada "papan" berbentuk segi empat atau dapat disebut juga matriks huruf. *Word search puzzle* dapat diselesaikan dengan berbagai macam strategi algoritma, salah satunya yakni *brute force*.

Langkah-langkah yang dilakukan dalam menyelesaikan persoalan *word search puzzle* dengan memanfaatkan strategi algorima *brute force* adalah sebagai berikut.

1. Buat sebuah matriks yang masing-masing elemen mengandung satu buah karakter yang menyimpan puzzle dari file *input*. Kemudian, buat sebuah *queue* yang terdiri dari list seluruh kata dari file input yang akan dicari nantinya pada permainan *word search puzzle*.
2. Mulai pencarian karakter pertama dari kata pertama pada queue pertama dengan mencocokkannya dengan karakter pada setiap elemen matriks. Hal tersebut akan dilakukan dengan memulai pada posisi pojok kiri atas dari matriks dan akan diasumsikan posisi awal tersebut sebagai koordinat (0,0). Apabila pada posisi tertentu tidak ditemukan kecocokan, maka dilakukan pencocokan selanjutnya pada baris kolom berikutnya. Apabila telah berada pada kolom terakhir, maka pencocokan selanjutnya dimulai dari baris berikutnya dan kolom pertama. Hal ini akan dilakukan seterusnya hingga ditemukan kecocokan atau proses pencocokan telah berakhir pada pojok kanan bawah.

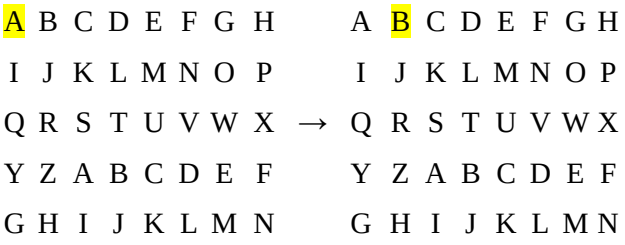
A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P
Q	R	S	T	U	V	W	X
Y	Z	A	B	C	D	E	F
G	H	I	J	K	L	M	N

Gambar 1. Pencarian kata dimulai dari koordinat (0,0)

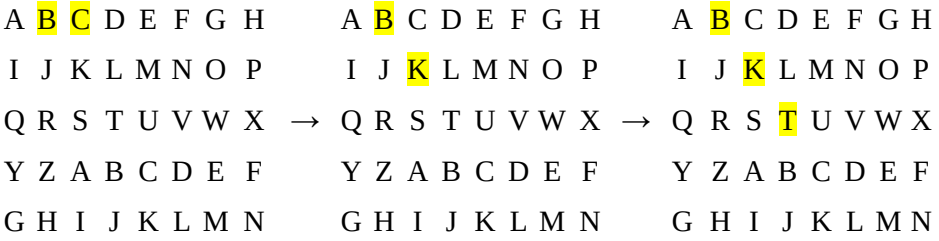
3. Jika kecocokan berhasil ditemukan, pencocokan akan lanjut ke arah yang telah ditentukan, yakni dengan melakukan pencocokan pada 8 arah yang mungkin, yaitu ke atas, serong kanan

atas, kanan, serong kanan bawah, bawah, serong kiri bawah, kiri, dan serong kiri atas.

4. Jika kecocokan berikutnya tidak berhasil ditemukan, ada dua kasus yang akan terjadi:
   a. Pertama, saat semua arah belum dicoba, maka pencarian akan berganti pada arah yang belum dicoba sebelumnya. Setelah itu, pencarian dilanjutkan.
   b. Kedua, saat semua arah telah dicoba, maka akan dilanjutkan ke elemen selanjutnya pada matriks puzzle sebagaimana yang telah dijelaskan pada poin kedua.



Gambar 2. Contoh pencarian kata “BKT” ketika karakter pertama pada kata tersebut tidak sama dengan karakter pada elemen tertentu sehingga pencarian dilanjutkan pada elemen berikutnya



Gambar 3. Contoh pencarian kata “BKT” yang mencoba semua arah kemudian menemukan arah yang tepat hingga membentuk kata “BKT”

5. Jika ditemukan kecocokan kata, artinya semua karakter sudah cocok dengan kata yang dicari dengan arah tertentu, maka akan dikeluarkan *output* berupa kata yang telah ditemukan sesuai dengan posisi pada masing-masing karakter dari kata tersebut yang terletak pada *puzzle*.

B. Source Program

Dalam menyelesaikan persoalan *word search puzzle* dengan memanfaatkan strategi algorima *brute force*, penulis membuat program dalam bahasa C dengan memanfaatkan beberapa ADT yang telah dipelajari pada mata kuliah IF2110.

1. charmachine.h dan charmachine.c

charmachine.h

```c
#ifndef CHAR_ENGINE_H
#define CHAR_ENGINE_H

#include "boolean.h"

#define MARK '.'
/* Char Engine State */
extern char currentChar;
extern boolean eot;

void startWithFile(FILE* f);
/* Mesin siap dioperasikan. Pita yag berasal dari sebuah file .txt disiapkan untuk dibaca.
   Karakter pertama yang ada pada pita posisinya adalah pada jendela.
   I.S. : sembarang
   F.S. : currentChar adalah karakter pertama pada pita
          Jika currentChar != MARK maka EOP akan padam (false)
          Jika currentChar = MARK maka EOP akan menyala (true) */

void adv();
/* Pita dimajukan satu karakter.
   I.S. : Karakter pada jendela = currentChar, currentChar != MARK
   F.S. : currentChar adalah karakter berikutnya dari currentChar yang lama,
          currentChar mungkin = MARK
          Jika  currentChar = MARK maka EOP akan menyala (true) */

#endif
```

charmachine.c

```c
#include "..\header\charmachine.h"

char currentChar;
boolean eot;

static FILE * tape;
static int retval;

void startWithFile(FILE* f) {
    tape = f;
    adv();
}

void adv() {
    retval = fscanf(tape,"%c",&currentChar);
    eot = (currentChar == MARK);
    if (eot) {
      fclose(tape);
    }
}
```

2. wordmachine.h dan wordmachine.c

wordmachine.h

```c
/* File: wordmachine.h */
/* Definisi Word Engine */

#ifndef WORD_ENGINE_H
#define WORD_ENGINE_H


#include "boolean.h"
#include "charmachine.h"

#define CAPACITY 50
#define BLANK ' '
#define CR '\r' //carriage return
#define LF '\n' //line feed

typedef struct {
   char contents[CAPACITY]; /* container penyimpan kata, indeks yang dipakai [0..CAPACITY-1] */
   int length;
} Word;

/* Word Engine State */
extern Word currentWord;

void ignoreBlank();
/* Mengabaikan satu atau beberapa BLANK
   I.S. : currentChar sembarang
   F.S. : currentChar ≠ BLANK */

void copyWordFromFile();
/* Mengakuisisi kata, menyimpan dalam currentWord
   I.S. : currentChar adalah karakter pertama dari kata
   F.S. : currentWord berisi kata yang sudah diakuisisi;
          currentChar = BLANK atau currentChar = MARK atau currentChar = '\n' atau currentChar = '\r'
          currentChar adalah karakter sesudah karakter terakhir yang diakuisisi.
          Jika ternyata currentChar tetap berupa karakter terakhir yang diakuisi, pembacaan file telah berakhir.
          Jika panjang kata melebihi CAPACITY, maka sisa kata terpotong */

#endif
```

wordmachine.c

```c
#include "..\header\wordmachine.h"

/* Word Engine State */
Word currentWord;

void ignoreBlank(){
    while ( (currentChar == BLANK ) ){
        adv();
    }
}

void copyWordFromFile(){
    int i = 0;
    boolean endOfWord;
    char tempCC,tempCC1,tempCC2,tempCC3,tempCC4,tempCC5;

    endOfWord = false;
    while ( (currentChar != LF) && (!endOfWord) ) {
        currentWord.contents[i] = currentChar;
        tempCC = currentChar; // S udah disimpen
        adv(); // S belom disimpen

        if (tempCC == currentChar) {
            tempCC1 = currentChar;
            adv();
            if (tempCC == currentChar){ // W
                tempCC2 = currentChar;
                adv();
                if (tempCC == currentChar){
                    tempCC3 = currentChar;
                    adv();
                    if (tempCC == currentChar){
                        tempCC4 = currentChar;
                        adv();
                        if (tempCC == currentChar){
                            tempCC5 = currentChar;
                            adv();
                            if ( tempCC == currentChar ){
                                endOfWord = true;
                            } else {
                                i = i + 5;
                                currentWord.contents[i-4] = tempCC1;
                                currentWord.contents[i-3] = tempCC2;
                                currentWord.contents[i-2] = tempCC3;
                                currentWord.contents[i-1] = tempCC4;
                                currentWord.contents[i] = tempCC5;
                            }
                        } else {
                            i = i + 4;
                            currentWord.contents[i-3] = tempCC1;
                            currentWord.contents[i-2] = tempCC2;
```

wordmachine.c

src > driver > C wordmachine.c > copyWordFromFile()

```c
            if (tempCC == currentChar){ // W
                tempCC2 = currentChar;
                adv();
                if (tempCC == currentChar){
                    tempCC3 = currentChar;
                    adv();
                    if (tempCC == currentChar){
                        tempCC4 = currentChar;
                        adv();
                        if (tempCC == currentChar){
                            tempCC5 = currentChar;
                            adv();
                            if ( tempCC == currentChar ){
                                endOfWord = true;
                            } else {
                                i = i + 5;
                                currentWord.contents[i-4] = tempCC1;
                                currentWord.contents[i-3] = tempCC2;
                                currentWord.contents[i-2] = tempCC3;
                                currentWord.contents[i-1] = tempCC4;
                                currentWord.contents[i] = tempCC5;
                            }
                        } else {
                            i = i + 4;
                            currentWord.contents[i-3] = tempCC1;
                            currentWord.contents[i-2] = tempCC2;
                            currentWord.contents[i-1] = tempCC3;
                            currentWord.contents[i] = tempCC4;
                        }
                    } else {
                        i = i + 3;
                        currentWord.contents[i-2] = tempCC1;
                        currentWord.contents[i-1] = tempCC2;
                        currentWord.contents[i] = tempCC3;
                    }
                } else {
                    i = i + 2;
                    currentWord.contents[i-1] = tempCC1;
                    currentWord.contents[i] = tempCC2;
                }
            } else {
                i = i + 1;
                currentWord.contents[i] = tempCC1;
            }
        }
        i++;
    }
    currentWord.length = i;
}
```

3. matrix.h dan matrix.c

matrix.h

src > header > C matrix.h > ...

```c
/* ********** Definisi TYPE Matrix dengan Index dan elemen integer ********** */

#ifndef Matrix_H
#define Matrix_H

#include "boolean.h"

/* Ukuran minimum dan maksimum baris dan kolom */
#define ROW_CAP 50
#define COL_CAP 50

typedef int Index; /* Index baris, kolom */
typedef char ElType;
typedef struct
{
   ElType contents[ROW_CAP][COL_CAP];
   int rowEff; /* banyaknya/ukuran baris yg terdefinisi */
   int colEff; /* banyaknya/ukuran kolom yg terdefinisi */
} Matrix;
/* rowEff >= 1 dan colEff >= 1 */
/* Indeks matriks yang digunakan: [0..ROW_CAP-1][0..COL_CAP-1] */
/* Memori matriks yang dipakai selalu di "ujung kiri atas" */

/* ********** DEFINISI PROTOTIPE PRIMITIF ********** */
/* *** Konstruktor membentuk Matrix *** */
void CreateMatrix(int nRow, int nCol, Matrix *m);
/* Membentuk sebuah Matrix "kosong" yang siap diisi berukuran nRow x nCol di "ujung kiri" memori */
/* I.S. nRow dan nCol adalah valid untuk memori matriks yang dibuat */
/* F.S. Matriks m sesuai dengan definisi di atas terbentuk */

/* *** Selektor *** */
#define ROWS(M) (M).rowEff
#define COLS(M) (M).colEff
#define ELMT(M, i, j) (M).contents[(i)][(j)]

```

```c

/* *** Selektor: Untuk sebuah matriks m yang terdefinisi: *** */
Index getLastIdxRow(Matrix m);
/* Mengirimkan Index baris terbesar m */
Index getLastIdxCol(Matrix m);
/* Mengirimkan Index kolom terbesar m */
boolean isIdxEff(Matrix m, Index i, Index j);
/* Mengirimkan true jika i, j adalah Index efektif bagi m */

void displayMatrix(Matrix m);
/* I.S. m terdefinisi */
/* F.S. Nilai m(i,j) ditulis ke layar per baris per kolom, masing-masing elemen per baris
   dipisahkan sebuah spasi */
/* Proses: Menulis nilai setiap elemen m ke layar dengan traversal per baris dan per kolom */
/* Contoh: Menulis matriks 3x3 (ingat di akhir tiap baris, tidak ada spasi)
1 2 3
4 5 6
8 9 10
*/

#endif
```

matrix.c

src > driver > matrix.c > CreateMatrix(int, int, Matrix *)

```c
#include "..\header\matrix.h"

void CreateMatrix(int nRow, int nCol, Matrix *m){
    ROWS(*m) = nRow;
    COLS(*m) = nCol;

    for (int i = 0 ; i < ROWS(*m) ; i++){
        for ( int j = 0 ; j < COLS(*m) ; j++){
            ELMT(*m,i,j) = '-';
        }
    }
}

Index getLastIdxRow(Matrix m){
    return(ROWS(m)-1);
}

Index getLastIdxCol(Matrix m){
    return(COLS(m)-1);
}

boolean isIdxEff(Matrix m, Index i, Index j){
    return( (0 <= i && i <= getLastIdxRow(m)) && (0 <= j && j <= getLastIdxCol(m) ) );
}

void displayMatrix(Matrix m){
    for (int i = 0 ; i <= getLastIdxRow(m) ; i++){
        for (int j = 0 ; j <= getLastIdxCol(m) ; j++){
            printf("%c", ELMT(m,i,j));

            if (j == getLastIdxCol(m)){
                printf("\n");
            } else {
                printf(" ");
            }
        }
    }
}
```

4. listpos.h dan listpos.c

listpos.h

src > header > C listpos.h > ...

```c
/* MODUL LIST INTEGER DENGAN ELEMEN POSITIF */
/* Berisi definisi dan semua primitif pemrosesan list integer dengan elemen positif */
/* Penempatan elemen selalu rapat kiri */
/* Banyaknya elemen didefinisikan secara implisit, memori array statik */

#ifndef LISTPOS_H
#define LISTPOS_H

#include "boolean.h"

/*  Kamus Umum */
#define CAPACITY_LIST 50
/* Kapasitas penyimpanan */
#define IDX_UNDEF_LIST -1
/* Indeks tak terdefinisi*/
#define CHAR_UNDEF_LIST '.'
/* Nilai elemen tak terdefinisi*/

/* Definisi elemen dan koleksi objek */
typedef char ElType_List;  /* type elemen List */
typedef struct {
   ElType_List contents[CAPACITY_LIST]; /* memori tempat penyimpan elemen (container) */
} ListPos;
/* Indeks yang digunakan [0..CAPACITY_LIST-1] */
/* Jika l adalah ListPos, cara deklarasi dan akses: */
/* Deklarasi : l : ListPos */
/* Maka cara akses:
   ELMT_LIST(l,i) untuk mengakses elemen ke-i */
/* Definisi :
   List kosong: semua elemen bernilai VAL_UNDEF
   Definisi elemen pertama: ELMT_LIST(l,i) dengan i=0 */

/* ********** SELEKTOR ********** */
#define ELMT_LIST(l, i) (l).contents[(i)]

/* ********** KONSTRUKTOR ********** */
/* Konstruktor : create List kosong  */
void CreateListPos(ListPos *l);
/* I.S. l sembarang */
/* F.S. Terbentuk List l kosong dengan kapasitas CAPACITY_LIST */
/* Proses: Inisialisasi semua elemen List l dengan VAL_UNDEF */

/* ********** SELEKTOR (TAMBAHAN) ********** */
/* *** Banyaknya elemen *** */
int lengthList(ListPos l);
/* Mengirimkan banyaknya elemen efektif List */
/* Mengirimkan nol jika List kosong */

```

listpos.h

src > header > listpos.h > ...

```
48
49  void displayList(ListPos l);
50  /* Proses : Menuliskan isi List dengan traversal, List ditulis di antara kurung
51     siku; antara dua elemen dipisahkan dengan separator "koma", tanpa tambahan
52     karakter di depan, di tengah, atau di belakang, termasuk spasi dan enter */
53  /* I.S. l boleh kosong */
54  /* F.S. Jika l tidak kosong: [e1,e2,...,en] */
55  /* Contoh : jika ada tiga elemen bernilai 1, 20, 30 akan dicetak: [1,20,30] */
56  /* Jika List kosong : menulis [] */
57
58  #endif
```

listpos.c

src > driver > listpos.c > ...

```
1   #include "..\header\listpos.h"
2
3   void CreateListPos(ListPos *l){
4       for (int i = 0 ; i < CAPACITY_LIST ; i++){
5           ELMT_LIST(*l,i) = CHAR_UNDEF_LIST;
6       }
7   }
8
9   int lengthList(ListPos l){
10      int i = 0;
11      while ( i < CAPACITY_LIST && ELMT_LIST(l,i) != CHAR_UNDEF_LIST ){
12          i++;
13      }
14      return(i);
15  }
16
17  void displayList(ListPos l){
18      for (int i = 0 ; i < lengthList(l) ; i++){
19          printf("%c", ELMT_LIST(l,i));
20      }
21  }
```

5. queue.h dan queue.c

queue.h

src > header > queue.h > ...

```
1   /* File : queue.h */
2   /* Definisi ADT Queue dengan representasi array secara eksplisit dan alokasi statik */
3
4   #ifndef QUEUE_H
5   #define QUEUE_H
6
7   #include "boolean.h"
8   #include "listpos.h"
9
10  #define IDX_UNDEF -1
11  #define CAPACITY_QUEUE 50
12
13  /* Definisi elemen dan address */
14  typedef ListPos ElType_Queue;
15  typedef struct {
16          ElType_Queue bufferQueue[CAPACITY_QUEUE];
17          int idxHead;
18          int idxTail;
19  } Queue;
20
21
22  /* ********* AKSES (Selektor) ********* */
23  /* Jika q adalah Queue, maka akses elemen : */
24  #define IDX_HEAD(q) (q).idxHead
25  #define IDX_TAIL(q) (q).idxTail
26  #define     HEAD(q) (q).bufferQueue[(q).idxHead]
27  #define     TAIL(q) (q).bufferQueue[(q).idxTail]
28
```

queue.h

src > header > C queue.h > ...

```c

  /* *** Kreator *** */
  void CreateQueue(Queue *q);
  /* I.S. sembarang */
  /* F.S. Sebuah q kosong terbentuk dengan kondisi sbb: */
  /* - Index head bernilai IDX_UNDEF */
  /* - Index tail bernilai IDX_UNDEF */
  /* Proses : Melakukan alokasi, membuat sebuah q kosong */

  /* ********* Prototype ********* */
  boolean isEmptyQueue(Queue q);
  /* Mengirim true jika q kosong: lihat definisi di atas */
  int lengthQueue(Queue q);
  /* Mengirimkan banyaknya elemen queue. Mengirimkan 0 jika q kosong. */

  /* *** Primitif Add/Delete *** */
  void enqueue(Queue *q, ElType_Queue val);
  /* Proses: Menambahkan val pada q dengan aturan FIFO */
  /* I.S. q mungkin kosong, tabel penampung elemen q TIDAK penuh */
  /* F.S. val menjadi TAIL yang baru, IDX_TAIL "mundur".
          Jika q penuh semu, maka perlu dilakukan aksi penggeseran "maju" elemen-elemen q
          menjadi rata kiri untuk membuat ruang kosong bagi TAIL baru  */

  void dequeue(Queue *q, ElType_Queue *val);
  /* Proses: Menghapus val pada q dengan aturan FIFO */
  /* I.S. q tidak mungkin kosong */
  /* F.S. val = nilai elemen HEAD pd I.S., HEAD dan IDX_HEAD "mundur";
          q mungkin kosong */
  #endif
```

queue.c

src > driver > C queue.c > ...

```c
#include "..\header\queue.h"

void CreateQueue(Queue *q){
    IDX_HEAD(*q) = IDX_UNDEF;
    IDX_TAIL(*q) = IDX_UNDEF;
}

boolean isEmptyQueue(Queue q){
    return( IDX_TAIL(q) == IDX_UNDEF && IDX_HEAD(q) == IDX_UNDEF );
}

int lengthQueue(Queue q){
    if ( isEmptyQueue(q) ){
        return(0);
    } else {
        return ( IDX_TAIL(q) - IDX_HEAD(q) + 1);
    }
}

void enqueue(Queue *q, ElType_Queue val){
    if ( isEmptyQueue(*q) ){
        IDX_HEAD(*q) = 0;
        IDX_TAIL(*q) = 0;
        TAIL(*q) = val;
    } else {
        if ( IDX_TAIL(*q) == CAPACITY_QUEUE - 1 ) {
            for ( int i = IDX_HEAD(*q) ; i <= IDX_TAIL(*q) ; i++ ){
                q->bufferQueue[i - IDX_HEAD(*q)] = q->bufferQueue[i];
            }
            IDX_HEAD(*q) = 0;
            IDX_TAIL(*q) = IDX_TAIL(*q) - IDX_HEAD(*q);
        }
        int i = IDX_TAIL(*q);
        q->bufferQueue[i+1] = val;
        IDX_TAIL(*q) = IDX_TAIL(*q) + 1;
    }
}

void dequeue(Queue *q, ElType_Queue *val){
    *val =  HEAD(*q);
    if ( IDX_HEAD(*q) == IDX_TAIL(*q) ){
        IDX_HEAD(*q) = IDX_UNDEF;
        IDX_TAIL(*q) = IDX_UNDEF;
    } else {
        IDX_HEAD(*q)++;
    }
}
```

6. main.c

main.c

src > driver > main.c > main()

```c
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <time.h>
#include "charmachine.c"
#include "wordmachine.c"
#include "matrix.c"
#include "listpos.c"
#include "queue.c"

int menu(){
    char inputMenu;

    printf("============ MENU ============\n");
    printf("1. Play World Search Puzzle\n");
    printf("2. Quit Game\n");
    printf("What do you want?\n");
    printf("Input example: 1\n>> ");
    scanf("%[^\n]%*c",&inputMenu);

    return(inputMenu);
}

int getCol(Matrix *m){
    int i = 1;
    ELMT(*m,0,i-1) = currentChar;
    adv();

    while ( currentChar != LF ){
        adv();
        i++;
        m->colEff++;
        ELMT(*m,0,i-1) = currentChar;
        adv();
    }
    return(i);
}

int getRow(int Col, Matrix *m){
    int j = 1;
    adv();
    while ( currentChar != LF ){
        for ( int i = 0 ; i < Col ; i++){
            ELMT(*m,j,i) = currentChar;
            adv();
            adv();
        }
        j++;
        m->rowEff++;
    }
    return(j);
```

main.c

src > driver > main.c > main()

```c
    return(j);
}

Matrix makeMatrixPuzzle() {
    boolean isFileFound = false;
    char filePath[] = "../test/";
    char inputFileName[100];
    int row, col;
    Matrix matPuzzle;
    FILE *f;

    // check file valid
    do {
        char filePath[] = "../test/";
        printf("Enter the file name without typing the extension (make sure the file is in the test folder and has a .txt extension)\n");
        printf("Example : test1 \n>> ");
        scanf("%[^\n]%*c", inputFileName);
        strcat(filePath,inputFileName);
        strcat(filePath, ".txt");
        f = fopen(filePath, "r");
    } while ( f == NULL );
    startWithFile(f);

    // make matrix
    CreateMatrix(1, 1, &matPuzzle);
    col = getCol(&matPuzzle);
    row = getRow(col, &matPuzzle);

    return ( matPuzzle );
}

Queue makeWord() {
    boolean isEndOfFile = false;
    char temp;
    ListPos oneWord;
    Queue q;

    CreateQueue(&q);

    while( !isEndOfFile ) {
        copyWordFromFile();

        CreateListPos(&oneWord);

        for ( int i = 0 ; i < currentWord.length ; i++ ){
            ELMT_LIST(oneWord, i) = currentWord.contents[i];
        }

        enqueue(&q, oneWord);

        temp = currentChar;
```

main.c

src > driver > main.c > main()

```
            temp = currentChar;
            adv();
            if ( temp == currentChar ) {
                isEndOfFile = true;
            }
        }

        return(q);
    }

    int checkNorth(int row, int col, Matrix m, ListPos list){
        int i = 1;
        int z = 0;
        boolean isWord = true;
        Matrix showWord;

        CreateMatrix( ROWS(m), COLS(m), &showWord) ;
        ELMT(showWord,row,col) = ELMT_LIST(list,0);

        while ( i < lengthList(list) && isWord ){
            if ( ELMT(m,row - i,col) == ELMT_LIST(list,i) && isIdxEff(m,row - i,col) ){
                ELMT(showWord,row - i ,col) = ELMT_LIST(list,i);
                z++;
                i++;
            } else {
                z++;
                isWord = false;
            }
        }
        if ( isWord ){
            printf("Found the word ");
            displayList(list);
            printf("\n");
            displayMatrix(showWord);
        }
        return(z);
    }

    int checkNorthEast(int row, int col, Matrix m, ListPos list){
        int i = 1;
        int z = 0;
        boolean isWord = true;
        Matrix showWord;

        CreateMatrix( ROWS(m), COLS(m), &showWord) ;
        ELMT(showWord,row,col) = ELMT_LIST(list,0);

        while ( i < lengthList(list) && isWord ){
            if ( ELMT(m,row - i,col + i) == ELMT_LIST(list,i && isIdxEff(m,row - i,col + i)) ){
                ELMT(showWord,row - i,col + i) = ELMT_LIST(list,i);
                z++;
```

main.c

src > driver > main.c > main()

```
151             z++;
152             i++;
153         } else {
154             z++;
155             isWord = false;
156         }
157     }
158     if ( isWord ){
159         printf("Found the word ");
160         displayList(list);
161         printf("\n");
162         displayMatrix(showWord);
163     }
164     return(z);
165 }
166 
167 int checkEast(int row, int col, Matrix m, ListPos list){
168     int i = 1;
169     int z = 0;
170     boolean isWord = true;
171     Matrix showWord;
172 
173     CreateMatrix( ROWS(m), COLS(m), &showWord) ;
174     ELMT(showWord,row,col) = ELMT_LIST(list,0);
175 
176     while ( i < lengthList(list) && isWord ){
177         if ( ELMT(m,row,col + i) == ELMT_LIST(list,i) && isIdxEff(m,row,col + i) ){
178             ELMT(showWord,row,col + i) = ELMT_LIST(list,i);
179             z++;
180             i++;
181         } else {
182             z++;
183             isWord = false;
184         }
185     }
186     if ( isWord ){
187         printf("Found the word ");
188         displayList(list);
189         printf("\n");
190         displayMatrix(showWord);
191     }
192     return(z);
193 }
194 int checkSouthEast(int row, int col, Matrix m, ListPos list){
195     int i = 1;
196     int z = 0;
197     boolean isWord = true;
198     Matrix showWord;
199 
200     CreateMatrix( ROWS(m), COLS(m), &showWord) ;
201     ELMT(showWord,row,col) = ELMT_LIST(list,0);
```

main.c

src > driver > main.c > main()

```c
    ELMT(showWord,row,col) = ELMT_LIST(list,0);

    while ( i < lengthList(list) && isWord ){
        if ( ELMT(m,row + i,col + i) == ELMT_LIST(list,i) && isIdxEff(m,row + i,col + i) ){
            ELMT(showWord,row + i,col + i) = ELMT_LIST(list,i);
            z++;
            i++;
        } else {
            z++;
            isWord = false;
        }
    }
    if ( isWord ){
        printf("Found the word ");
        displayList(list);
        printf("\n");
        displayMatrix(showWord);
    }
    return(z);
}
int checkSouth(int row, int col, Matrix m, ListPos list){
    int i = 1;
    int z = 0;
    boolean isWord = true;
    Matrix showWord;

    CreateMatrix( ROWS(m), COLS(m), &showWord) ;
    ELMT(showWord,row,col) = ELMT_LIST(list,0);

    while ( i < lengthList(list) && isWord ){
        if ( ELMT(m,row + i,col) == ELMT_LIST(list,i) && isIdxEff(m,row + i,col) ){
            ELMT(showWord,row + i,col) = ELMT_LIST(list,i);
            z++;
            i++;
        } else {
            z++;
            isWord = false;
        }
    }
    if ( isWord ){
        printf("Found the word ");
        displayList(list);
        printf("\n");
        displayMatrix(showWord);
    }
    return(z);
}
int checkSouthWest(int row, int col, Matrix m, ListPos list){
    int i = 1;
    int z = 0;
    boolean isWord = true;
```

main.c

src > driver > C main.c > main()

```
251     boolean isWord = true;
252     Matrix showWord;
253 
254     CreateMatrix( ROWS(m), COLS(m), &showWord) ;
255     ELMT(showWord,row,col) = ELMT_LIST(list,0);
256 
257     while ( i < lengthList(list) && isWord ){
258         if ( ELMT(m,row + i,col - i) == ELMT_LIST(list,i) && isIdxEff(m,row + i,col - i) ){
259             ELMT(showWord,row + i,col - i) = ELMT_LIST(list,i);
260             z++;
261             i++;
262         } else {
263             z++;
264             isWord = false;
265         }
266     }
267     if ( isWord ){
268         printf("Found the word ");
269         displayList(list);
270         printf("\n");
271         displayMatrix(showWord);
272     }
273     return(z);
274 }
275 int checkWest(int row, int col, Matrix m, ListPos list){
276     int i = 1;
277     int z = 0;
278     boolean isWord = true;
279     Matrix showWord;
280 
281     CreateMatrix( ROWS(m), COLS(m), &showWord) ;
282     ELMT(showWord,row,col) = ELMT_LIST(list,0);
283 
284     while ( i < lengthList(list) && isWord ){
285         if ( ELMT(m,row,col - i) == ELMT_LIST(list,i) && isIdxEff(m,row,col - i) ){
286             ELMT(showWord,row,col - i) = ELMT_LIST(list,i);
287             z++;
288             i++;
289         } else {
290             z++;
291             isWord = false;
292         }
293     }
294     if ( isWord ){
295         printf("Found the word ");
296         displayList(list);
297         printf("\n");
298         displayMatrix(showWord);
299     }
300     return(z);
301 }
```

main.c

src > driver > main.c > main()

```c
}
int checkNorthWest(int row, int col, Matrix m, ListPos list){
    int i = 1;
    int z = 0;
    boolean isWord = true;
    Matrix showWord;

    CreateMatrix( ROWS(m), COLS(m), &showWord) ;
    ELMT(showWord,row,col) = ELMT_LIST(list,0);

    while ( i < lengthList(list) && isWord ){
        if ( ELMT(m,row - i,col - i) == ELMT_LIST(list,i) && isIdxEff(m,row - i,col - i) ){
            ELMT(showWord,row - i,col - i) = ELMT_LIST(list,i);
            z++;
            i++;
        } else {
            z++;
            isWord = false;
        }
    }
    if ( isWord ){
        printf("Found the word ");
        displayList(list);
        printf("\n");
        displayMatrix(showWord);
    }
    return(z);
}

int getAnswer(Matrix matPuzzle, ListPos list){
    int comparison, tempComparisonNorth, tempComparisonNorthEast, tempComparisonEarth, tempComparisonSouthEast, tempComparisonSouth, tempComparisonSouthWwest, tempComparisonWest, tempComparisonNorthWest;
    char temp;

    comparison = 0;
    temp = ELMT_LIST(list, 0);
    for ( int i = 0 ; i <= getLastIdxRow(matPuzzle) ; i++ ){
        for ( int j = 0 ; j <= getLastIdxCol(matPuzzle) ; j++ ) {
            if ( ELMT(matPuzzle,i,j) == temp ){
                tempComparisonNorth = checkNorth(i,j,matPuzzle,list);
                tempComparisonNorthEast = checkNorthEast(i,j,matPuzzle,list);
                tempComparisonEarth = checkEast(i,j,matPuzzle,list);
                tempComparisonSouthEast = checkSouthEast(i,j,matPuzzle,list);
                tempComparisonSouth = checkSouth(i,j,matPuzzle,list);
                tempComparisonSouthWwest = checkSouthWest(i,j,matPuzzle,list);
                tempComparisonWest = checkWest(i,j,matPuzzle,list);
                tempComparisonNorthWest = checkNorthWest(i,j,matPuzzle,list);
                comparison = comparison + tempComparisonNorth + tempComparisonNorthEast + tempComparisonEarth + tempComparisonSouthEast + tempComparisonSouth + tempComparisonSouthWwest + tempComparisonWest + tempComparisonNorthWest;
            } else {
                comparison = comparison + 1;
            }
        }
```

main.c

src > driver > C main.c > main()

```c
        }
    }
    printf("Comparison as much as %d to find the word above\n\n",comparison);
    return(comparison);
}

void proccessAnswer(Matrix matPuzzle, Queue q){
    int sumComparison;
    float tempComparison;
    ListPos tempWord;

    sumComparison = 0;

    clock_t begin = clock();
    while ( !isEmptyQueue(q) ){
        tempComparison = 0;
        dequeue(&q, &tempWord);
        tempComparison = getAnswer(matPuzzle, tempWord);
        sumComparison = sumComparison + tempComparison;
    }
    clock_t end = clock();
    float time_spent = (double)(end - begin) / CLOCKS_PER_SEC;
    printf("The program execution time is %.2f seconds\n",time_spent);
    printf("The number of comparisons of all letters made to find all the words in the puzzle is %d comparison\n",sumComparison);
}

int main() {

    char menuInput;
    boolean isQuit = false;
    boolean isFirstStart = true;
    Matrix matPuzzle;
    Queue listWord;

    while ( !isQuit ){
        // intro
        if ( isFirstStart ){
            printf("Welcome to World Search Puzzle\n");
            menuInput = menu();
            isFirstStart = false;
        } else {
            menuInput = menu();
        }

        if ( menuInput == '1' ) {
            // make matrix puzzle
            matPuzzle = makeMatrixPuzzle();

            // make list word that use to play the games
            adv();
            listWord = makeWord();
```

main.c

src > driver > main.c > main()

```
401                 listWord = makeWord();
402
403                 // solve the problem
404                 printf("Here are all the words found in the puzzle.\n\n");
405                 proccessAnswer(matPuzzle, listWord);
406
407             } else if ( menuInput == '2' ) {
408                 isQuit = true;
409             } else {
410                 printf("Your input is wrong! Please re-enter.\n");
411             }
412         }
413
414         return(0);
415     }
```

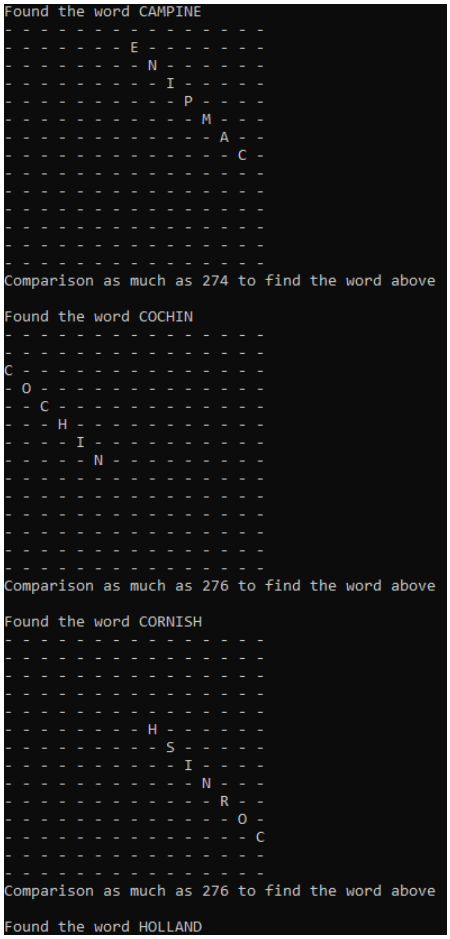
C. Input dan OutputProgram

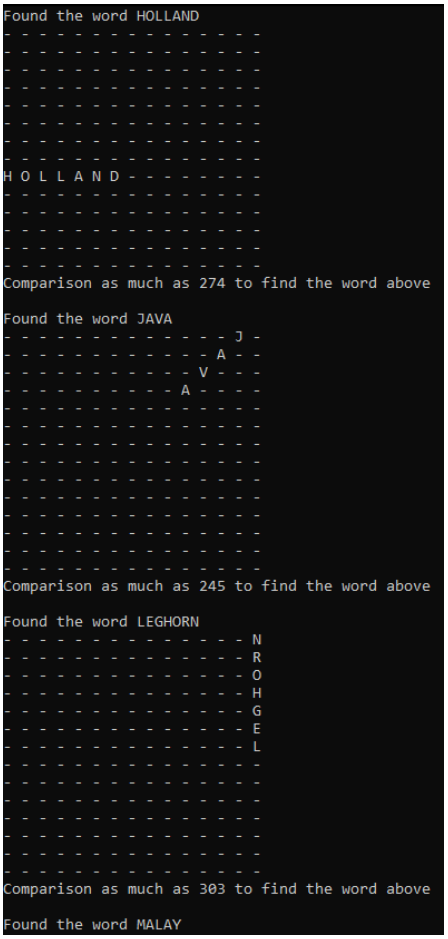
1. Ukuran 14 x 15

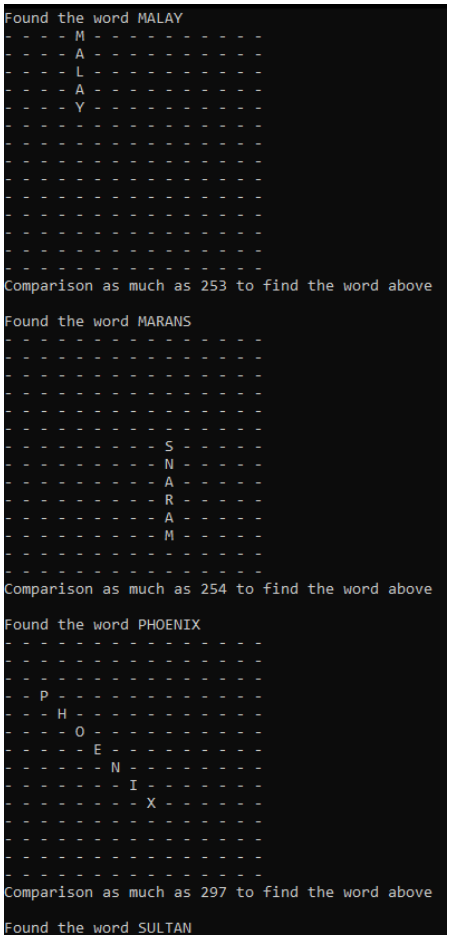
   Input :

   Output :

```
Enter the file name without typing the extension (make sure the file is in the test folder and has a .txt extension)
Example : test1
>> small1
Here are all the words found in the puzzle.

Found the word ANCONA
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - A N O C N A - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
Comparison as much as 365 to find the word above

Found the word ASEEL
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - L -
- - - - - - - - - - - - E - -
- - - - - - - - - - - E - - -
- - - - - - - - - - S - - - -
- - - - - - - - - A - - - - -
Comparison as much as 358 to find the word above

Found the word BUCKEYE
- - - - - - B - - - - - - - -
- - - - - - U - - - - - - - -
- - - - - - C - - - - - - - -
- - - - - - K - - - - - - - -
- - - - - - E - - - - - - - -
- - - - - - Y - - - - - - - -
- - - - - - E - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
Comparison as much as 278 to find the word above

Found the word CAMPINE
```


Found the word CAMPINE
Comparison as much as 274 to find the word above
Found the word COCHIN
Comparison as much as 276 to find the word above
Found the word CORNISH
Comparison as much as 276 to find the word above
Found the word HOLLAND


Found the word HOLLAND
H O L L A N D
Comparison as much as 274 to find the word above
Found the word JAVA
Comparison as much as 245 to find the word above
Found the word LEGHORN
Comparison as much as 303 to find the word above
Found the word MALAY


Found the word MALAY
Comparison as much as 253 to find the word above
Found the word MARANS
Comparison as much as 254 to find the word above
Found the word PHOENIX
Comparison as much as 297 to find the word above
Found the word SULTAN

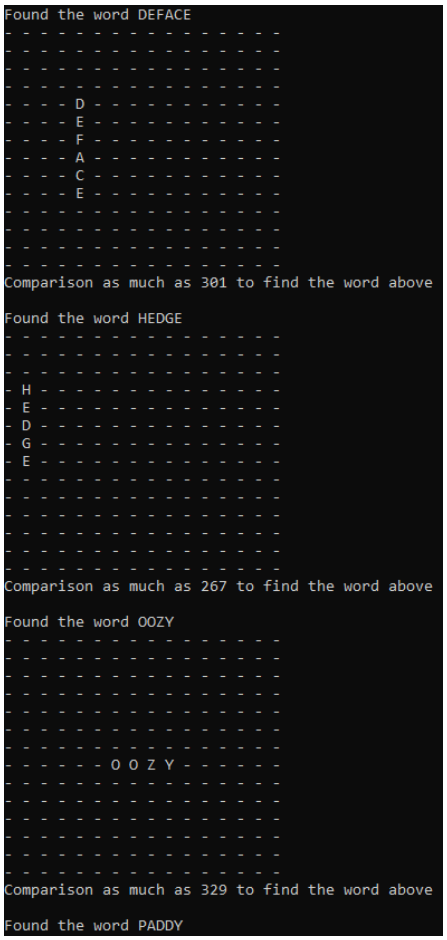
```
Found the word SULTAN
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
N A T L U S - - - - - - - -
- - - - - - - - - - - - - -
Comparison as much as 280 to find the word above

Found the word SUMATRA
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
S U M A T R A - - - - - - - -
Comparison as much as 281 to find the word above

Found the word SUSSEX
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - - - - - - - - -
- - - - - - X E S S U S - -
- - - - - - - - - - - - - -
Comparison as much as 281 to find the word above

The program execution time is 0.20 seconds
The number of comparisons of all letters made to find all the words in the puzzle is 4295 comparison
```

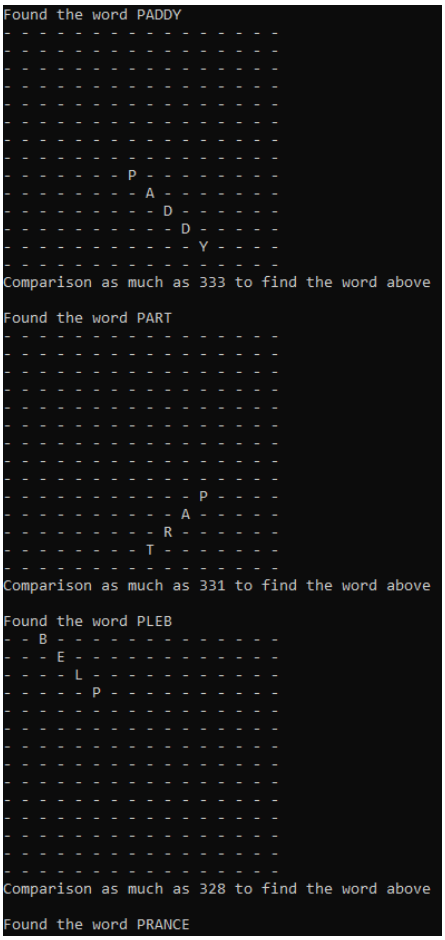
2. Ukuran 14 x 16

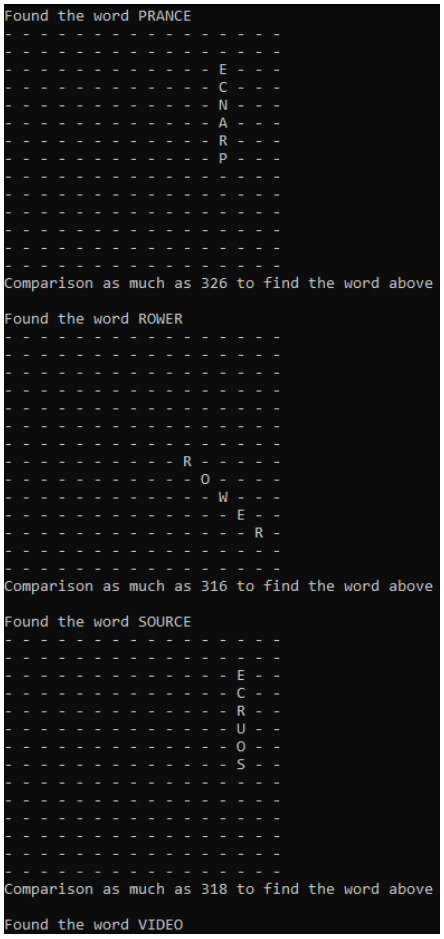
   Input :

   Output :

```
Enter the file name without typing the extension (make sure the file is in the test folder and has a .txt extension)
Example : test1
>> small2
Here are all the words found in the puzzle.

Found the word ASLEEP
- - - - - - - - - - - - - - -
- - - - - - A S L E E P - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
Comparison as much as 312 to find the word above

Found the word BRUNT
- - - - - - - - - - - - - - -
- - - - T - - - - - - - - - -
- - - - - N - - - - - - - - -
- - - - - - U - - - - - - - -
- - - - - - - R - - - - - - -
- - - - - - - - B - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
Comparison as much as 271 to find the word above

Found the word CONVEY
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - Y
- - - - - - - - - - - - - - E
- - - - - - - - - - - - - - V
- - - - - - - - - - - - - - N
- - - - - - - - - - - - - - O
- - - - - - - - - - - - - - C
- - - - - - - - - - - - - - -
Comparison as much as 322 to find the word above

Found the word DEFACE
```


Found the word DEFACE
Comparison as much as 301 to find the word above
Found the word HEDGE
Comparison as much as 267 to find the word above
Found the word OOZY
Comparison as much as 329 to find the word above
Found the word PADDY


Found the word PADDY
Comparison as much as 333 to find the word above
Found the word PART
Comparison as much as 331 to find the word above
Found the word PLEB
Comparison as much as 328 to find the word above
Found the word PRANCE


Found the word PRANCE
Comparison as much as 326 to find the word above
Found the word ROWER
Comparison as much as 316 to find the word above
Found the word SOURCE
Comparison as much as 318 to find the word above
Found the word VIDEO

```
Found the word VIDEO
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - O - - - - - - - -
- - - - - - E - - - - - - - -
- - - - - - D - - - - - - - -
- - - - - - I - - - - - - - -
- - - - - - V - - - - - - - -
Comparison as much as 256 to find the word above

Found the word WAXING
- - - - - - - - - - - - - - -
- - G - - - - - - - - - - - -
- - - N - - - - - - - - - - -
- - - - I - - - - - - - - - -
- - - - - X - - - - - - - - -
- - - - - - A - - - - - - - -
- - - - - - - W - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
Comparison as much as 263 to find the word above

The program execution time is 0.49 seconds
The number of comparisons of all letters made to find all the words in the puzzle is 4273 comparison
```

3. Ukuran 14 x 16

   Input :

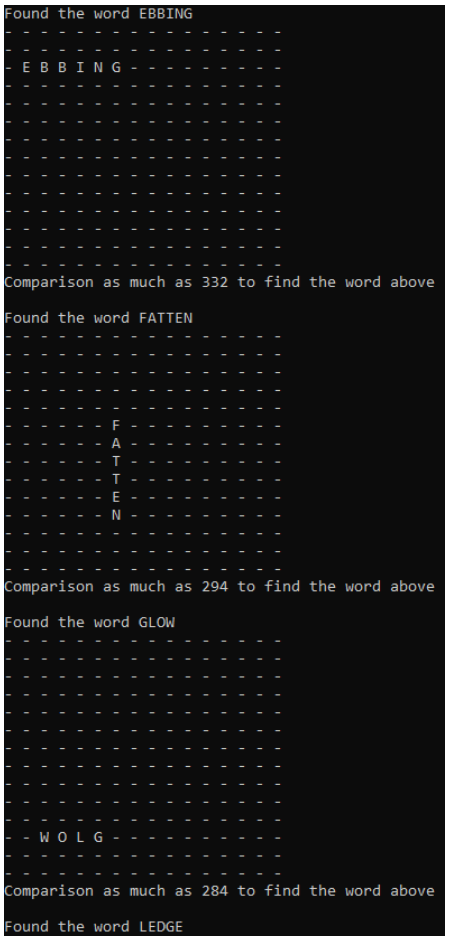
small3.txt

test > small3.txt

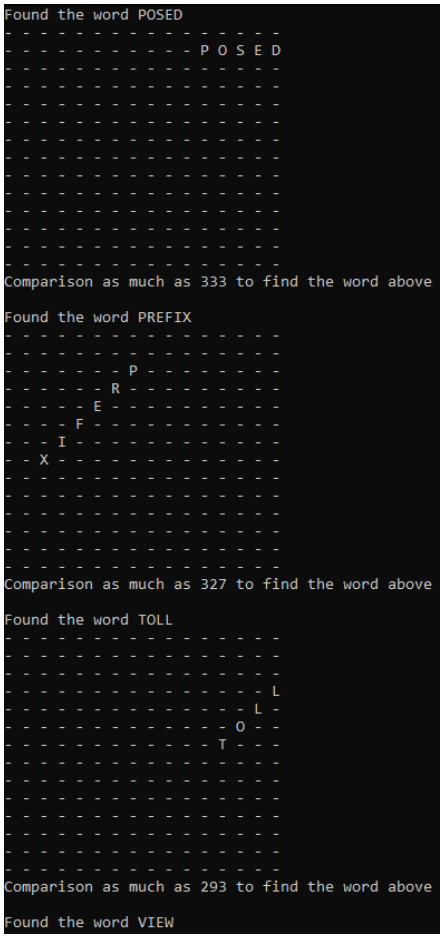
```
1   K H T R A M X P P J U V V L C Q
2   Z R M E O G W H Z V K P O S E D
3   I E B B I N G P K R Y X H T N Y
4   X Q B G H U R G H T M R A W H L
5   J X V G I E F Y G Y V C P F L J
6   E U X I F B F T S O O P J O C B
7   U A W I L I A I D N I E T T P P
8   Y R X E S P T B H A U C Z P H M
9   D N D E I O T J N A R K S S Q D
10  Y G S B F V E M D M B E W B O C
11  E Z L U P U N S P M V D H Z W I
12  E C W O L G Z L Z O P C B I K L
13  T U P W O X F I F C E L I F V U
14  W K L Y B U H A N F R H E W M V
15
16  AILS
17  COBWEB
18  COMMA
19  EBBING
20  FATTEN
21  GLOW
22  LEDGE
23  MART
24  PECKED
25  POSED
26  PREFIX
27  TOLL
28  VIEW
29  WARMTH
```

Output :

```
Enter the file name without typing the extension (make sure the file is in the test folder and has a .txt extension)
Example : test1
>> small3
Here are all the words found in the puzzle.

Found the word AILS
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - S - - - - - - -
- - - - - - - L - - - - - - -
- - - - - - - I - - - - - - -
- - - - - - - A - - - - - - -
Comparison as much as 279 to find the word above

Found the word COBWEB
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - B E W B O C
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
Comparison as much as 287 to find the word above

Found the word COMMA
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - A - - - -
- - - - - - - - - - M - - - -
- - - - - - - - - - M - - - -
- - - - - - - - - - O - - - -
- - - - - - - - - - C - - - -
- - - - - - - - - - - - - - -
Comparison as much as 286 to find the word above

Found the word EBBING
```


Found the word EBBING
E B B I N G
Comparison as much as 332 to find the word above
Found the word FATTEN
F
A
T
T
E
N
Comparison as much as 294 to find the word above
Found the word GLOW
W O L G
Comparison as much as 284 to find the word above
Found the word LEDGE


Found the word LEDGE
L
E
D
G
E
Comparison as much as 300 to find the word above
Found the word MART
T R A M
Comparison as much as 283 to find the word above
Found the word PECKED
P
E
C
K
E
D
Comparison as much as 327 to find the word above
Found the word POSED


Found the word POSED
P O S E D
Comparison as much as 333 to find the word above
Found the word PREFIX
P
R
E
F
I
X
Comparison as much as 327 to find the word above
Found the word TOLL
L
L
O
T
Comparison as much as 293 to find the word above
Found the word VIEW

```
Found the word VIEW
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - W - - - - - - - - - - - - - - - - -
- - - E - - - - - - - - - - - - - - - -
- - - - I - - - - - - - - - - - - - - -
- - - - - V - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
Comparison as much as 291 to find the word above

Found the word WARMTH
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - H T M R A W - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
Comparison as much as 292 to find the word above

The program execution time is 0.62 seconds
The number of comparisons of all letters made to find all the words in the puzzle is 4208 comparison
```

4. Ukuran 20 x 20

   Input :

medium1.txt

```
1  T Q S Q L A D A S T H G I M R U B U W L
2  I A A E S A W S O S H K A J A J H F M E
3  O I F T M Y M S H G E J X P C G K V E E
4  Q T H G L B E E Q X A R L M S L I M E S
5  Y M M S D V S R H I X B P Q O T B M Z G
6  A E O B M J Z T U S M N X M R J E V Y J
7  M N G R H U B I L N A N W O O Y O Y Z K
8  I Q R X A L G N Q H M L P H T C D N E D
9  G L A N C E A G Y P Z S F T Z W E T W U
10 D E P R A W R U D H S P G S D O H D Y D
11 S U I S L E C G G A E A R R W E W H T C
12 B Z I O O O K N P H R R B X S E P Z D F
13 S V T K D F H I B S L I T A N Y N Z L U
14 B Y O V L T D S O J R W U T S C D U D U
15 G W D J J V Y I S O F R H W L H Y I L Y
16 E A O R T G G P Q U U G O I K S U Y H B
17 Y X P U W N F S X S U J U H Z F L N H F
18 Y X D M I M W E U A N B D A D C H X C G
19 Z L M P G H I D R S B B K G T W R R X R
20 O A K U U F U D O L R Z U D A G A C Z O
21
22 ABASH
23 ASSERTING
24 ASTHMA
25 CELSIUS
26 DECOMPRESS
27 DESPISING
28 DRAUGHT
29 GLANCE
30 LAUGH
31 LEES
32 LEFTY
33 MIGHT
34 NEWSFLASH
35 OSCAR
36 PASSPORT
37 SLIME
38 SMUG
39 THESAURUS
40 WARPED
```

Output :

```
Enter the file name without typing the extension (make sure the file is in the test folder and has a .txt extension)
Example : test1
>> medium1
Here are all the words found in the puzzle.

Found the word ABASH
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - A - - - - - - -
- - - - - - - - - - B - - - - - - -
- - - - - - - - - - A - - - - - - -
- - - - - - - - - - S - - - - - - -
- - - - - - - - - - H - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
Comparison as much as 569 to find the word above

Found the word ASSERTING
- - - - - - - A - - - - - - - - - -
- - - - - - - S - - - - - - - - - -
- - - - - - - S - - - - - - - - - -
- - - - - - - E - - - - - - - - - -
- - - - - - - R - - - - - - - - - -
- - - - - - - T - - - - - - - - - -
- - - - - - - I - - - - - - - - - -
- - - - - - - N - - - - - - - - - -
- - - - - - - G - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
Comparison as much as 582 to find the word above

Found the word ASTHMA
```


Found the word ASTHMA
Comparison as much as 580 to find the word above
Found the word CELSIUS
S U I S L E C
Comparison as much as 470 to find the word above

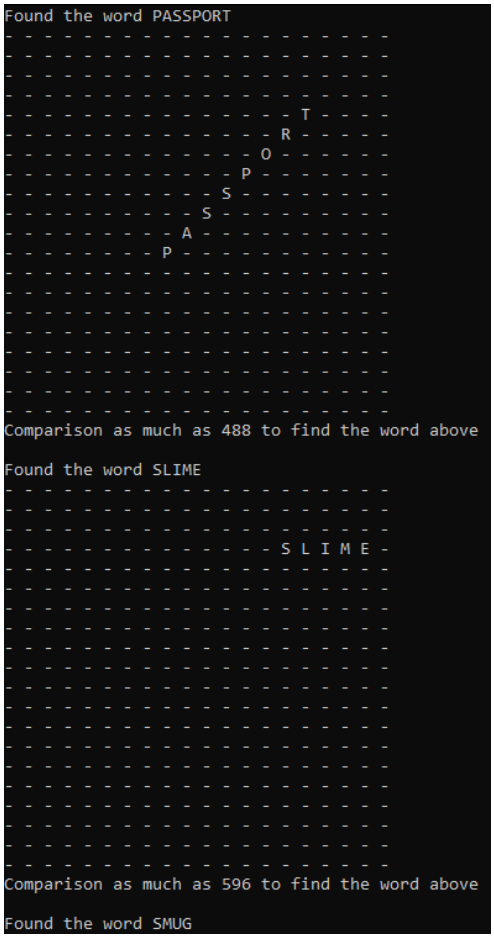

Found the word DECOMPRESS
Comparison as much as 560 to find the word above
Found the word DESPISING
Comparison as much as 559 to find the word above

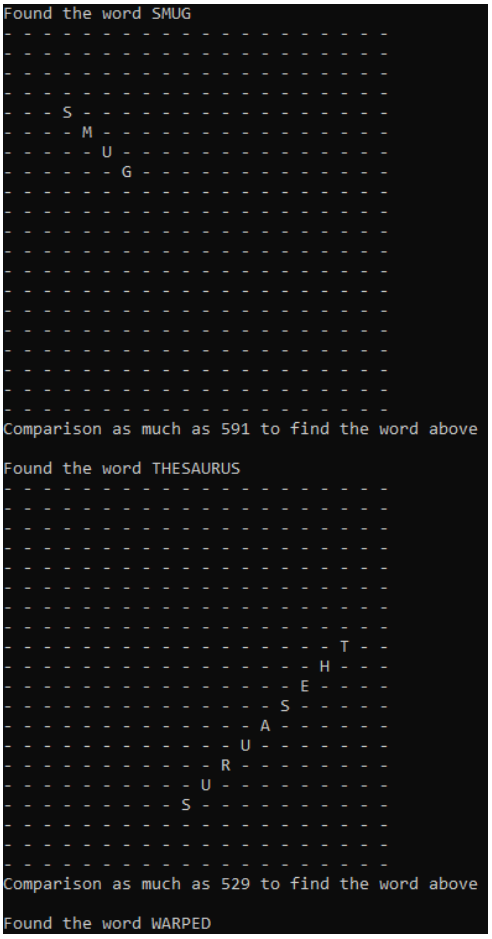

Found the word DECOMPRESS
Found the word DRAUGHT
Comparison as much as 555 to find the word above
Found the word GLANCE
G L A N C E
Comparison as much as 548 to find the word above
Found the word LAUGH


Found the word DRAUGHT
Found the word LAUGH
Comparison as much as 536 to find the word above
Found the word LEES
Comparison as much as 532 to find the word above
Found the word LEFTY


Found the word LEFTY
Comparison as much as 533 to find the word above
Found the word MIGHT
Comparison as much as 531 to find the word above
Found the word NEWSFLASH


Found the word NEWSFLASH
Comparison as much as 503 to find the word above
Found the word OSCAR
Comparison as much as 548 to find the word above
Found the word PASSPORT


Found the word PASSPORT
Comparison as much as 488 to find the word above
Found the word SLIME
Comparison as much as 596 to find the word above
Found the word SMUG


Found the word SMUG
Comparison as much as 591 to find the word above
Found the word THESAURUS
Comparison as much as 529 to find the word above
Found the word WARPED

```
Found the word WARPED
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
D E P R A W - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
Comparison as much as 509 to find the word above

The program execution time is 1.18 seconds
The number of comparisons of all letters made to find all the words in the puzzle is 10319 comparison
```

5. Ukuran 20 x 20

Input :

medium2.txt

test > medium2.txt

```
1   E N I T O L L I U G U Y D Q M C X E N T
2   P A V I L I O N T N W R D Y G R G O W A
3   F D A Y Q L Q X B L R E J E U F I L Y T
4   M R E M E H P S A L B L N E P T G D Q C
5   G N I T T I L P S S W T F H C I A R E A
6   B O R R M Q Y C N W L U Q E Q F R O B L
7   V T J E E I O Z I E L C L F L L M N K W
8   Y X H Y G V B C F L J F G K L U E T L Q
9   T D U F R U E O Y S E P F A T P N H D V
10  D S V H C F L F Y D R E R L O I T Z K P
11  N M E T H K U A Y N G O J K M E C G G F
12  Y W P I D K B S T A M O J V S X W B S P
13  W O P O G E C B I E H G T U K S V R W J
14  F E T U E N U I L O I B P W A H M X T Y
15  F W Z P D O I X B G N T M N Z P M H H L
16  U V E C M L Z R S U Q W M I H T M M O F
17  O R H Q F U H Z P I C D E P O S I T E D
18  H J C I W J K Y B S M O Y M S T D O S G
19  F U T M M H A Q W D W O F M G W G A D H
20  X J E T U Y U S R F T I A M H X W G T G
21
22  BEEPER
23  BLASPHEMER
24  CUBIC
25  CUTLERY
26  DEFLECTION
27  DEPOSITED
28  FUSION
29  GARMENT
30  GENTLEFOLK
31  GUILLOTINE
32  HAYFEVER
33  MORAL
34  PAVILION
35  REGULATE
36  RUEFULLY
37  SPLITTING
38  SPRINGIEST
```

Output :

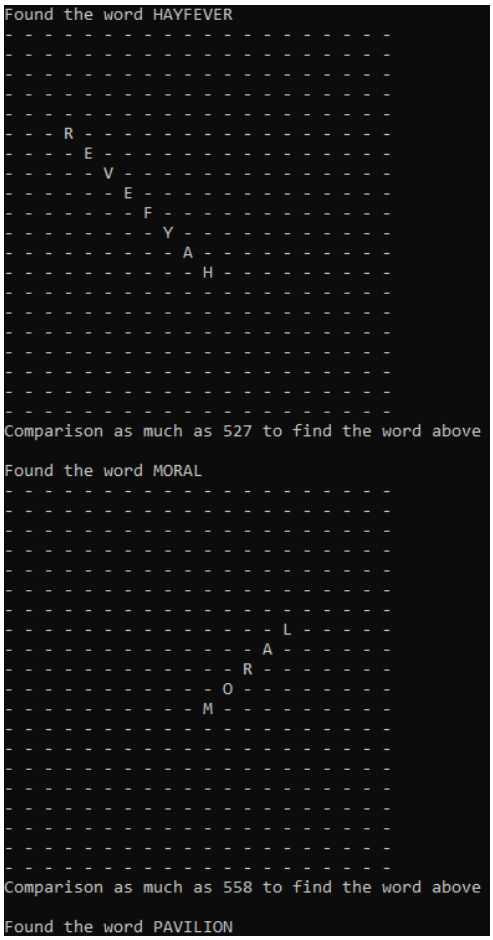
```
Enter the file name without typing the extension (make sure the file is in the test folder and has a .txt extension)
Example : test1
>> medium2
Here are all the words found in the puzzle.

Found the word BEEPER
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - B - - - - - - - - - - - - -
- - - - - E - - - - - - - - - - - - - -
- - - - E - - - - - - - - - - - - - - -
- - - P - - - - - - - - - - - - - - - -
- - E - - - - - - - - - - - - - - - - -
- R - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
Comparison as much as 484 to find the word above

Found the word BLASPHEMER
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- R E M E H P S A L B - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
Comparison as much as 492 to find the word above

Found the word CUBIC
```

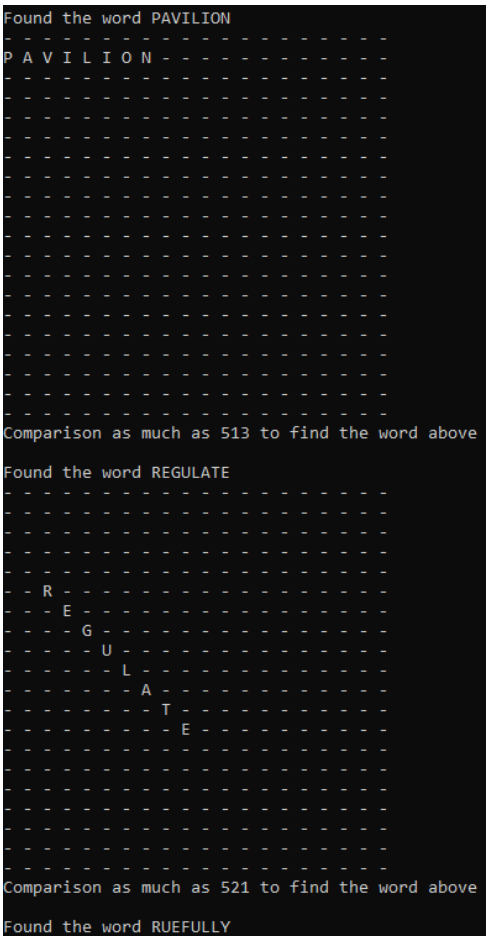

Found the word CUBIC
Comparison as much as 492 to find the word above
Found the word CUTLERY
Comparison as much as 493 to find the word above
Found the word DEFLECTION


Found the word DEFLECTION
Comparison as much as 521 to find the word above
Found the word DEPOSITED
Comparison as much as 521 to find the word above
Found the word FUSION


Found the word FUSION
Comparison as much as 545 to find the word above
Found the word GARMENT
Comparison as much as 535 to find the word above
Found the word GENTLEFOLK


Found the word GENTLEFOLK
Comparison as much as 541 to find the word above
Found the word GUILLOTINE
Comparison as much as 540 to find the word above
Found the word HAYFEVER


Found the word HAYFEVER
Comparison as much as 527 to find the word above
Found the word MORAL
Comparison as much as 558 to find the word above
Found the word PAVILION


Found the word PAVILION
P A V I L I O N
Comparison as much as 513 to find the word above
Found the word REGULATE
Comparison as much as 521 to find the word above
Found the word RUEFULLY


Found the word RUEFULLY
Comparison as much as 515 to find the word above
Found the word SPLITTING
G N I T T I L P S
Comparison as much as 518 to find the word above
Found the word SPRINGIEST

```
Found the word SPRINGIEST
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
T - - - - - - - - - - - - - - - - - -
- S - - - - - - - - - - - - - - - - -
- - E - - - - - - - - - - - - - - - -
- - - I - - - - - - - - - - - - - - -
- - - - G - - - - - - - - - - - - - -
- - - - - N - - - - - - - - - - - - -
- - - - - - I - - - - - - - - - - - -
- - - - - - - R - - - - - - - - - - -
- - - - - - - - P - - - - - - - - - -
- - - - - - - - - S - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
Comparison as much as 519 to find the word above

The program execution time is 0.79 seconds
The number of comparisons of all letters made to find all the words in the puzzle is 8835 comparison
```

6. Ukuran 22 x 22

   Input :

medium3.txt

test > medium3.txt

```
1   E S V G A B Q D G D H O N E Y S U C K L E G
2   U M I E N C I N C S E P Q G R K U L N M Q N
3   Q I B K Q I Y T K E Z M U M O S L U S F J C
4   I V P O R S M T D R Z S R W M L L I A E L T
5   E X M U L I X R I E K M R O F R V T C G B B
6   L A V X G D B U O G U T J V F I H T J V J B
7   A A L L I V E R R F I N D R T E E O L Y W K
8   X E T A L U S N I K C X I A R D D D S V U O
9   L F F V H S R G E X I L G I V H L V N Z T M
10  X Z I I W M O F M D R E N R G I U L R G O J
11  E C O N O M I Z E Y N L E I L R C S N N V B
12  V A P H Y D P X Q K A S P E A W E I B K I O
13  O C P U C Q V F F W O X N F C D G T V A D C
14  R Y H M E T E F A W F O V B G G W S S J N S
15  A E A A W E C C C C T P A O U E J T F B V D
16  U C V N A B O S E S K P P R E G A R E V O C
17  Y A M I L L U D D K L J D S O B B E R Q R M
18  U E U T U D Y A J K A A B W W N O Z U X D L
19  E H F Y R Q E V O D D Z Z T X H U K C S B L
20  W O L X Q H O P P R E S S I V E Q C T W D A
21  S V U J K X J N C B K T L N M P R F A W A G
22  H P K O S B T Z N S G F X Z I Q V C D X Z R
23
24  COVERAGE
25  DEFORMED
26  DIVOT
27  DRUGGING
28  ECONOMIZE
29  EMBOLDENED
30  FACED
31  FATHERINLAW
32  FETE
33  FORMING
34  GALL
35  HEADSTONE
36  HONEYSUCKLE
37  INHUMANITY
38  INSULATE
39  MOBSTER
40  NEGATIVISM
41  OPPRESSIVE
```

Output :

```
Enter the file name without typing the extension (make sure the file is in the test folder and has a .txt extension)
Example : test1
>> medium3
Here are all the words found in the puzzle.

Found the word COVERAGE
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Comparison as much as 649 to find the word above

Found the word DEFORMED
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- - - - - - - - - - E - - - - - - - - - - -
- - - - - - - - - - - M - - - - - - - - - -
- - - - - - - - - - - - R - - - - - - - - -
- - - - - - - - - - - - - O - - - - - - - -
- - - - - - - - - - - - - - F - - - - - - -
- - - - - - - - - - - - - - - E - - - - - -
- - - - - - - - - - - - - - - - D - - - - -
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Comparison as much as 660 to find the word above

Found the word DIVOT
```
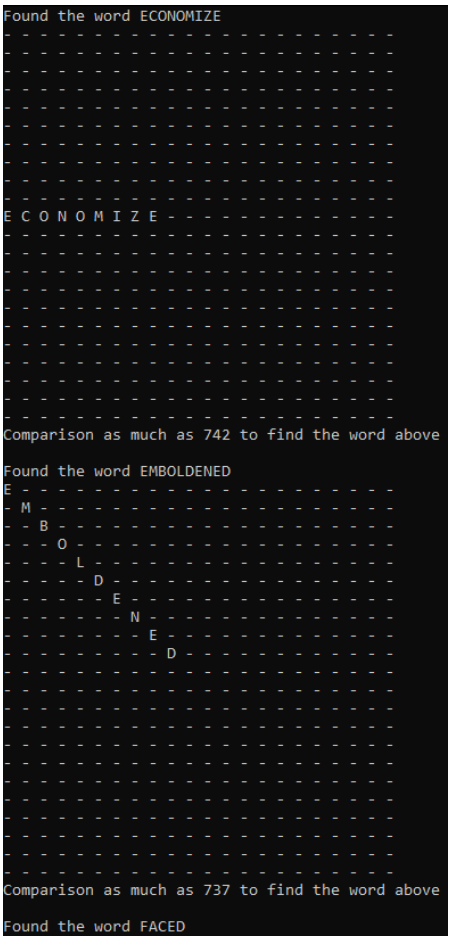
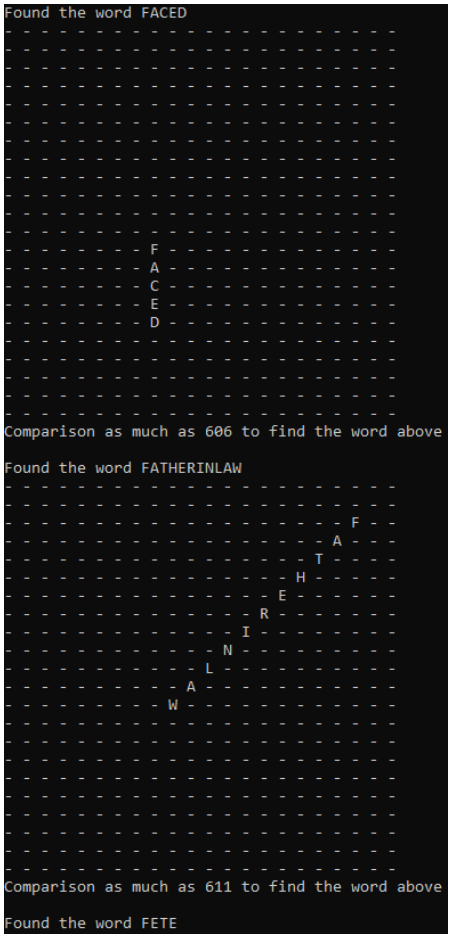
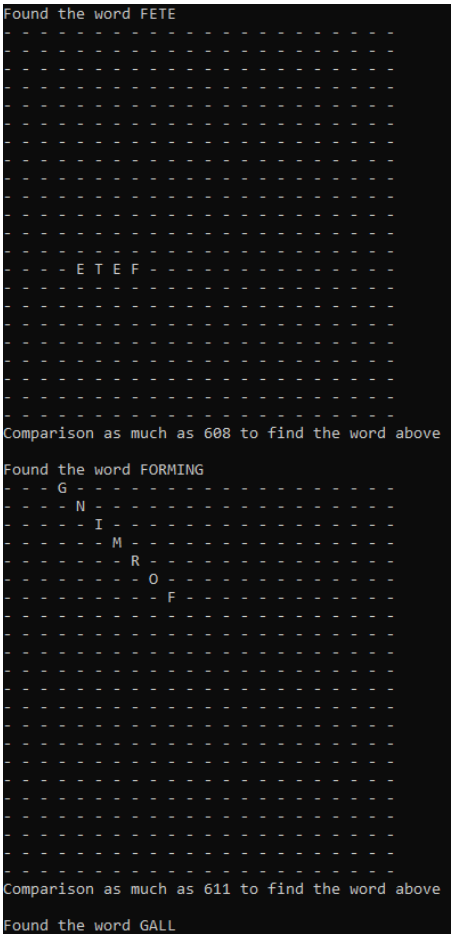


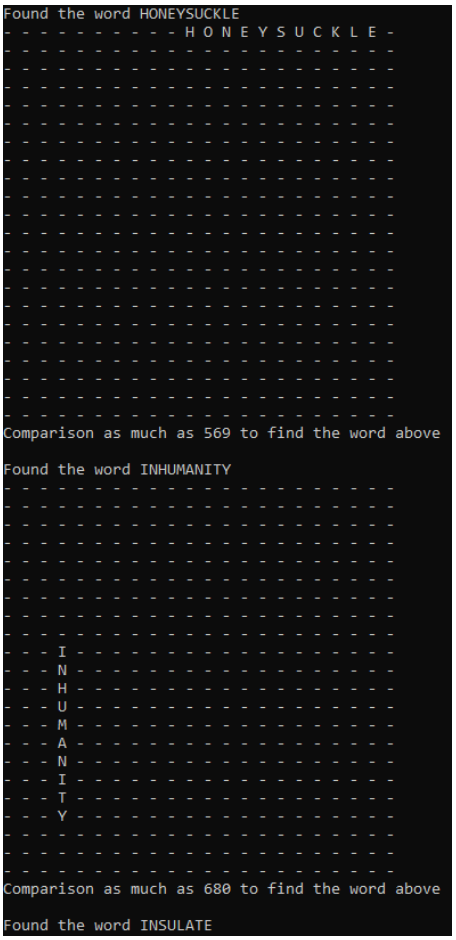
Found the word DIVOT
Comparison as much as 648 to find the word above
Found the word DRUGGING
Comparison as much as 653 to find the word above
Found the word ECONOMIZE


Found the word ECONOMIZE
E C O N O M I Z E
Comparison as much as 742 to find the word above
Found the word EMBOLDENED
Comparison as much as 737 to find the word above
Found the word FACED

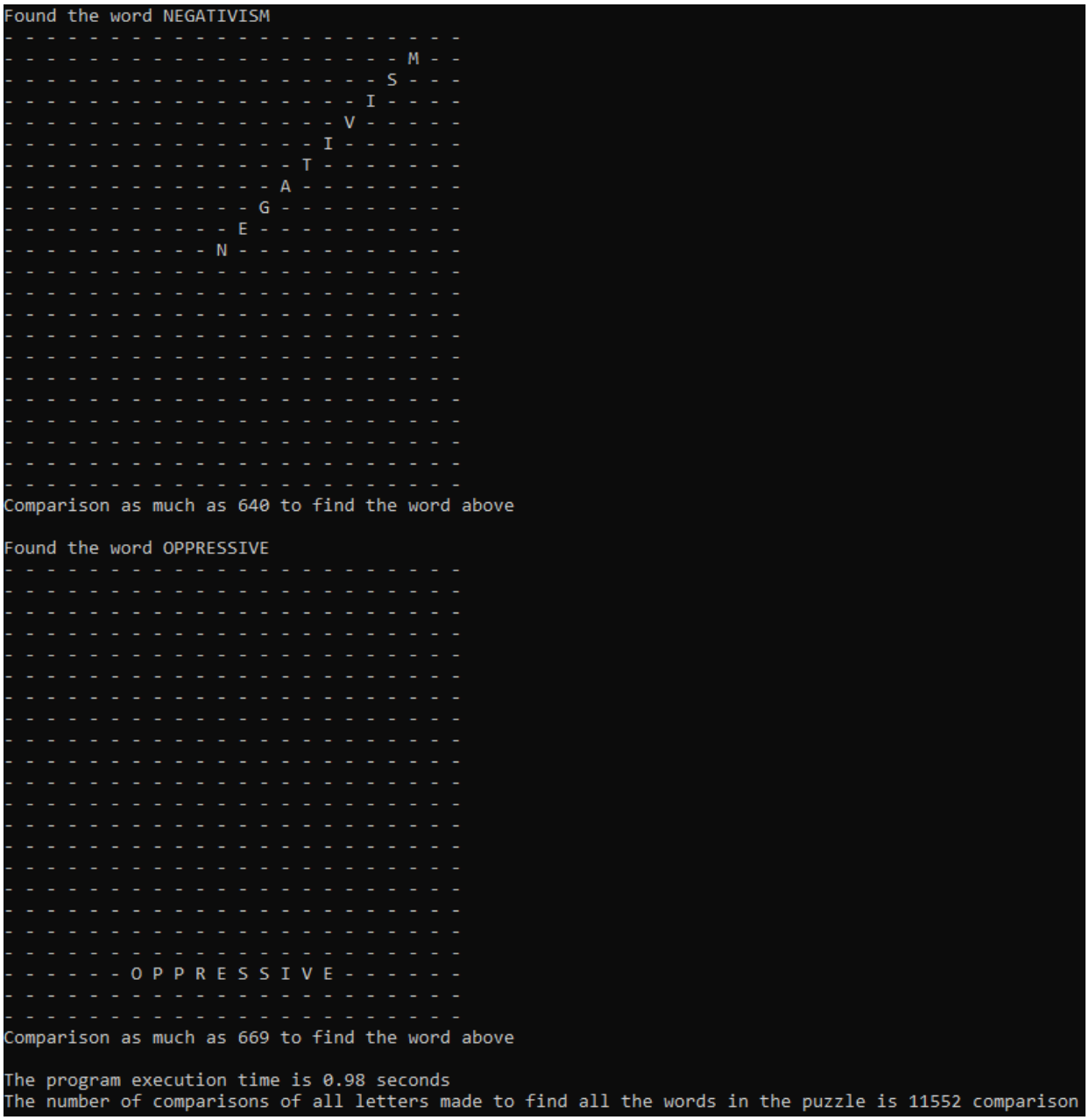

Found the word FACED
Comparison as much as 606 to find the word above
Found the word FATHERINLAW
Comparison as much as 611 to find the word above
Found the word FETE


Found the word FETE
Comparison as much as 608 to find the word above
Found the word FORMING
Comparison as much as 611 to find the word above
Found the word GALL


Found the word GALL
Comparison as much as 610 to find the word above
Found the word HEADSTONE
Comparison as much as 569 to find the word above
Found the word HONEYSUCKLE


Found the word HONEYSUCKLE
Comparison as much as 569 to find the word above
Found the word INHUMANITY
Comparison as much as 680 to find the word above
Found the word INSULATE


Found the word INSULATE
Comparison as much as 679 to find the word above
Found the word MOBSTER
Comparison as much as 611 to find the word above
Found the word NEGATIVISM



7. Ukuran 32 x 30

   Input :

large1.txt

test > large1.txt

```
J B L S I D D T V Y I B E N I L C N I S M Z Y F G A U D
W P A U P B R I C R Q L V C O Z G E L B Y M N X X K L Y
N F C N B P A B K I A Y O X N H W T E K K A E D T K Q V
Q X I I W X M N X D R G N I R E B M U C N E Q C A R S Y
T H G W Z V A O B B I S D P U B R X L S M W C X Q O A E
H Z O S H V T L L D I S Z E C C Z E Y D U O L C C X D X
U H L F Q P I I A B O K C L T P Z I F U T S O Q D B F U
V T O E G D Z C C R N G B O W A M G Q N Z Y S X Y W E Q
O Z M R W X E D K R E S I V F P R Q K O O E I E E X G Y
G X S N J O D C T E H V E D E V D O K B F C W U R T B Y
I P O H L P Y R T V V C O L N A C U P F K I H R M C G R
D E C O M P O S E E L I L G Z I U I O A H W U T Y X Z G
N T P W P I P O D R W E P S Q Q C R H I V H K T N C V J
T H M D W Q C E J O D E P M D B T A A I E E O A T Y W Y
D A T R G I R O W F C I L T X P M V W J V S K G T P B L
H V U O P O B X N R E J R O W X X C H J I P X X Z Q B D
P R S A D M N C C I J O G D A A X J U V T U N T V Z E J
J Y A M F R G L R L C T B L C D X Y J J P B Q H K T I X
G C T M E L M P B D S C F X L V N A F S A C O L A Z D S
P K S R T S V U O E Y C P V S H N R N P D V E C B E A F
W K O S X R D G L S I T K T T T C Y L K A M I X D L T Q
O D F H P G F E M Y D J T T J Y W M S V I N B S S Z Y E
A R J G E A U W B T Z N B Y W A J D O J R D K E N H I X
X Y J T O R E F N J R P Z T Y N A Y X O S C Q U Y H N F
C Y I C C X P X H T F H W P Y A W Q F C P H G Y M M G Y
T N B W U V R B P I E Z E T S U V Y C T A P G C F V B I
G Q O S I A Y K Y Y T M P Y X R S J L W S R X R F P Z U
X W L N O Q O H L F I I Y X U H F W D P M W C N L S K W
S U K H B Z Q D P J S N O V R G A K D H M O X Z K Y Z U
O M H P T Q A B E H A L F A P Z R N V P U J P I Y H T Q
U O K R I A S J C O D L A Q Y L D R W R V M Y P N V J F
F P A C K H S W K G N P A C H U H F Z G M C H M D A H R

ADAPTIVE
ADORER
BEHALF
BLACK
BUDGETING
CLOUDY
CONFERENCE
COSMOLOGICAL
CRUELEST
DECOMPOSE
DISCO
DRAMATIZED
EFFORT
ENCUMBERING
EVAPORATED
FOREVER
FORNICATED
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ADAPTIVE
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COSMOLOGICAL
CRUELEST
DECOMPOSE
DISCO
DRAMATIZED
EFFORT
ENCUMBERING
EVAPORATED
FOREVER
FORNICATED
ICONIC
IMPELLED
INCLINE
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Output :

```
Enter the file name without typing the extension (make sure the file is in the test folder and has a .txt extension)
Example : test1
>> large1
Here are all the words found in the puzzle.

Found the word ADAPTIVE
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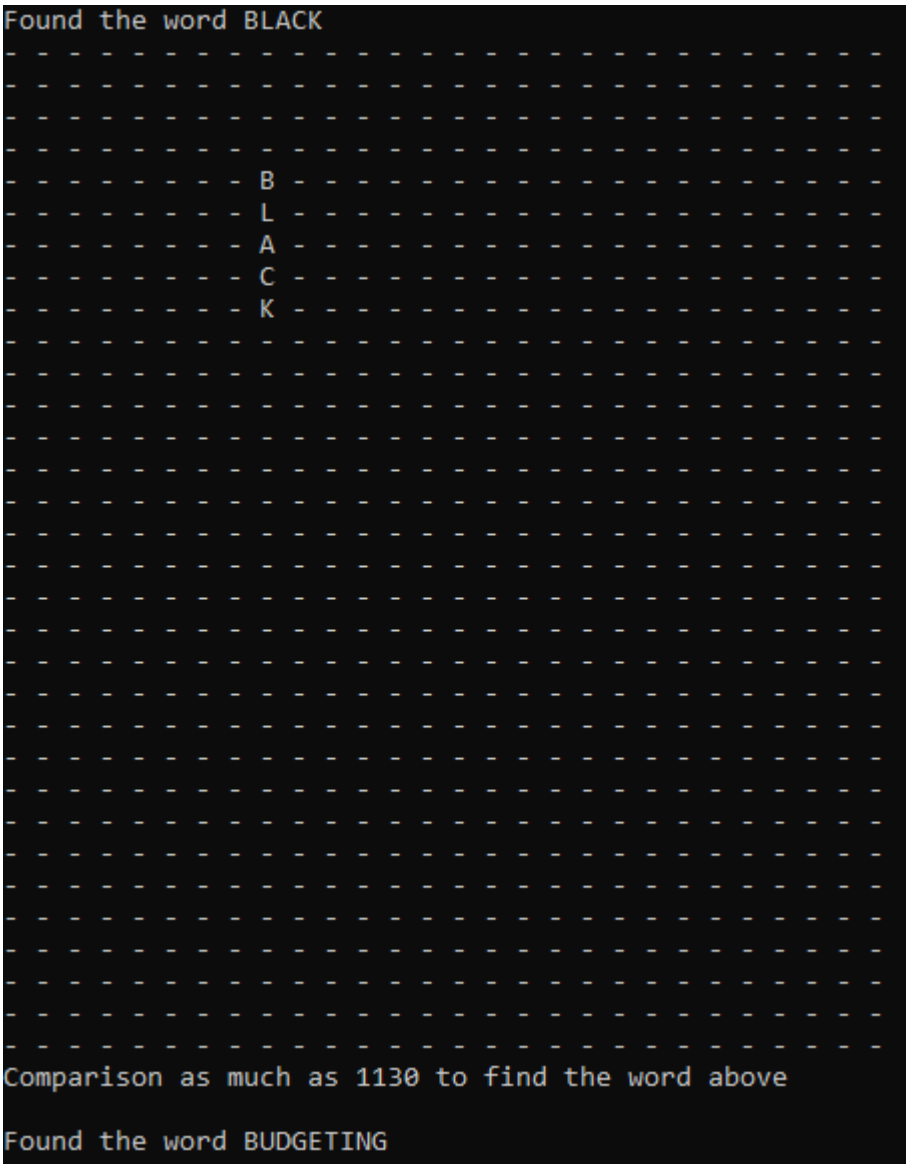
Comparison as much as 1207 to find the word above

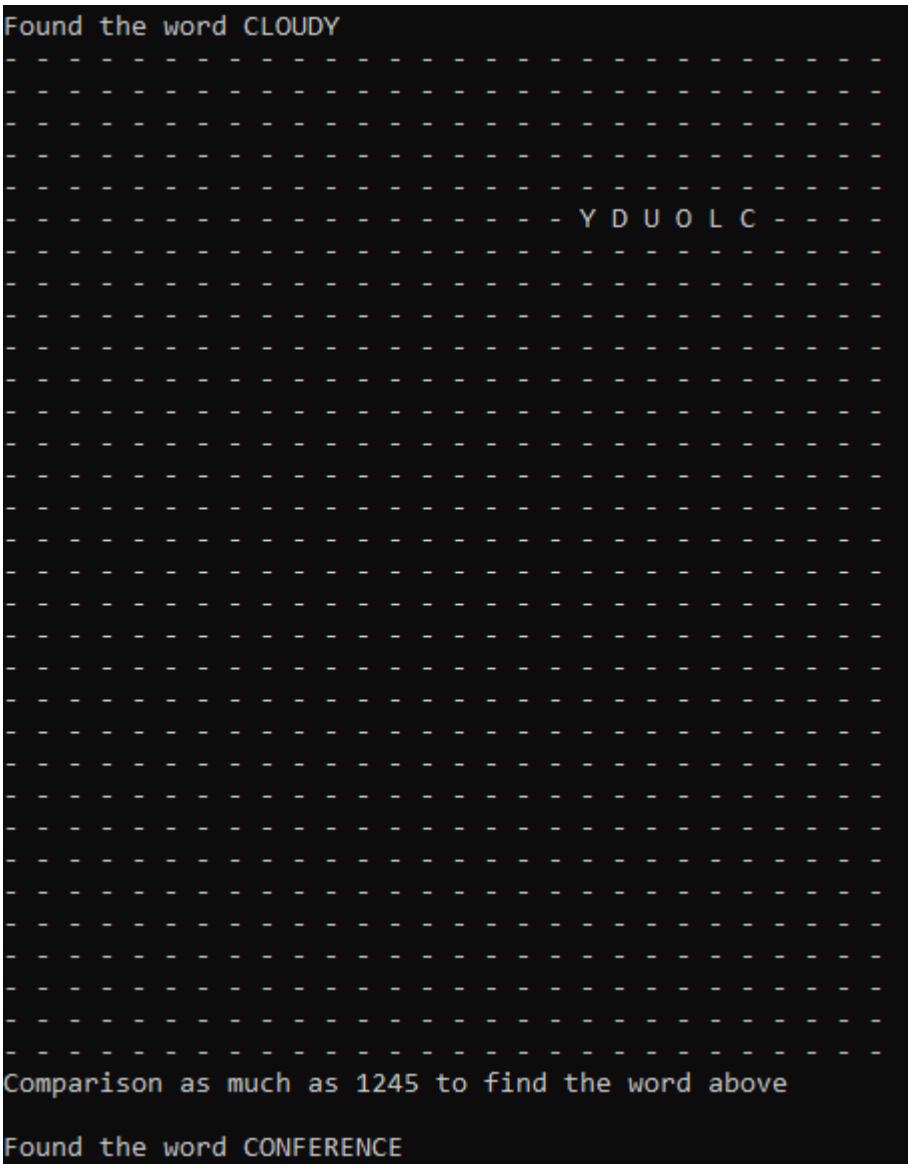
Found the word ADORER
```

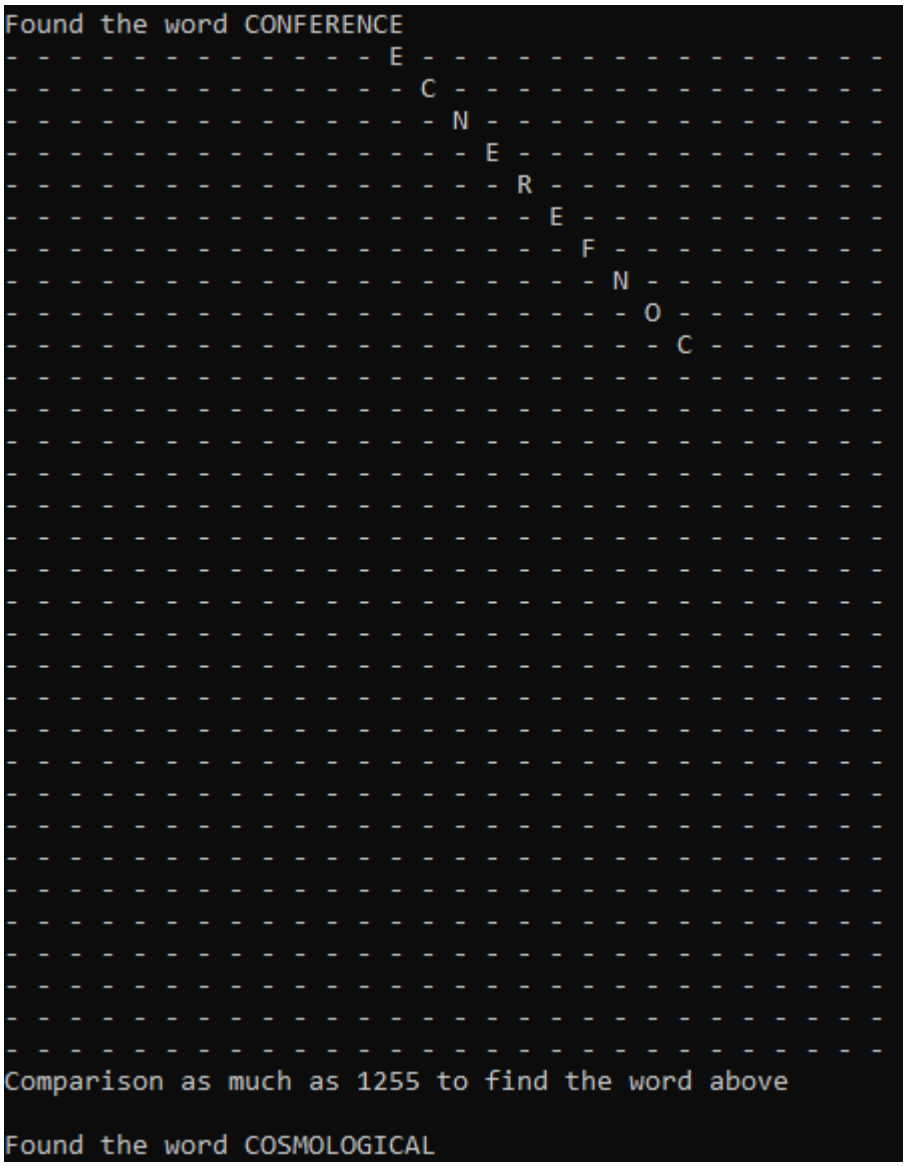

Found the word ADORER
Comparison as much as 1204 to find the word above
Found the word BEHALF

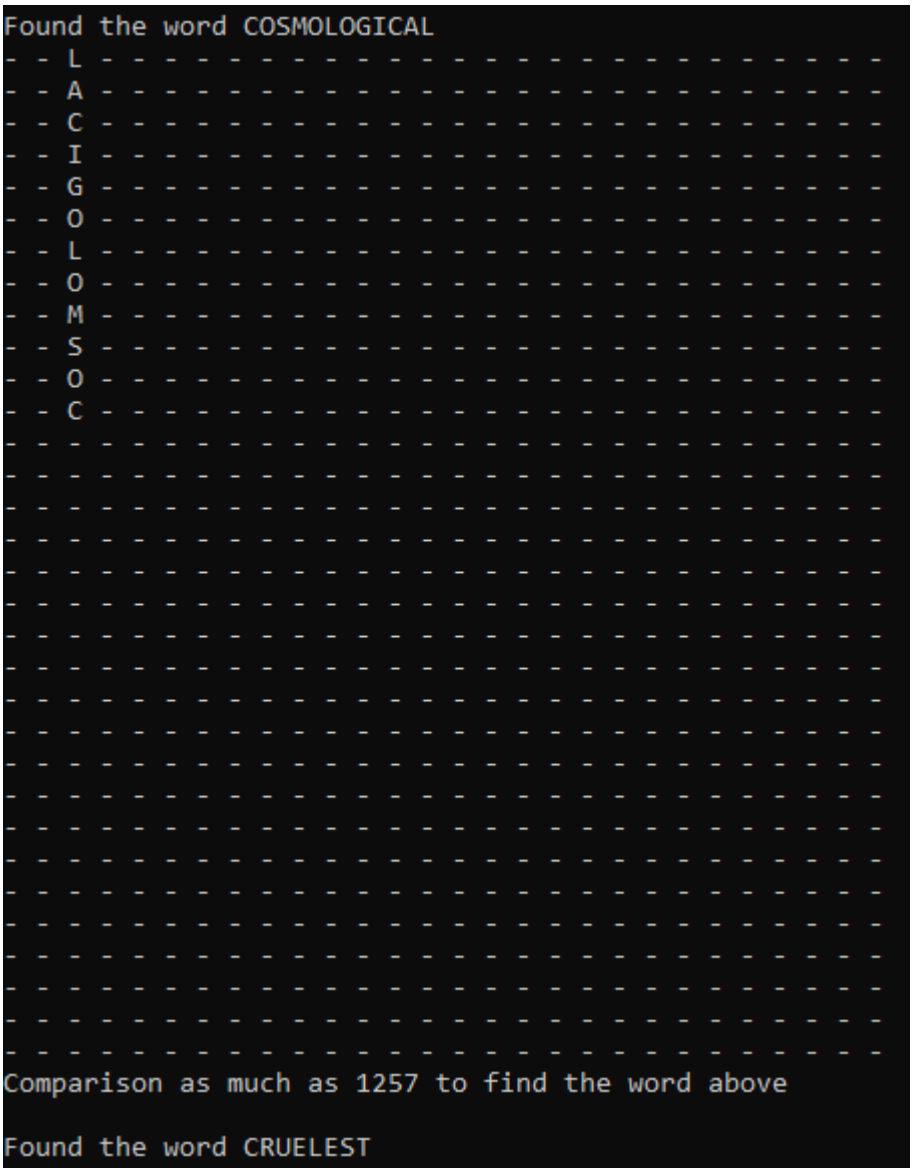

Found the word BEHALF
- - - - - - - B E H A L F - - - - - - - - - - - - - - -
Comparison as much as 1128 to find the word above
Found the word BLACK


Found the word BLACK
B
L
A
C
K
Comparison as much as 1130 to find the word above
Found the word BUDGETING


Found the word BUDGETING
Comparison as much as 1124 to find the word above
Found the word CLOUDY


Found the word CLOUDY
Y D U O L C
Comparison as much as 1245 to find the word above
Found the word CONFERENCE


Found the word CONFERENCE
Comparison as much as 1255 to find the word above
Found the word COSMOLOGICAL



```
Found the word COSMOLOGICAL
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- - A - - - - - - - - - - - - - - - - - - - - - - - - -
- - C - - - - - - - - - - - - - - - - - - - - - - - - -
- - I - - - - - - - - - - - - - - - - - - - - - - - - -
- - G - - - - - - - - - - - - - - - - - - - - - - - - -
- - O - - - - - - - - - - - - - - - - - - - - - - - - -
- - L - - - - - - - - - - - - - - - - - - - - - - - - -
- - O - - - - - - - - - - - - - - - - - - - - - - - - -
- - M - - - - - - - - - - - - - - - - - - - - - - - - -
- - S - - - - - - - - - - - - - - - - - - - - - - - - -
- - O - - - - - - - - - - - - - - - - - - - - - - - - -
- - C - - - - - - - - - - - - - - - - - - - - - - - - -
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Comparison as much as 1257 to find the word above

Found the word CRUELEST
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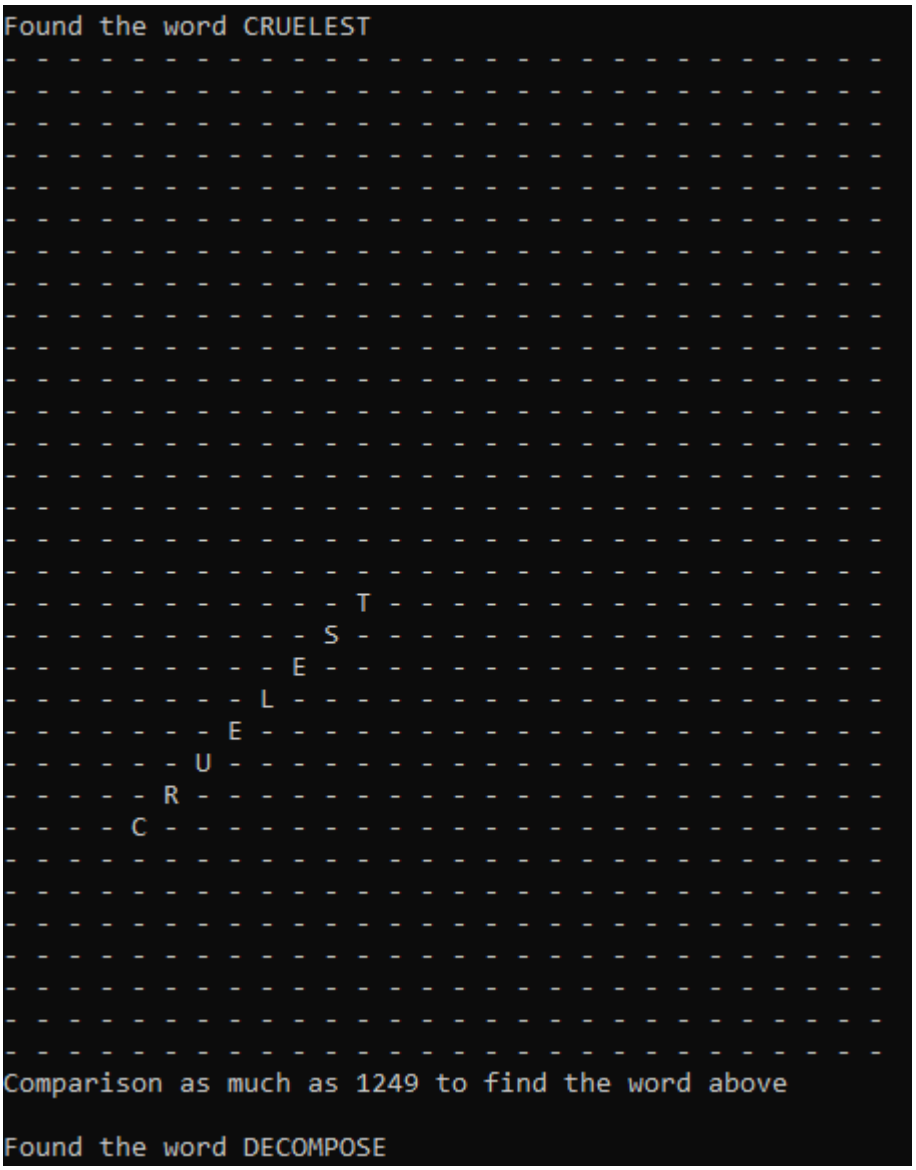
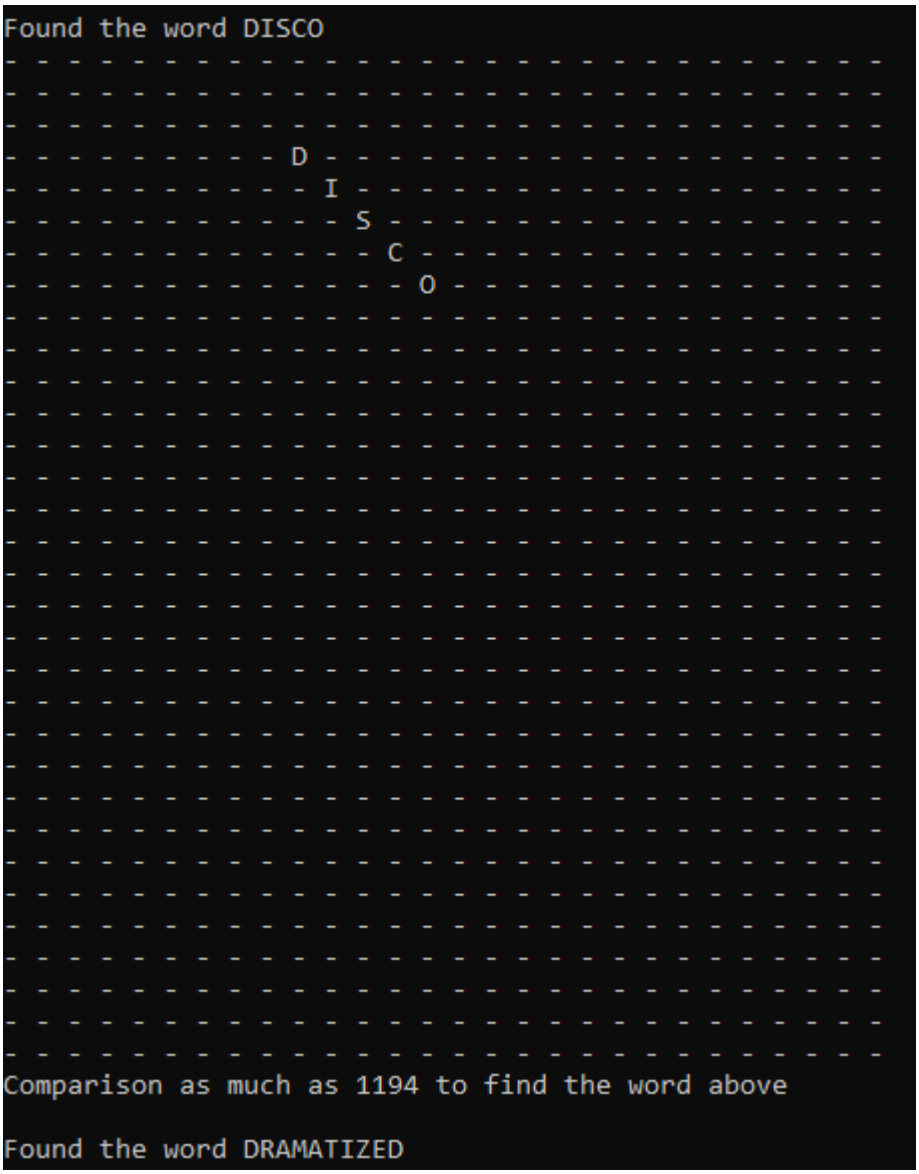
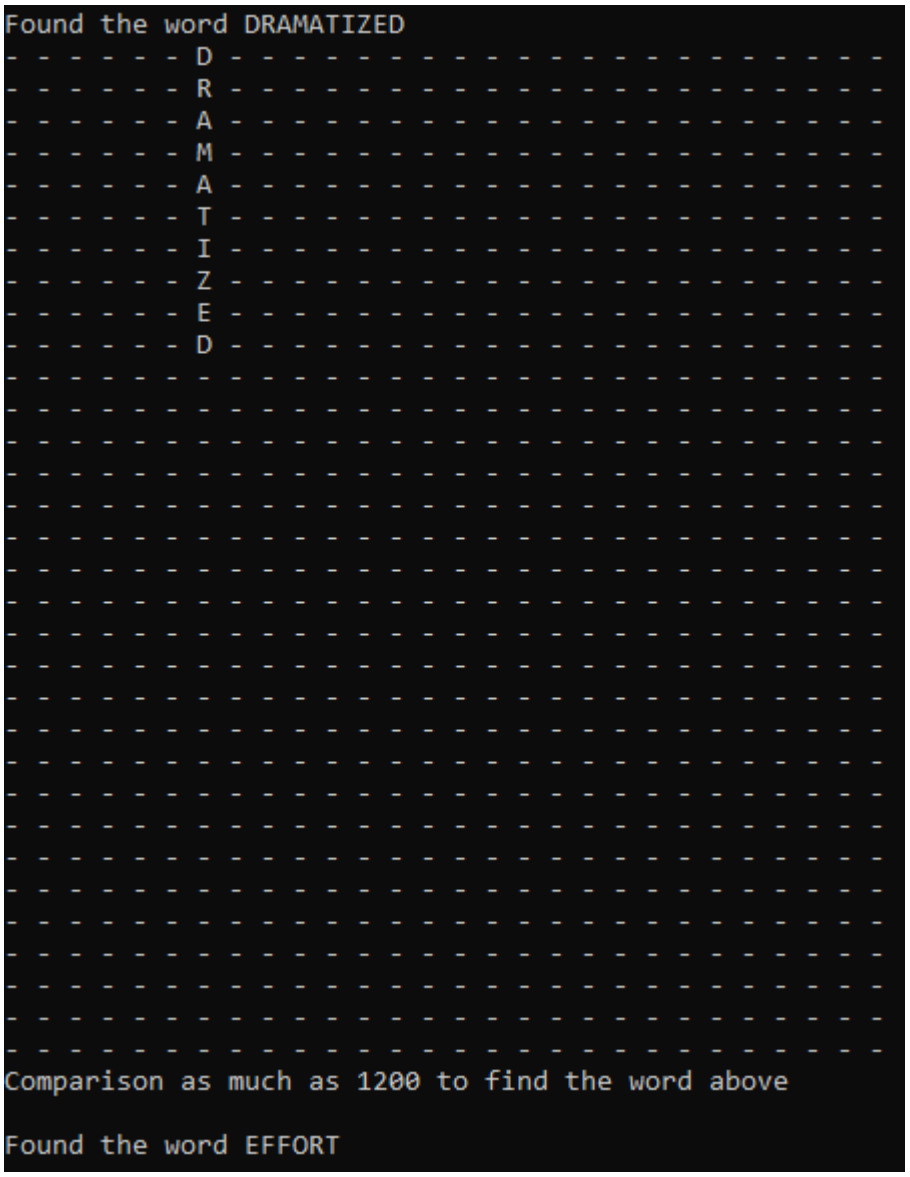
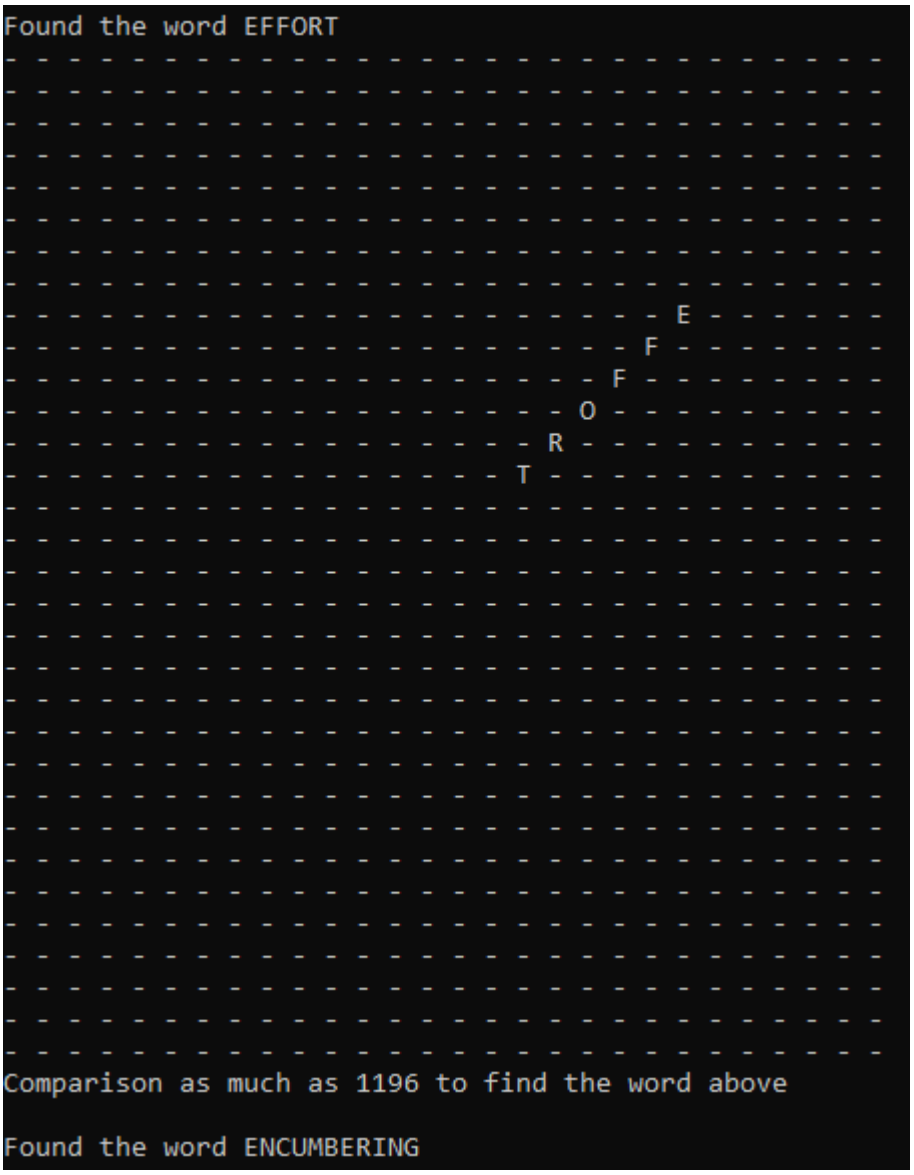
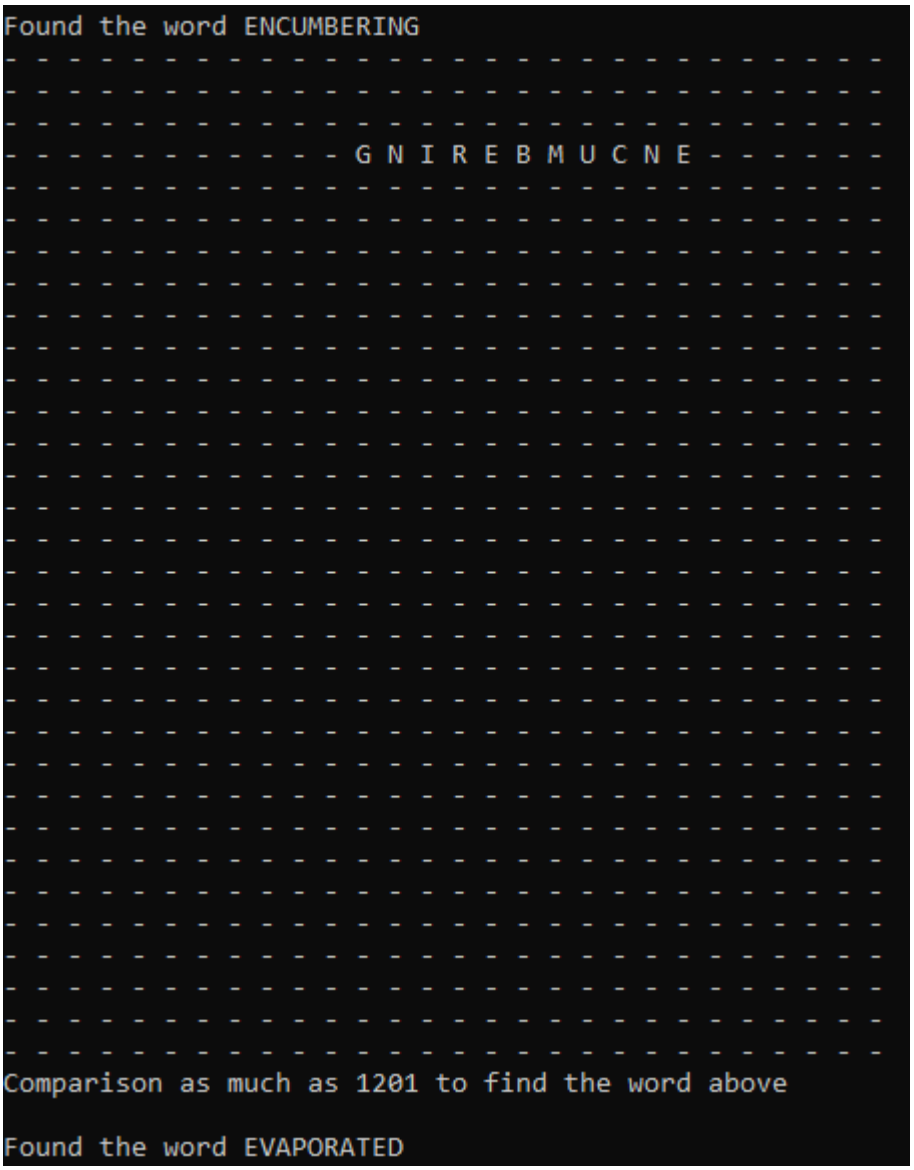

Found the word CRUELEST
Comparison as much as 1249 to find the word above
Found the word DECOMPOSE

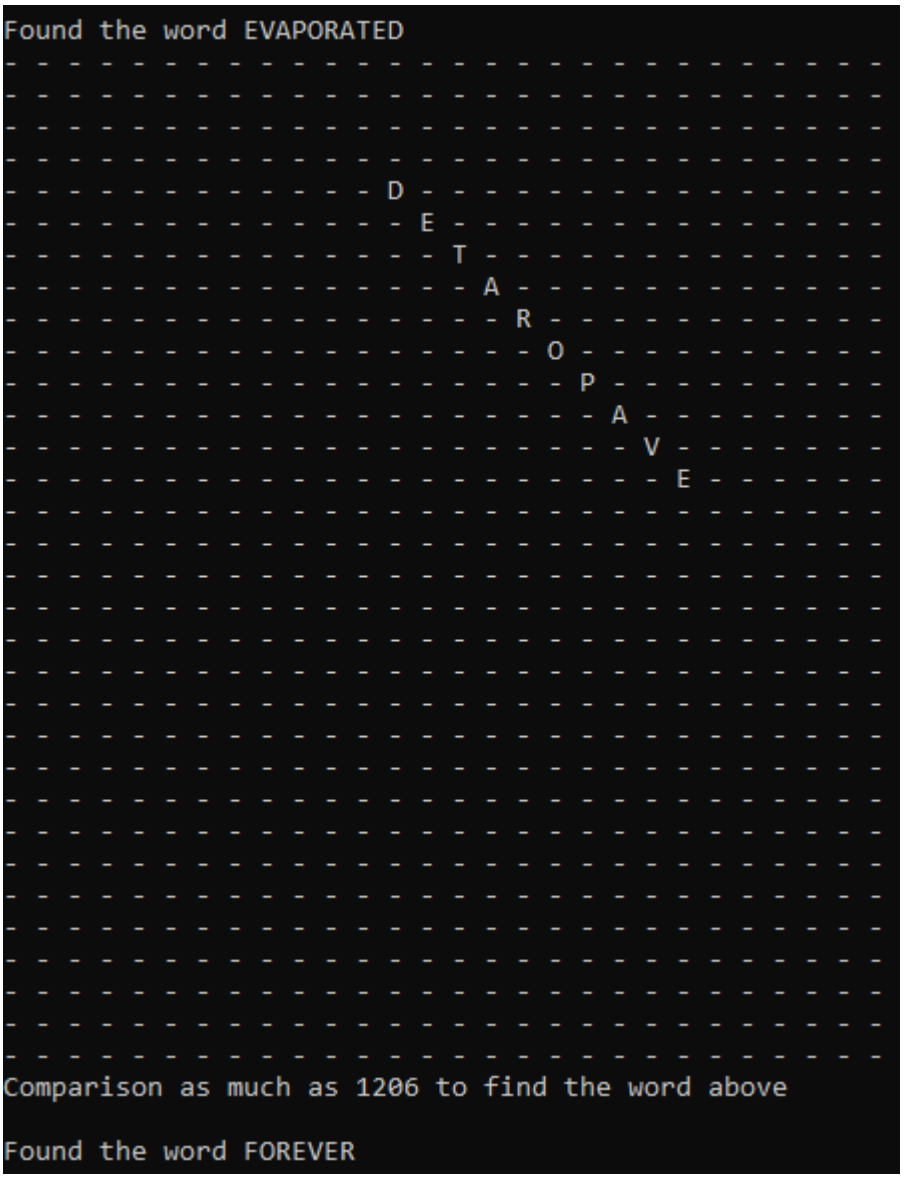

Found the word DECOMPOSE
D E C O M P O S E
Comparison as much as 1203 to find the word above
Found the word DISCO

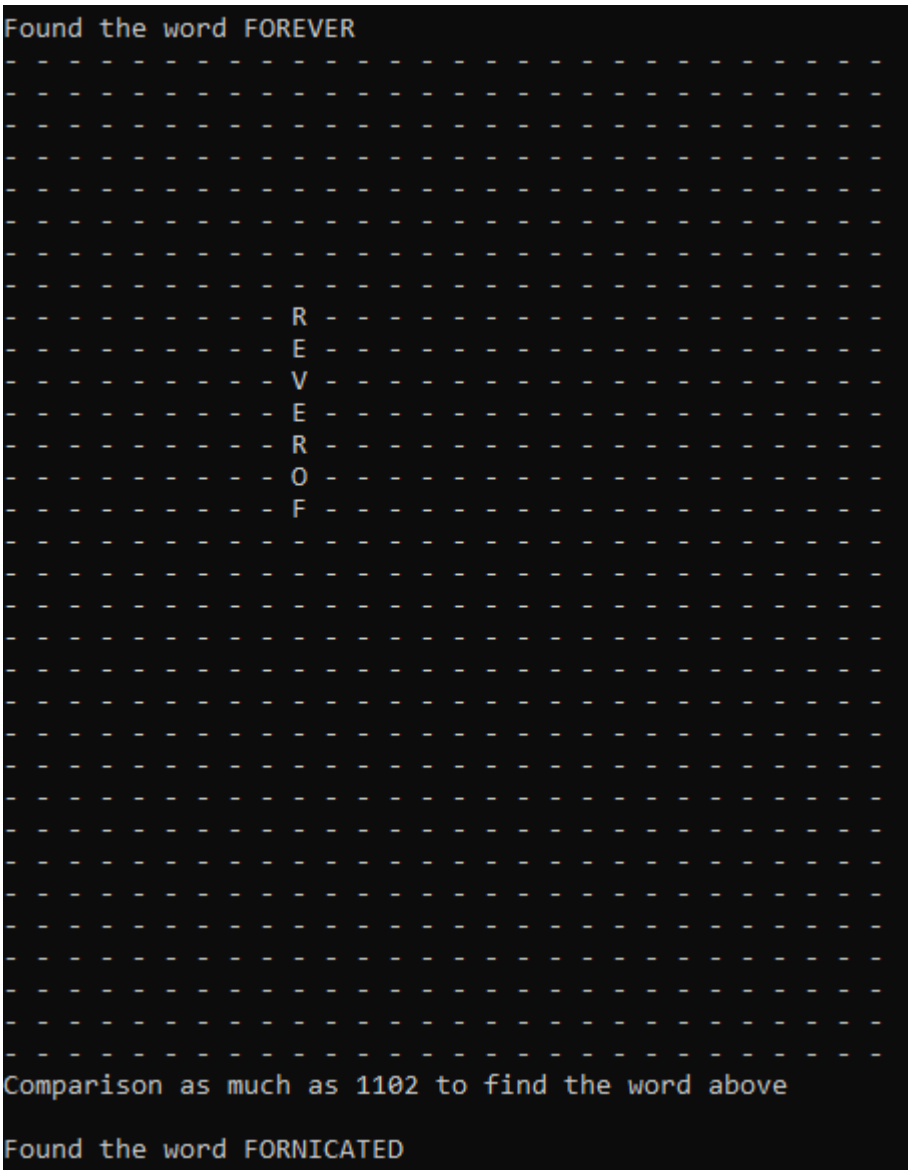

Found the word DISCO
Comparison as much as 1194 to find the word above
Found the word DRAMATIZED

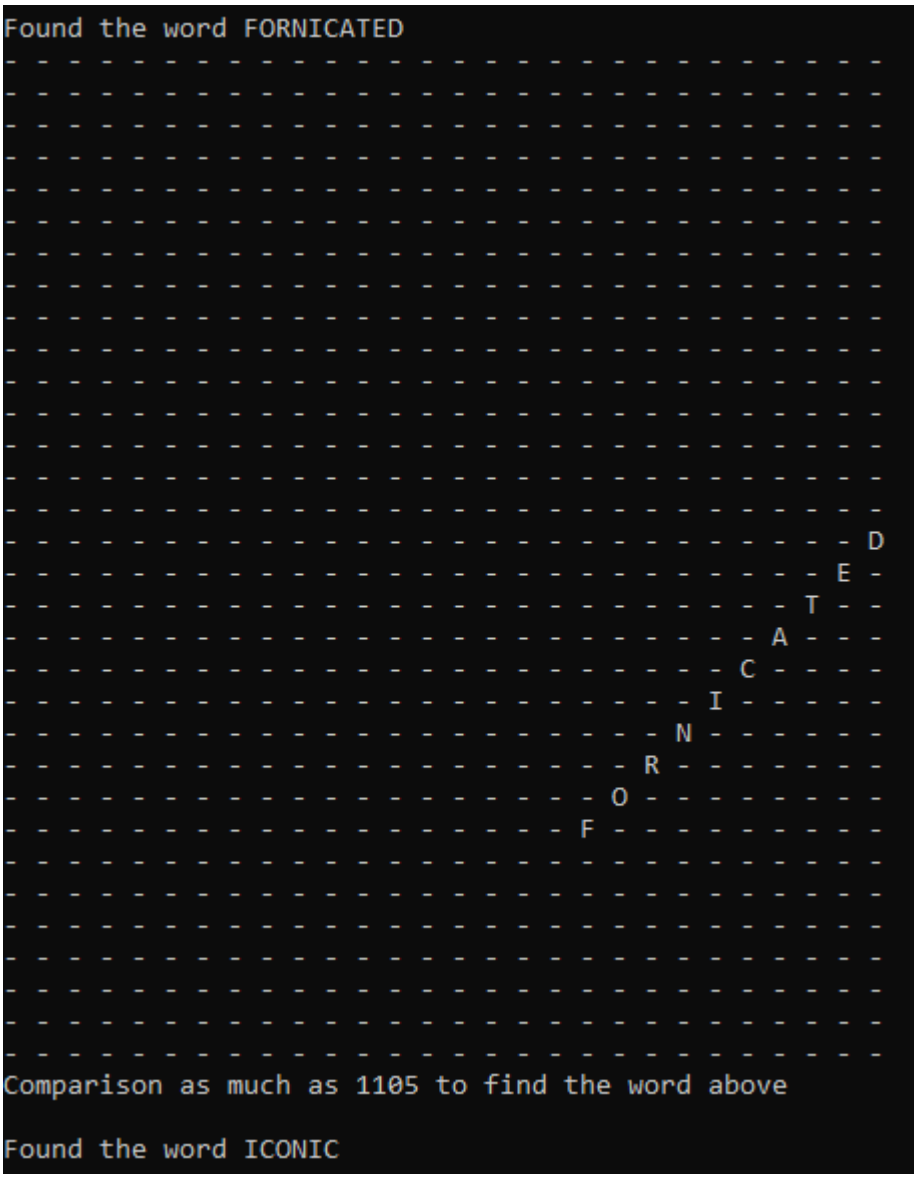

Found the word DRAMATIZED
D
R
A
M
A
T
I
Z
E
D
Comparison as much as 1200 to find the word above
Found the word EFFORT


Found the word EFFORT
Comparison as much as 1196 to find the word above
Found the word ENCUMBERING


Found the word ENCUMBERING
G N I R E B M U C N E
Comparison as much as 1201 to find the word above
Found the word EVAPORATED

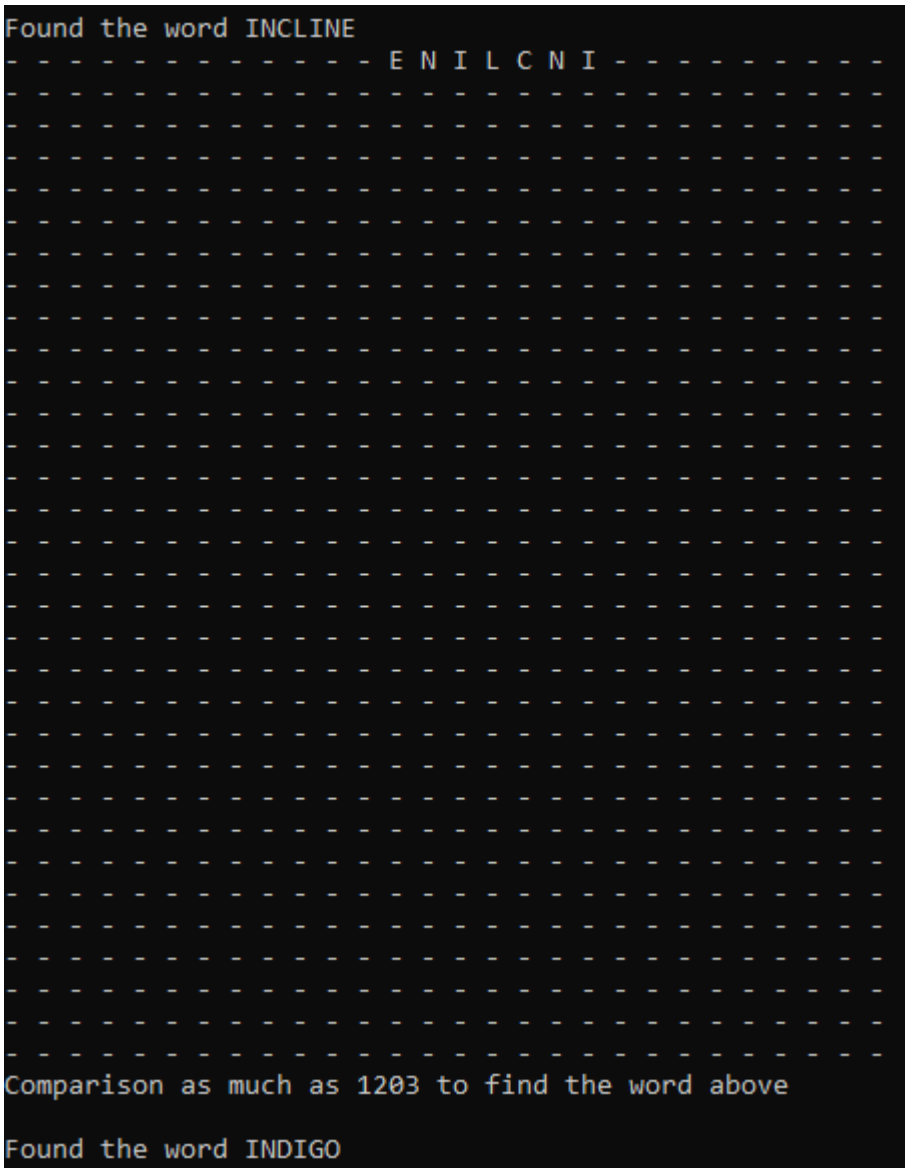

Found the word EVAPORATED
D
E
T
A
R
O
P
A
V
E
Comparison as much as 1206 to find the word above
Found the word FOREVER

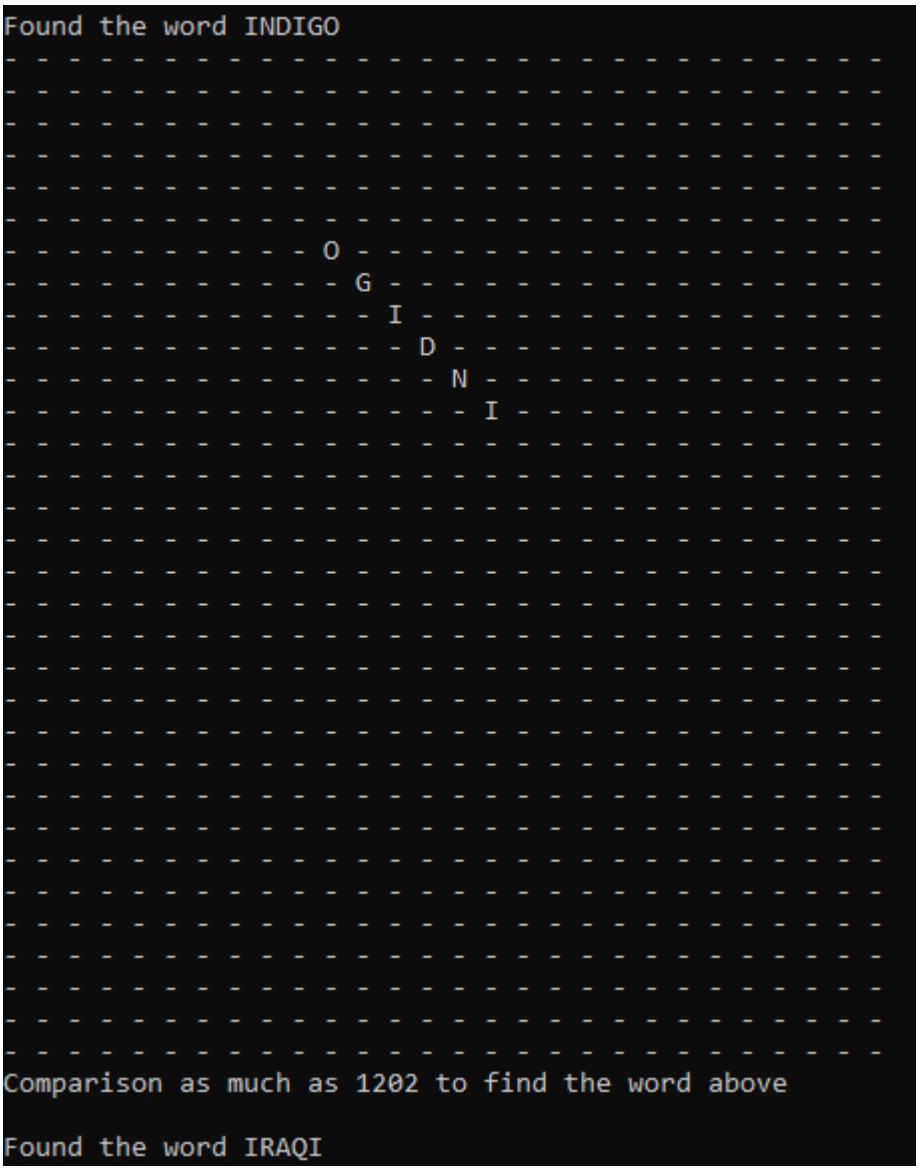

Found the word FOREVER
R
E
V
E
R
O
F
Comparison as much as 1102 to find the word above
Found the word FORNICATED


Found the word FORNICATED
Comparison as much as 1105 to find the word above
Found the word ICONIC


Found the word ICONIC
Comparison as much as 1213 to find the word above
Found the word IMPELLED


Found the word IMPELLED
Comparison as much as 1194 to find the word above
Found the word INCLINE


Found the word INCLINE
E N I L C N I
Comparison as much as 1203 to find the word above
Found the word INDIGO


Found the word INDIGO
O
G
I
D
N
I
Comparison as much as 1202 to find the word above
Found the word IRAQI

8. Ukuran 35 x 34

   Input:

large3.txt

test > large3.txt

```
H I E K J W S Z X Y X T U G W R J R B T D J N J P S F F P L F O A
L M R I Z V L E J S P O I N A H W N R Q O N E O D E C Z B Z F D U
G L O K G N J F M P F C K O E O O E A G Q L L E F S W M O D P T U
M N H U W L P B V Q R G T R P G C Q C U W I A V E S P I R J A P P
W D S C G Z O N U A S C O A C A G M D A T M S E U I B N Y H A V Y
E T N M W W K A X J N I N S P C L W N E A A L Y Z O H G N Z G S A
R E O H E R E X N O I T A L U D O M S T Y M P V J N R L J S U O A
P E R S I A R A C P X B N I Y Y U T Z C K E N Y C E U C J Z F A C
S D D U T N T Z O L A D Y O U B N S X F O G L S N Y K M Y X N P M
R E G L X Z R C Q O E D I V W R I C O Q O Z E Y A E Q A A M O W S
D K Q V Z U H T W Q V Q X T N T F J E B P P S V U N J Q I S H O A
D R H U Q Q U M P A H S P L M G Y A E G S I Q X F O W Y B P M N R
P Z G V E M L Z Q X M C A N E Y I W S D T A N G V P N B A J E E D
C E P Y N L A N F A B E P Y N V N U E W M Z D W S H W G J V C J V
S K G D U J Z S C H E D U L E D G Z J N G E V J J S S Q D L Q P K
M U Y O F V Y H M G P R G T O U I J R J O Z O Q H O M L F S W B U
Z J W T L L I E Q U F Q U T B R C O O V W I I N B H L W F U U Z U
D C K V W N P K W I A K M X I Z C D J M G N T J T L L C O U A K E
L X G Y A U P I R G X C J T H B O I T Z I C A A D I N N E U T I J
N F K T R T O S R Z B P A J E Q Y I B Y K Z X L V R A J E K P R B
J T I J L Z X P A E T S I D S T F W R E D F R V C I A D E C N B N
H O Z J P E P O W N X Z M N T N E M E N I F E R I Q T M T U R L N
N P P I K K T D B F N D X X T Q C R D P Z G Z J M N C O L W I M P
A W B L E G Z K V S P Z H E W O O R W N H K L R K Z G S M V O N G
O Y J Z J I Z Y I A N F N C T M N K N Z M D Z B Y S M E L T D X C
K E Z O Y F Q M O I D S M O Q R K R L C Y Y Z C D K F Y H D J B Q
A B F Z O D K M F A V O S Y P L N W E A I F U B T V C Z N Q F W S
O T F K L A V V T B Y T K P N T U N C Y M R K O P Z Q A V G J W U
N B L B U A B J O A Y V Q M D X Y N S V F O Y R T U A P S D L P V
G G J B K R I W S Y P U X T Q N U I I V H A C C B O G R O D W V S
U X O S J L O K Q P S U A G Q V S X R F B Q U B H A H Z J S A B L
N I T X A M Q A B B O H A M V T A K G T Y O E Q P T U B X V F S T
W Y H P L L K E Q I P S I H E S Y R C O I F N L D E P A U A R S V
W W A H P U L B Y J C C L R Y L H S I V A L S S V A U N D A R C W
L D P A C Z J G E I L V K C Q C B K L A E O L O N I I F H U H G V

MACHINATION
MODULATION
MOTIVATION
ONSHORE
PACER
PERSIA
PINT
POKER
POLITEST
REFINEMENT
SADSACK
SARONG
SATIRIZED
SCHEDULED
SEQUEL
```

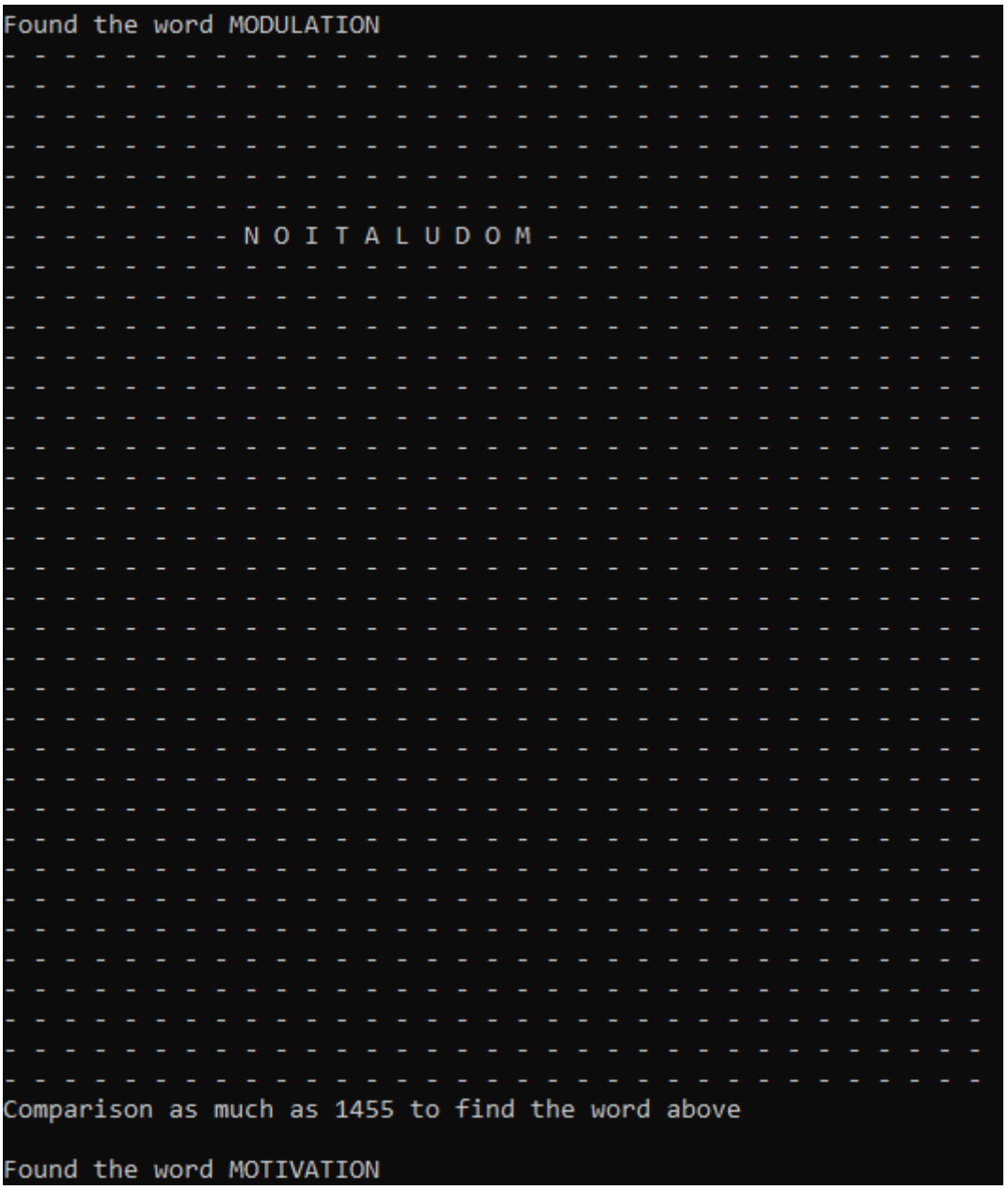
large3.txt

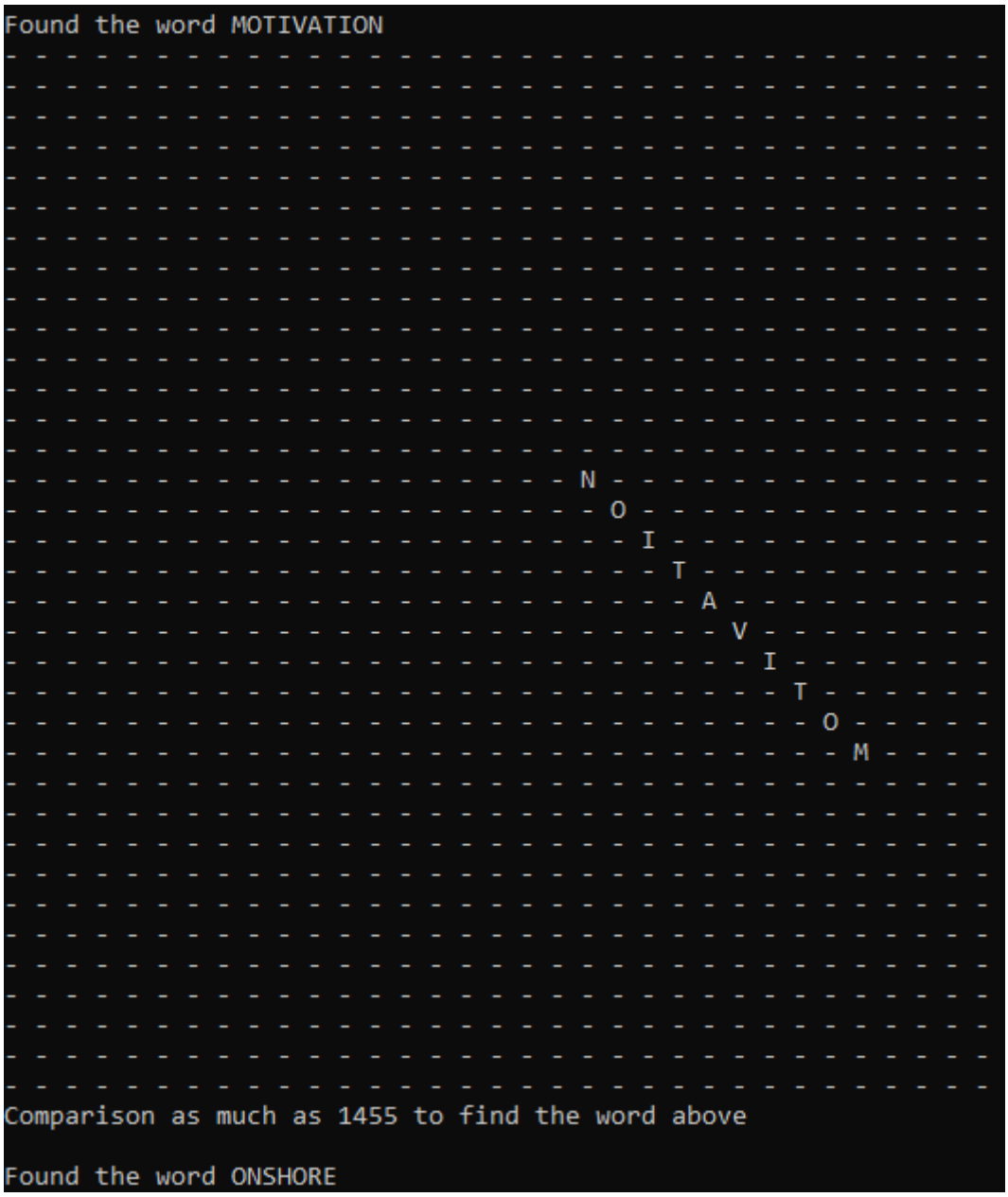
test > large3.txt

```
SCHEDULED
SEQUEL
SESSION
SISTER
SLAVISHLY
SNOB
SPOOKY
SYNERGY
TANG
UNIFYING
UTAH
VIDEO
ZEALOT
```

Output:


Enter the file name without typing the extension (make sure the file is in the test folder and has a .txt extension)
Example : test1
>> large3
Here are all the words found in the puzzle.
Found the word MACHINATION
Comparison as much as 1454 to find the word above
Found the word MODULATION


Found the word MODULATION
N O I T A L U D O M
Comparison as much as 1455 to find the word above
Found the word MOTIVATION


Found the word MOTIVATION
N
O
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V
I
T
O
M
Comparison as much as 1455 to find the word above
Found the word ONSHORE

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Found the word ONSHORE
- - E - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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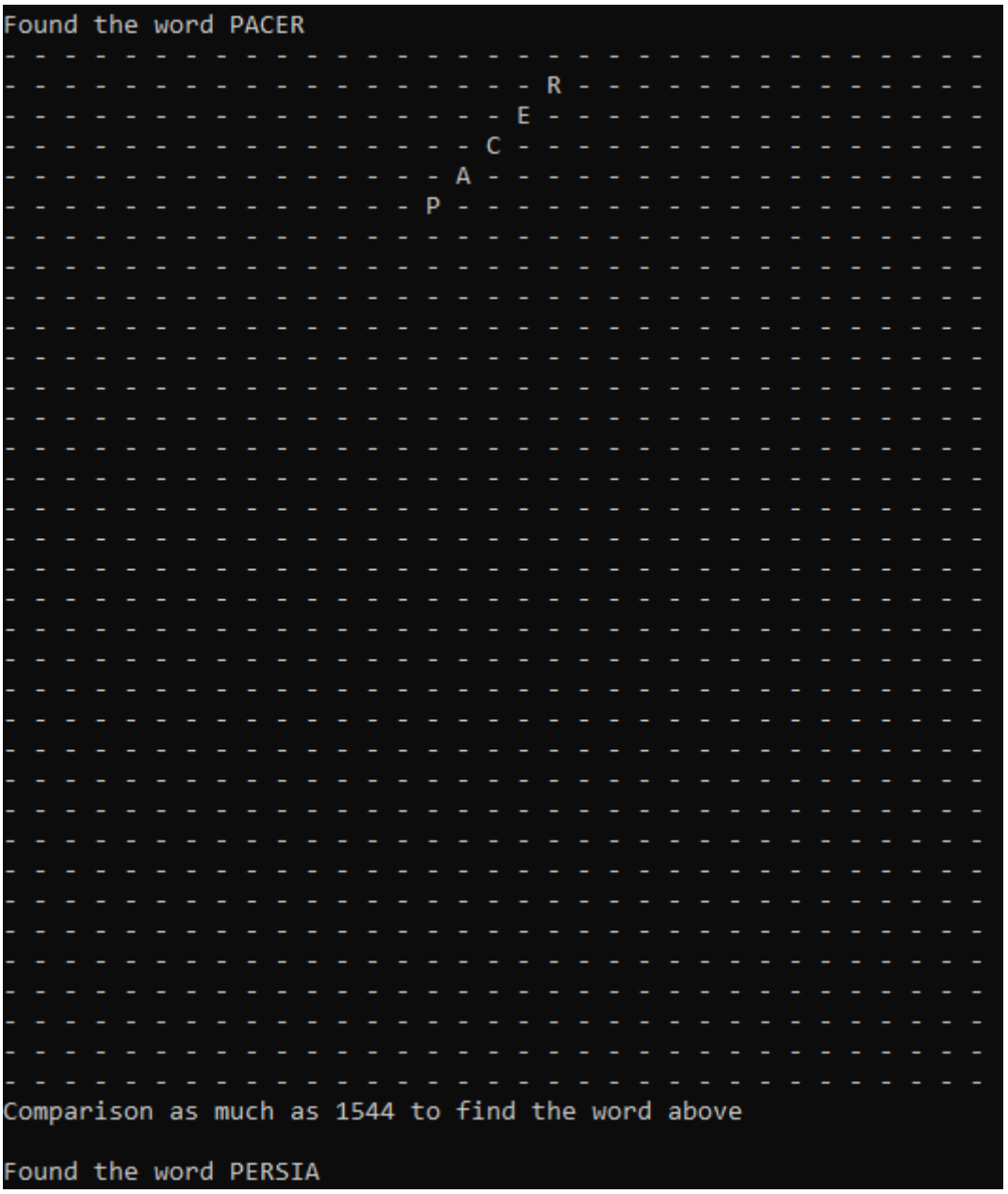
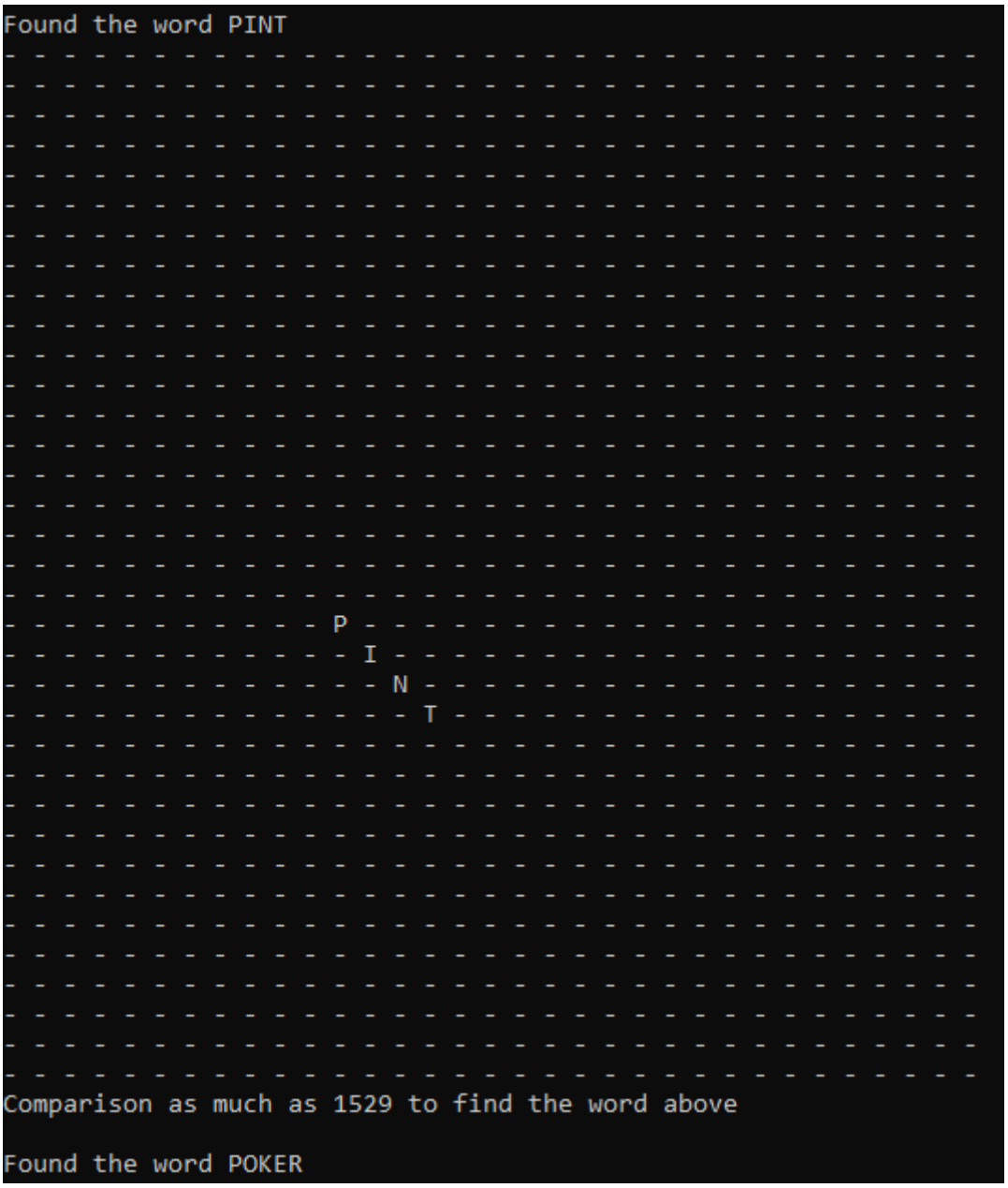
Comparison as much as 1607 to find the word above

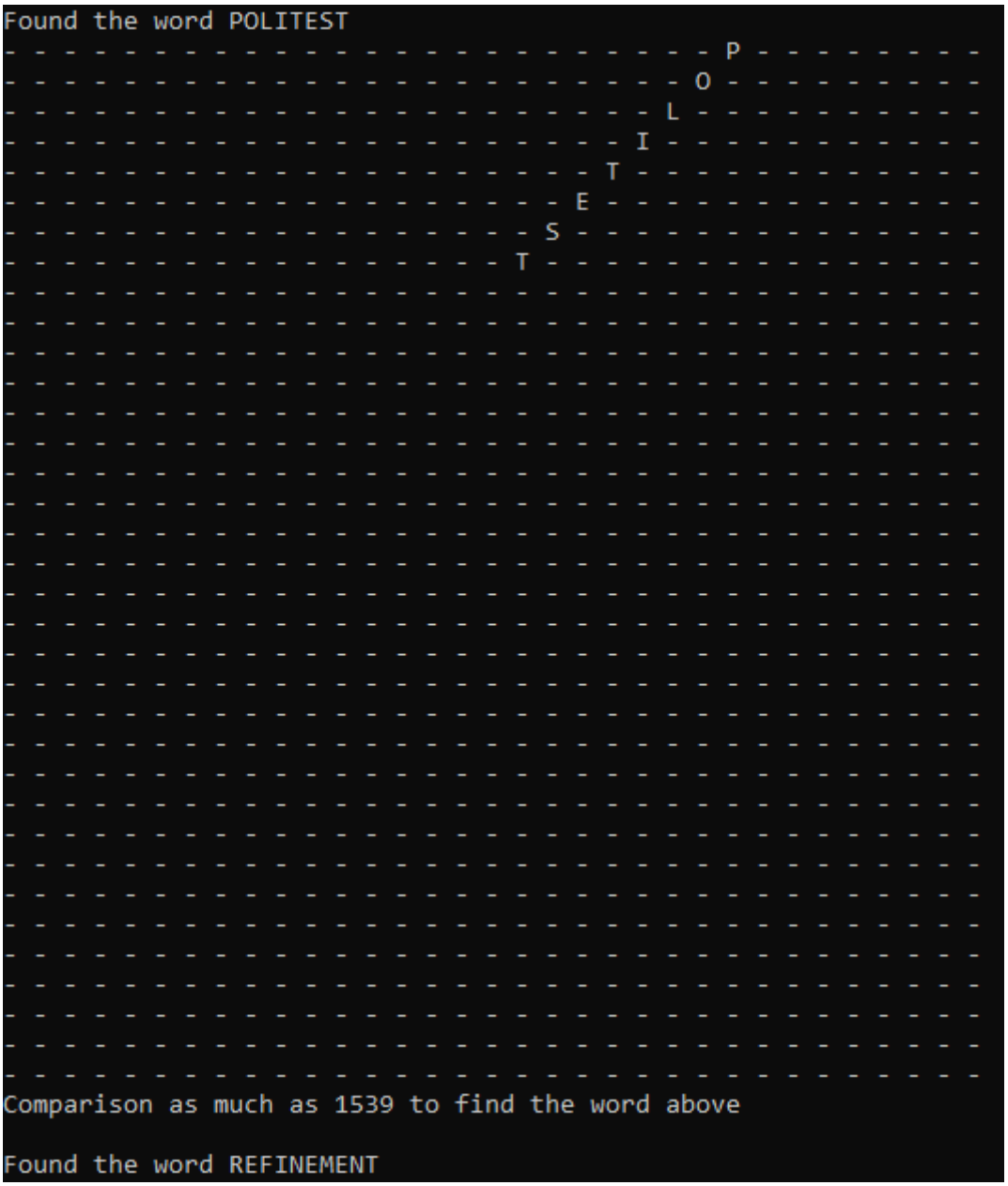
Found the word PACER
```

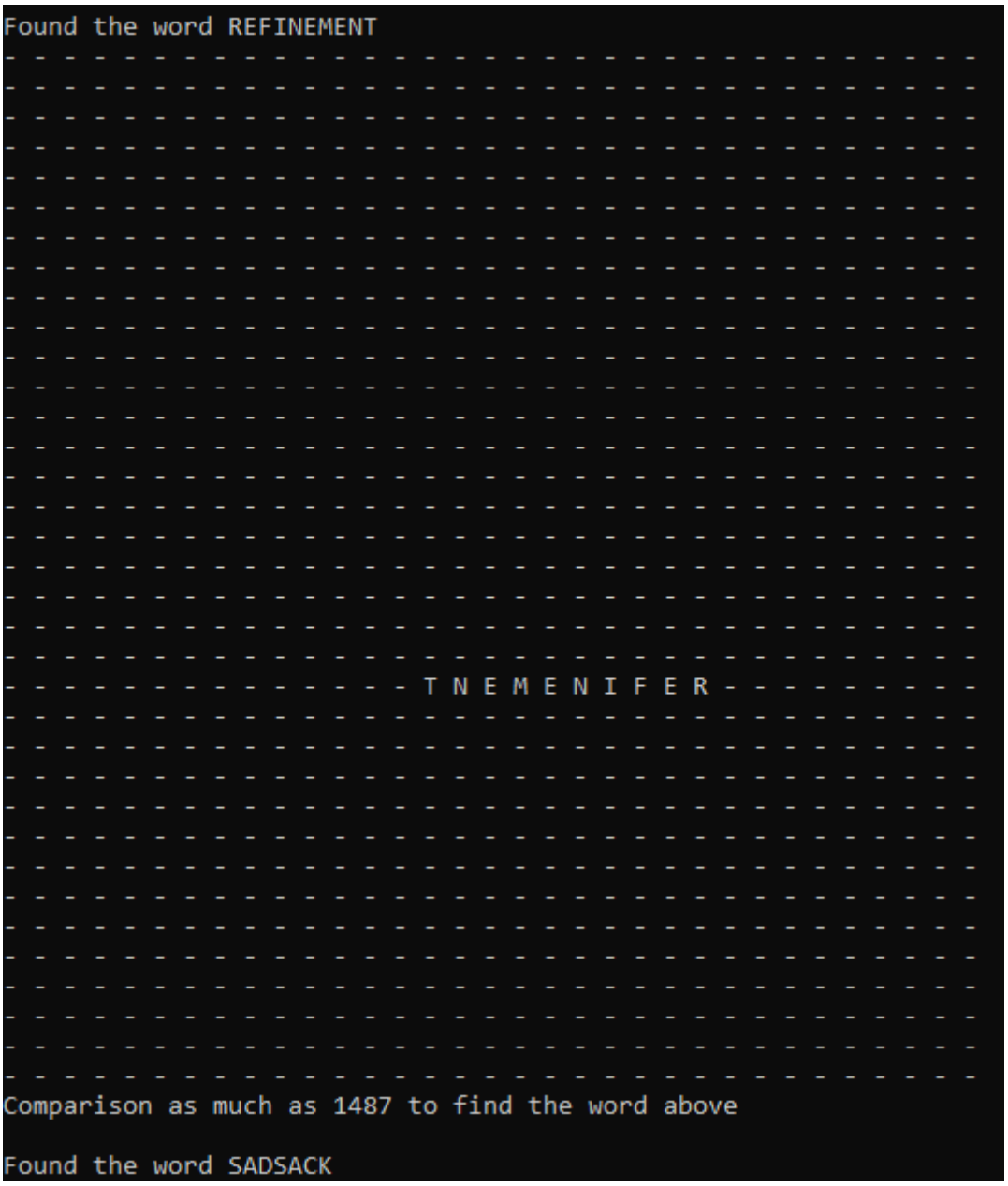

Found the word PACER
R
E
C
A
P
Comparison as much as 1544 to find the word above
Found the word PERSIA

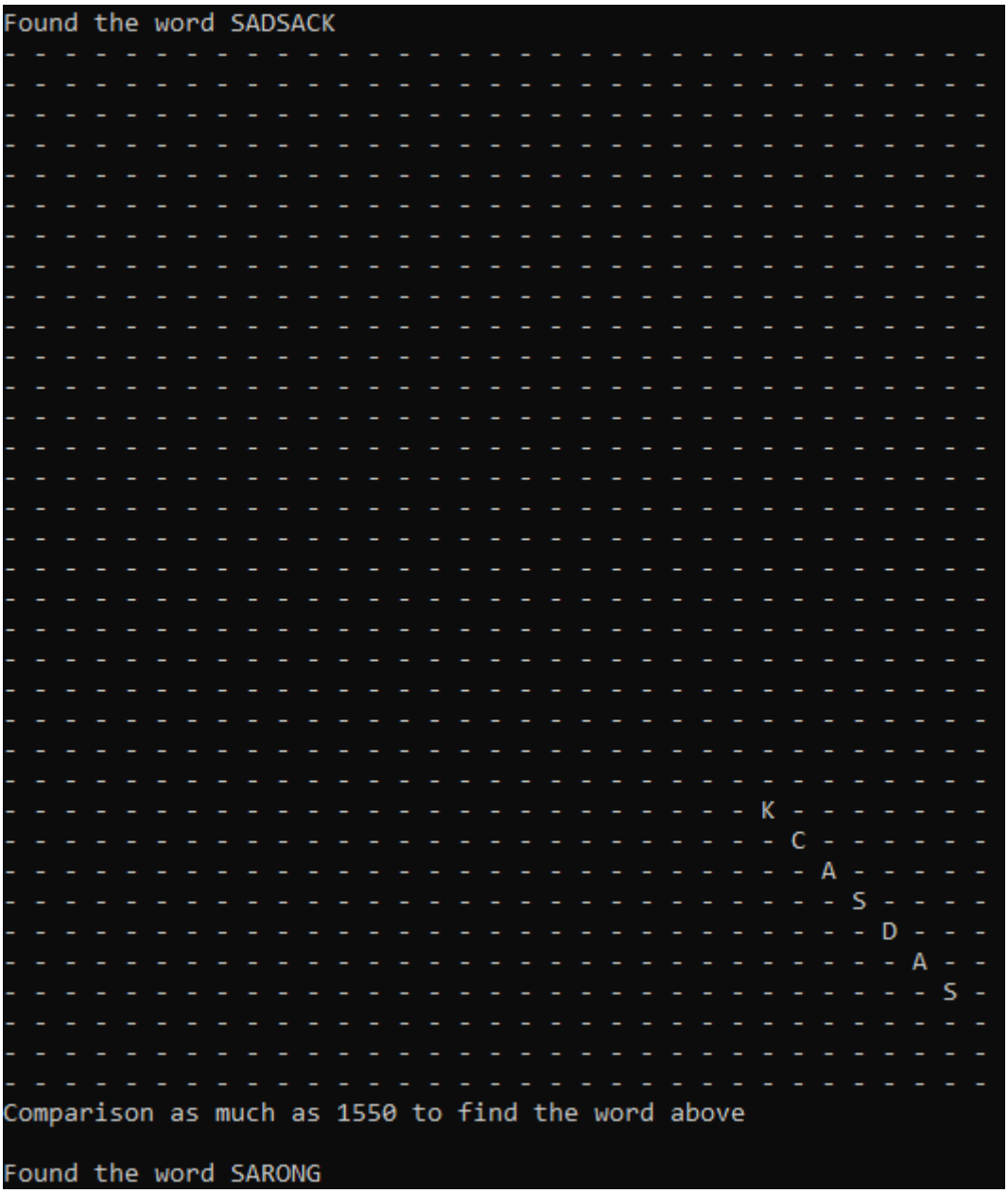

Found the word PERSIA
P E R S I A
Comparison as much as 1532 to find the word above
Found the word PINT

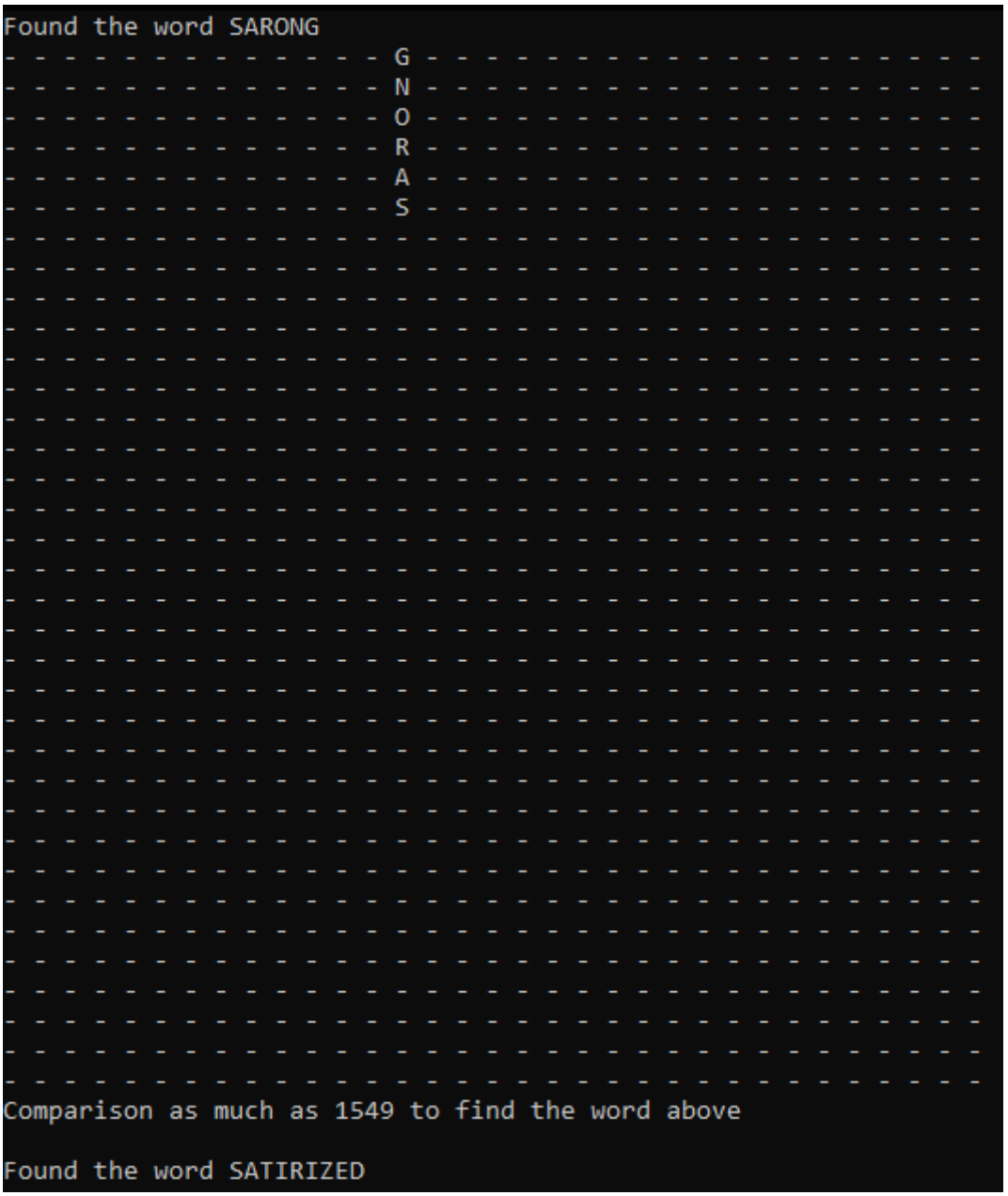

Found the word PINT
P
I
N
T
Comparison as much as 1529 to find the word above
Found the word POKER

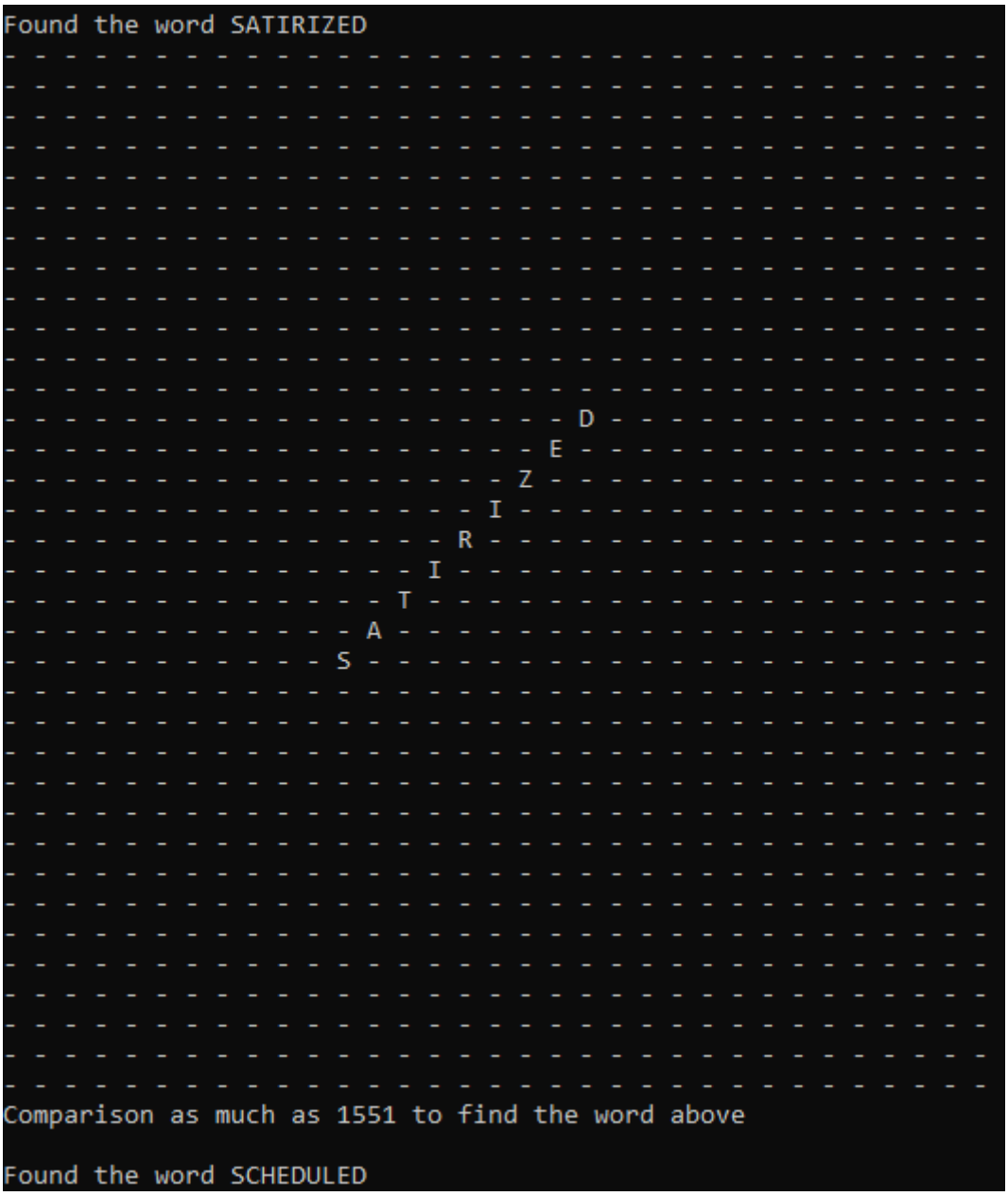

Found the word POKER
P
O
K
E
R
Comparison as much as 1537 to find the word above
Found the word POLITEST

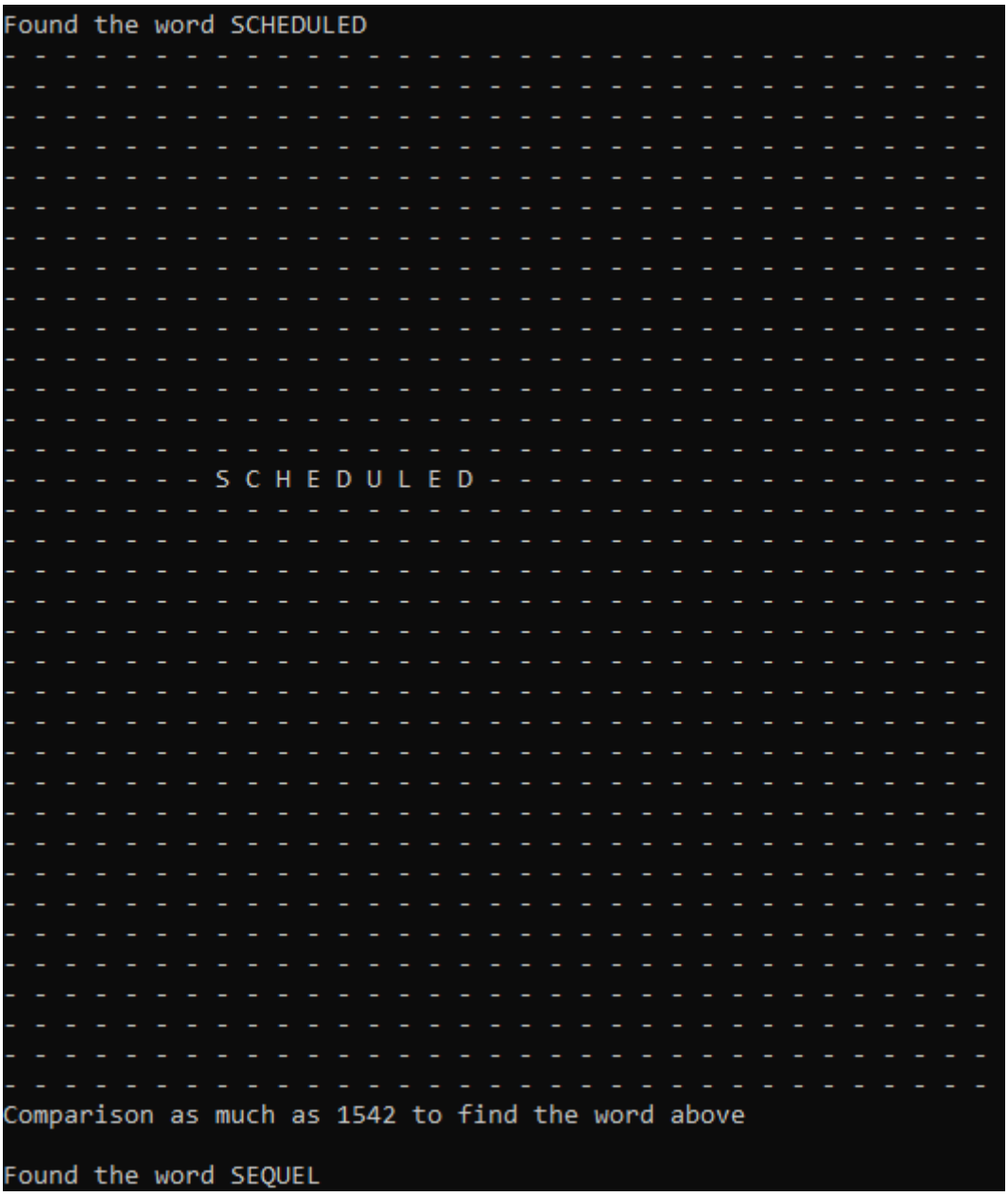

Found the word POLITEST
P
O
L
I
T
E
S
T
Comparison as much as 1539 to find the word above
Found the word REFINEMENT

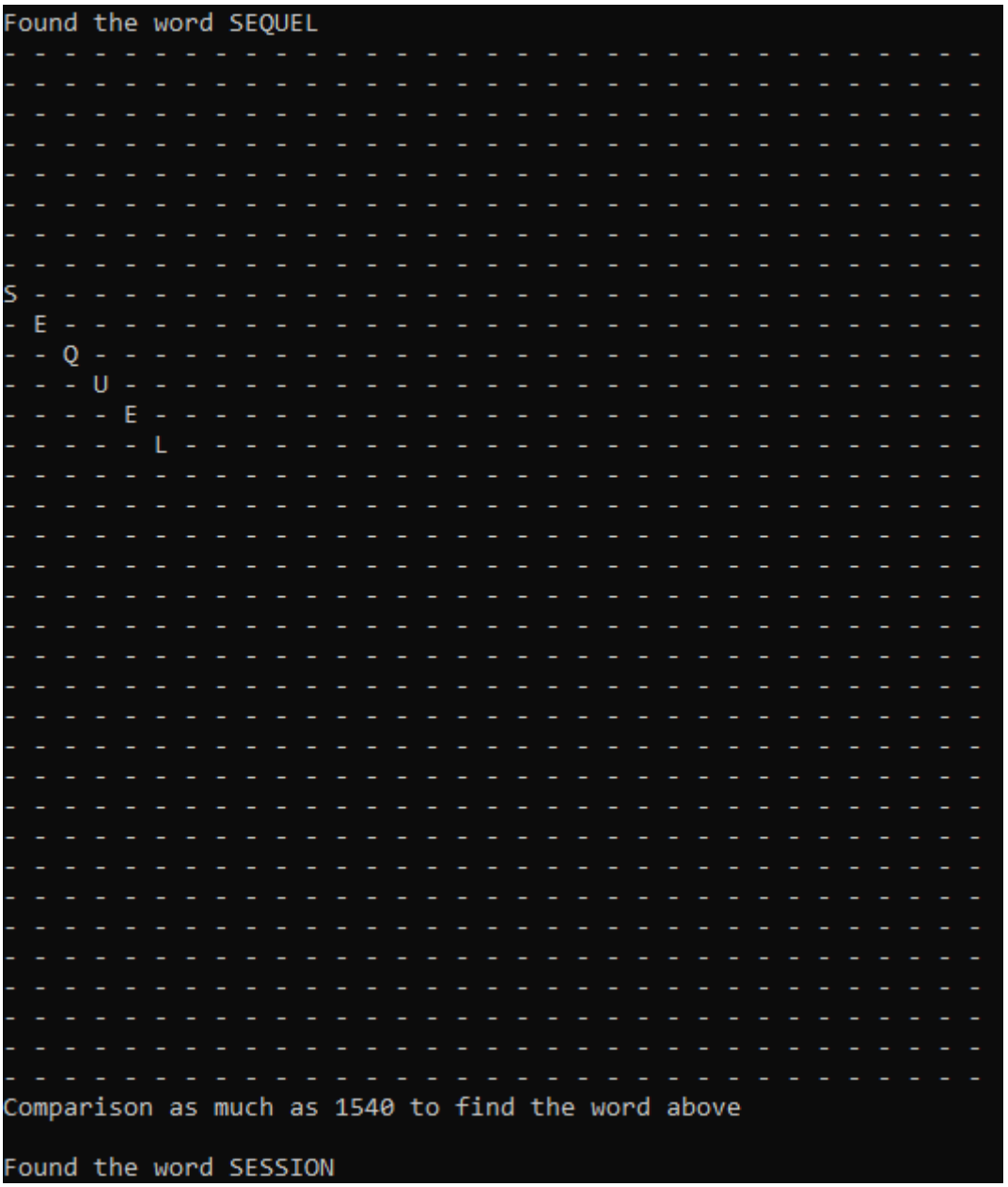

Found the word REFINEMENT
T N E M E N I F E R
Comparison as much as 1487 to find the word above
Found the word SADSACK

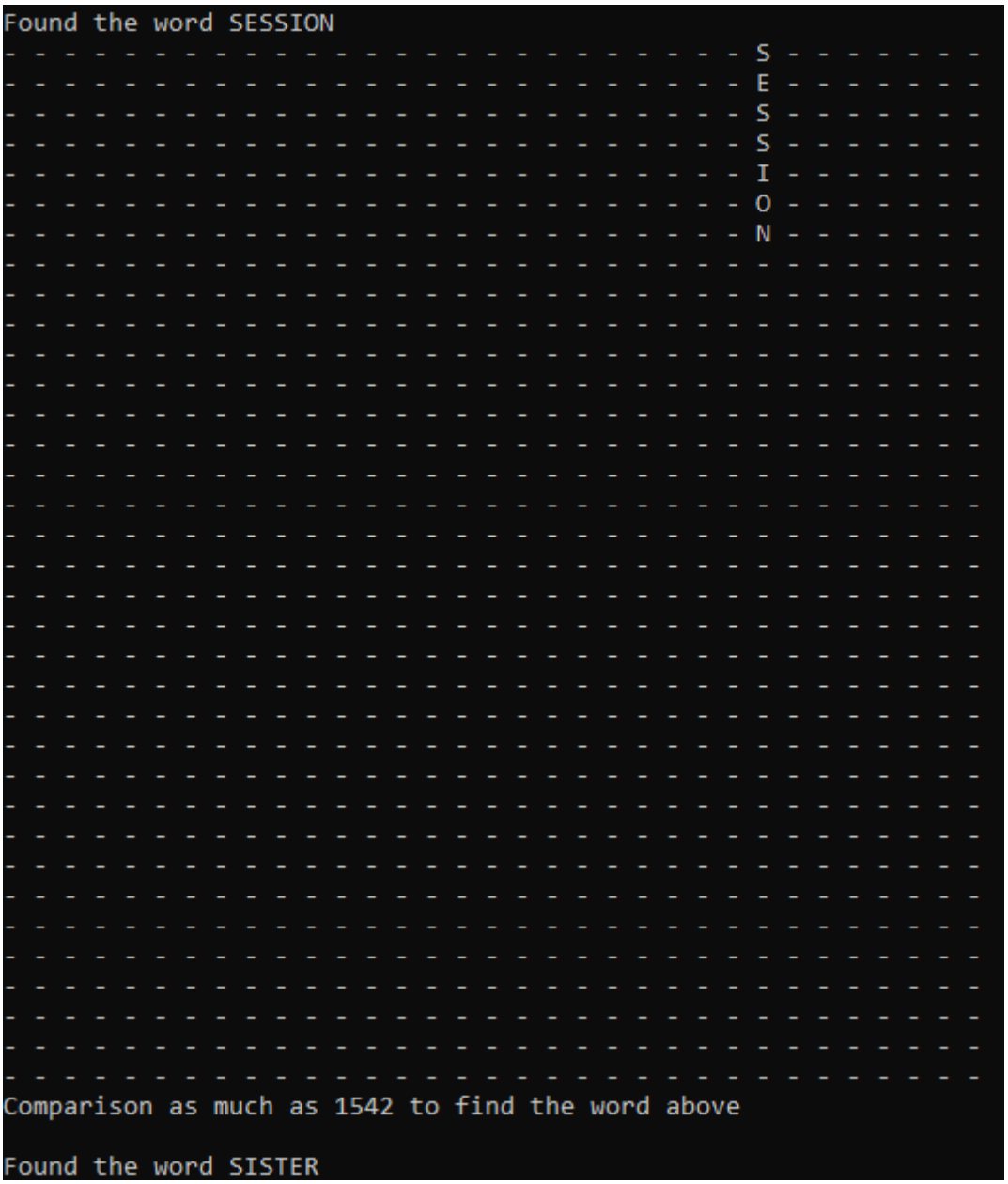

Found the word SADSACK
Comparison as much as 1550 to find the word above
Found the word SARONG

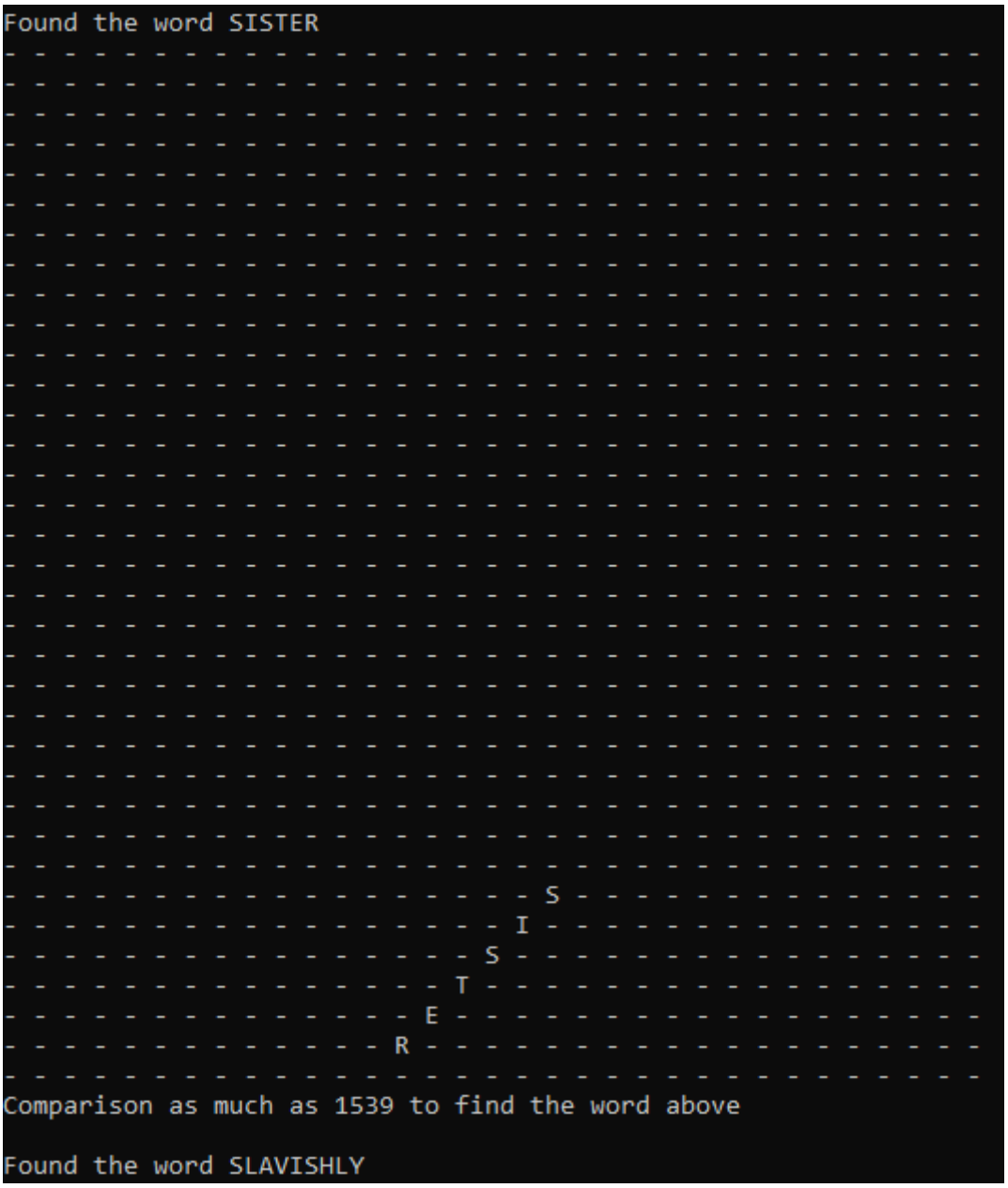

Found the word SARONG
G
N
O
R
A
S
Comparison as much as 1549 to find the word above
Found the word SATIRIZED


Found the word SATIRIZED
D
E
Z
I
R
I
T
A
S
Comparison as much as 1551 to find the word above
Found the word SCHEDULED


Found the word SCHEDULED
S C H E D U L E D
Comparison as much as 1542 to find the word above
Found the word SEQUEL


Found the word SEQUEL
S
E
Q
U
E
L
Comparison as much as 1540 to find the word above
Found the word SESSION


Found the word SESSION
S
E
S
S
I
O
N
Comparison as much as 1542 to find the word above
Found the word SISTER


Found the word SISTER
Comparison as much as 1539 to find the word above
Found the word SLAVISHLY

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Found the word SLAVISHLY
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- - - - - - - - - - - - - - Y L H S I V A L S - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Comparison as much as 1543 to find the word above

Found the word SNOB
```
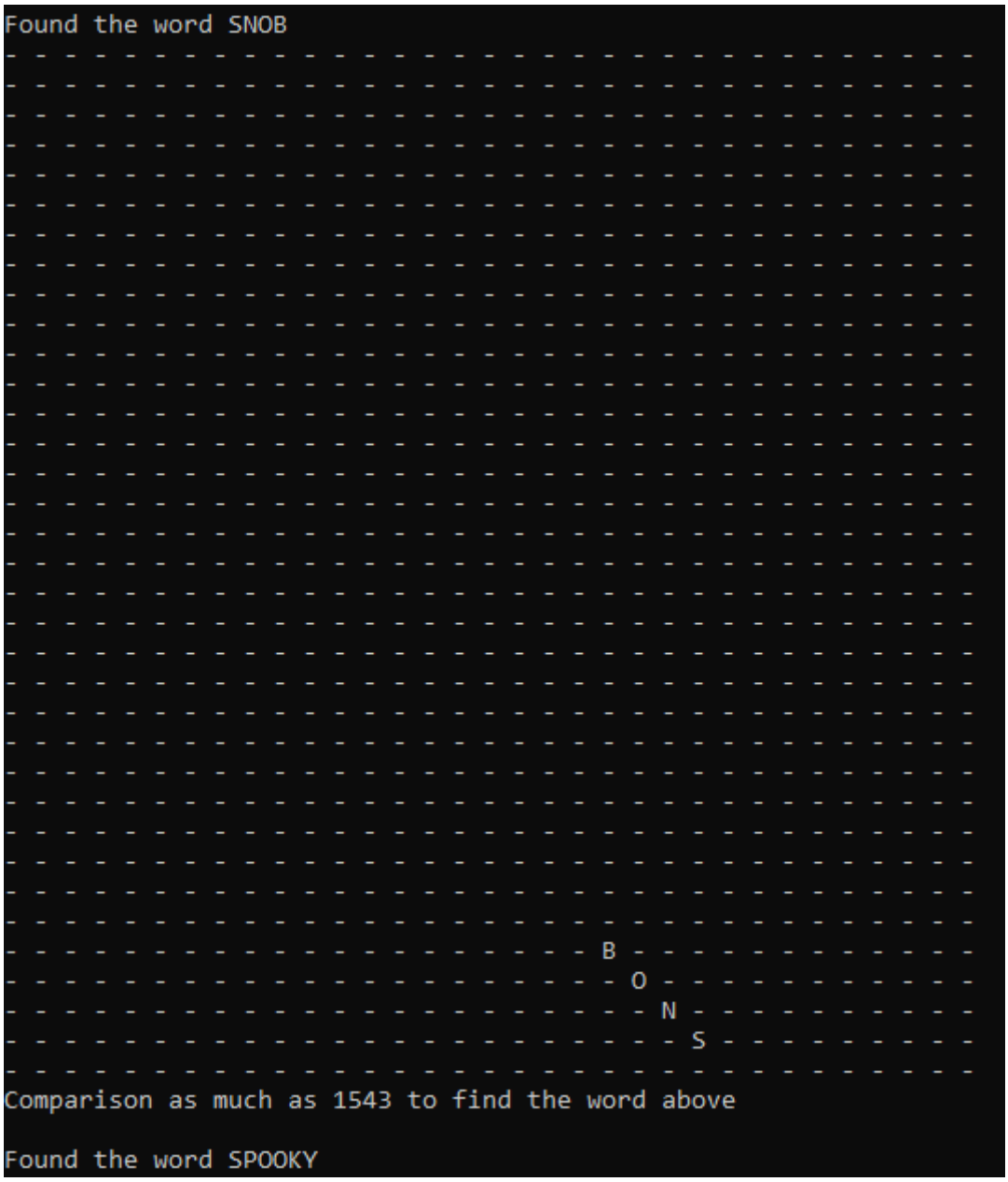
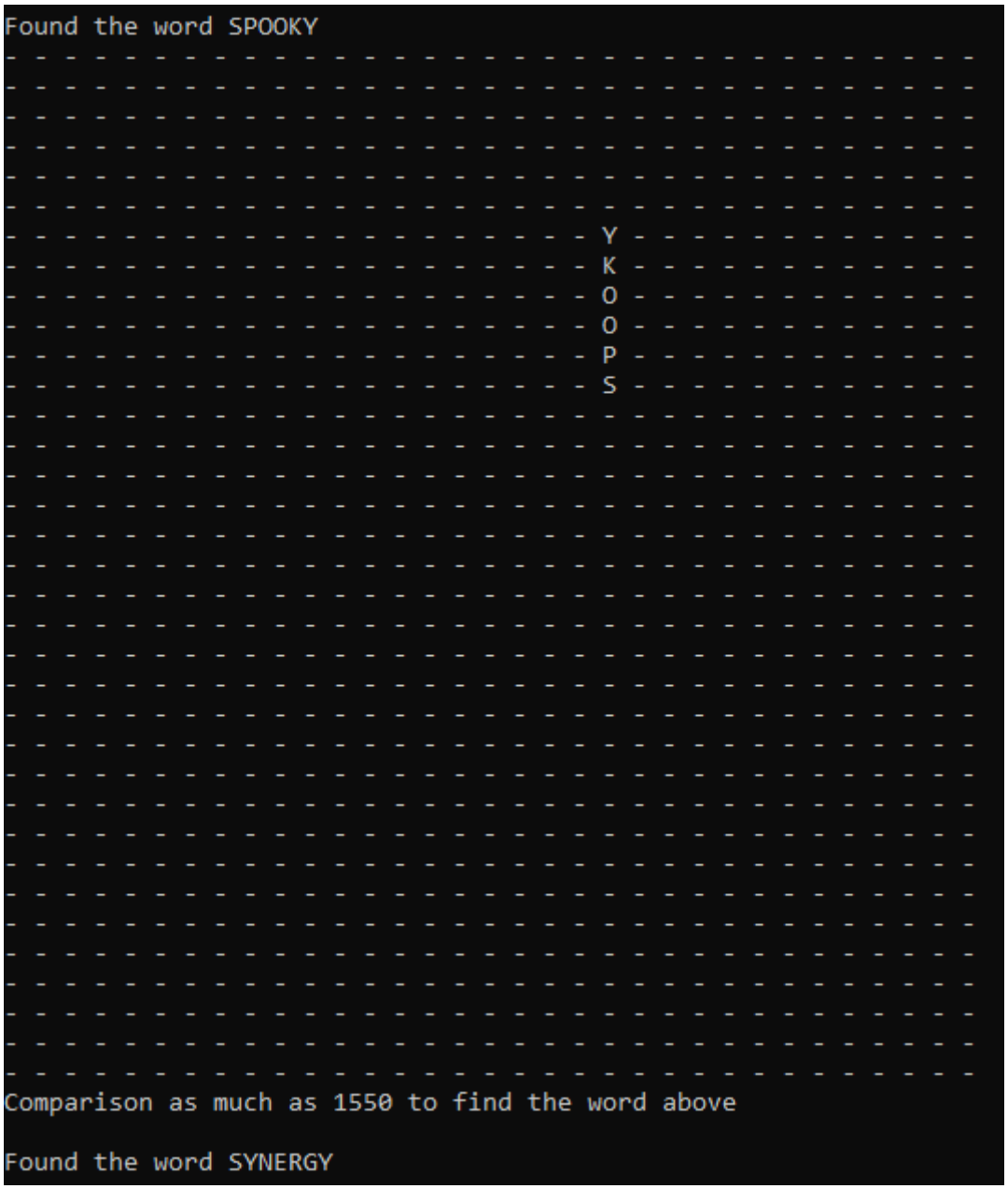
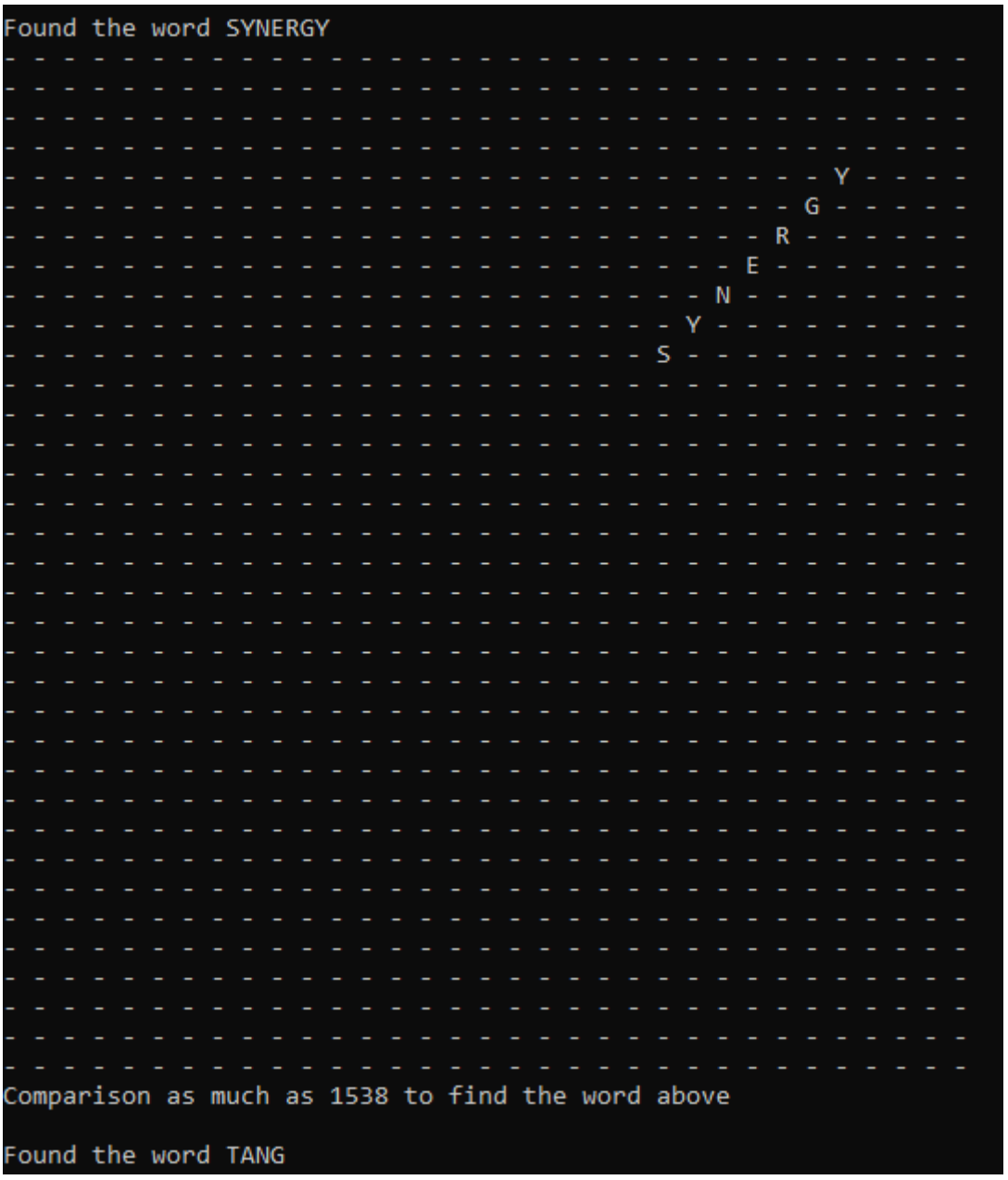
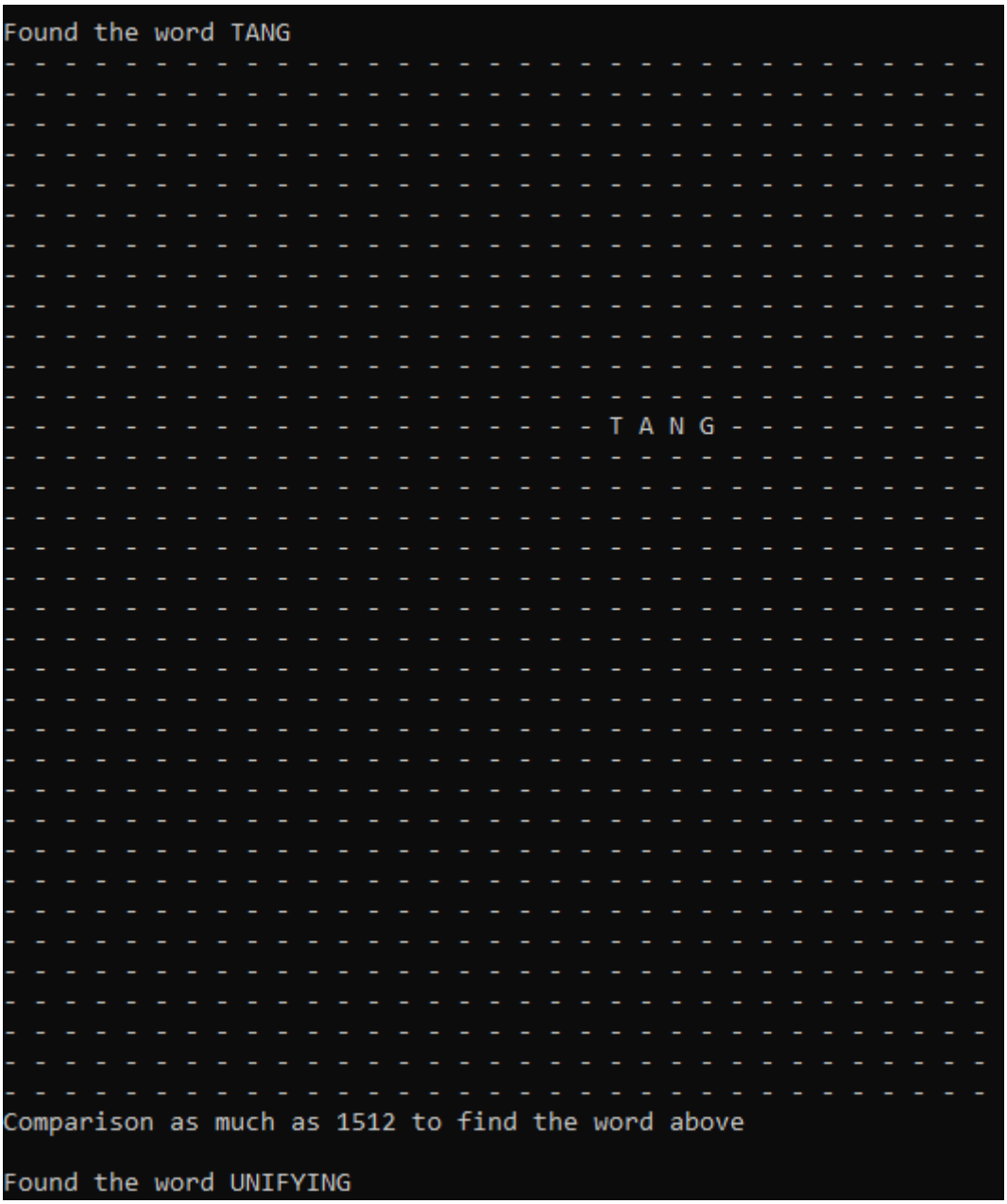
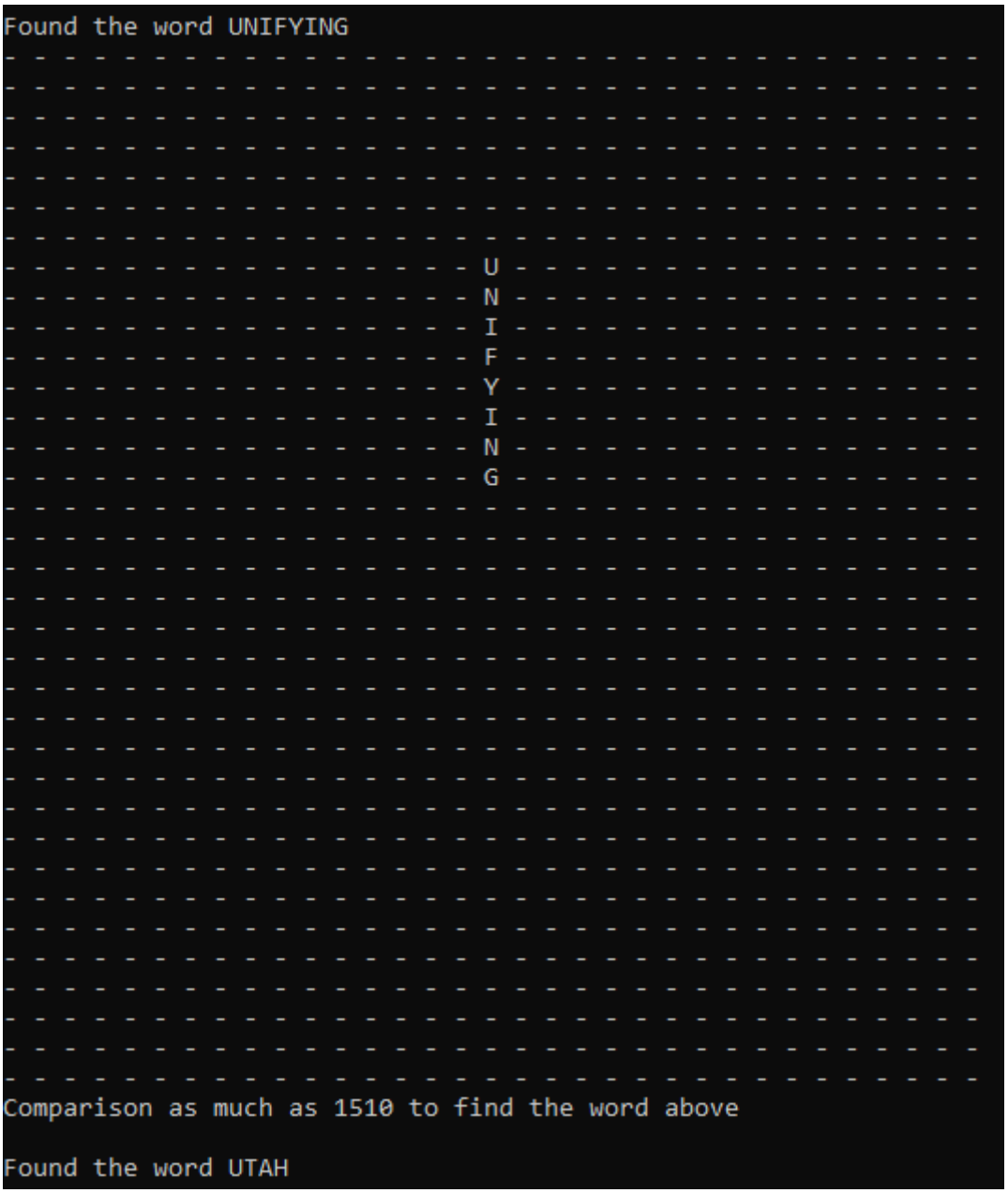
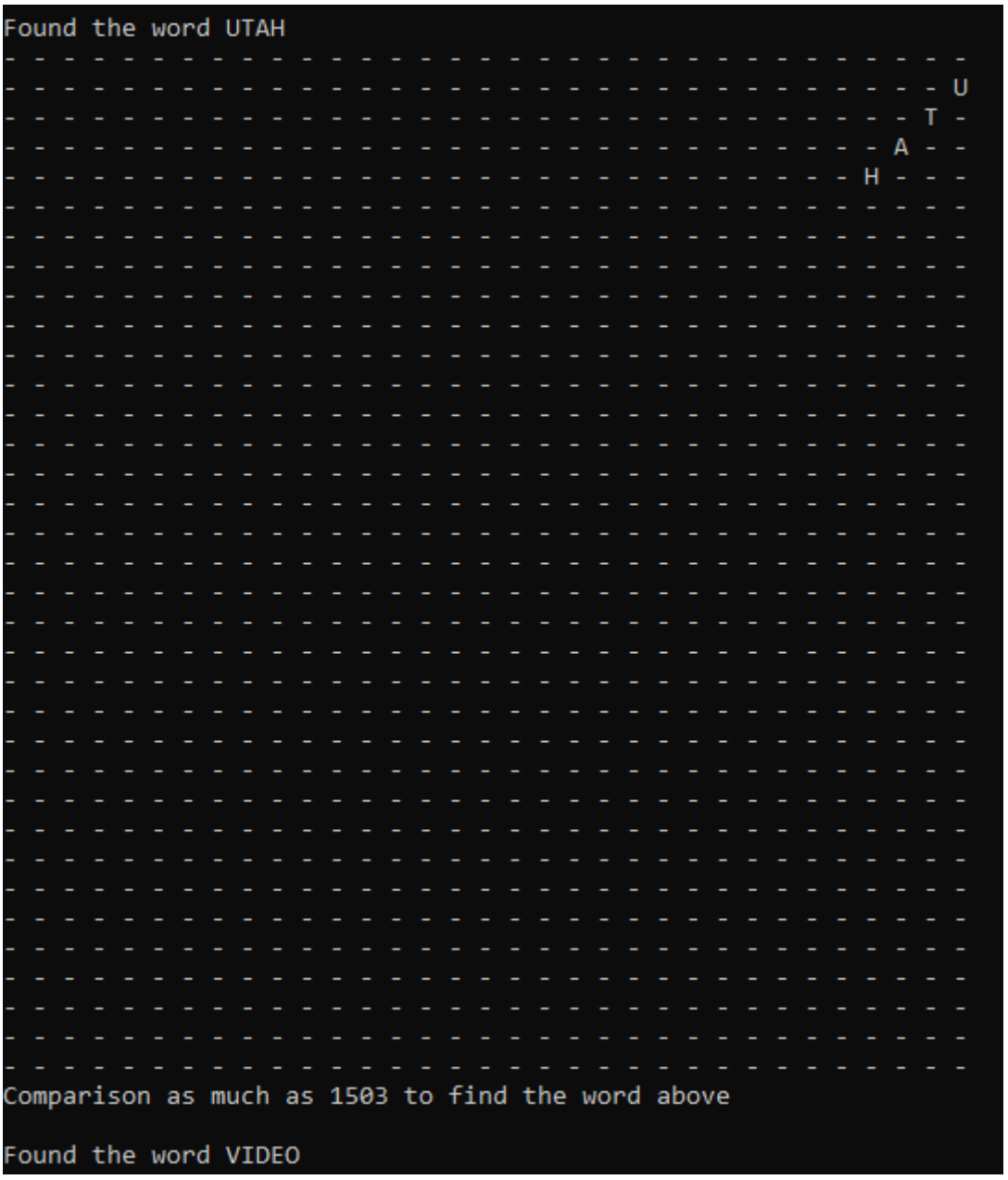


Found the word SNOB
B
O
N
S
Comparison as much as 1543 to find the word above
Found the word SPOOKY

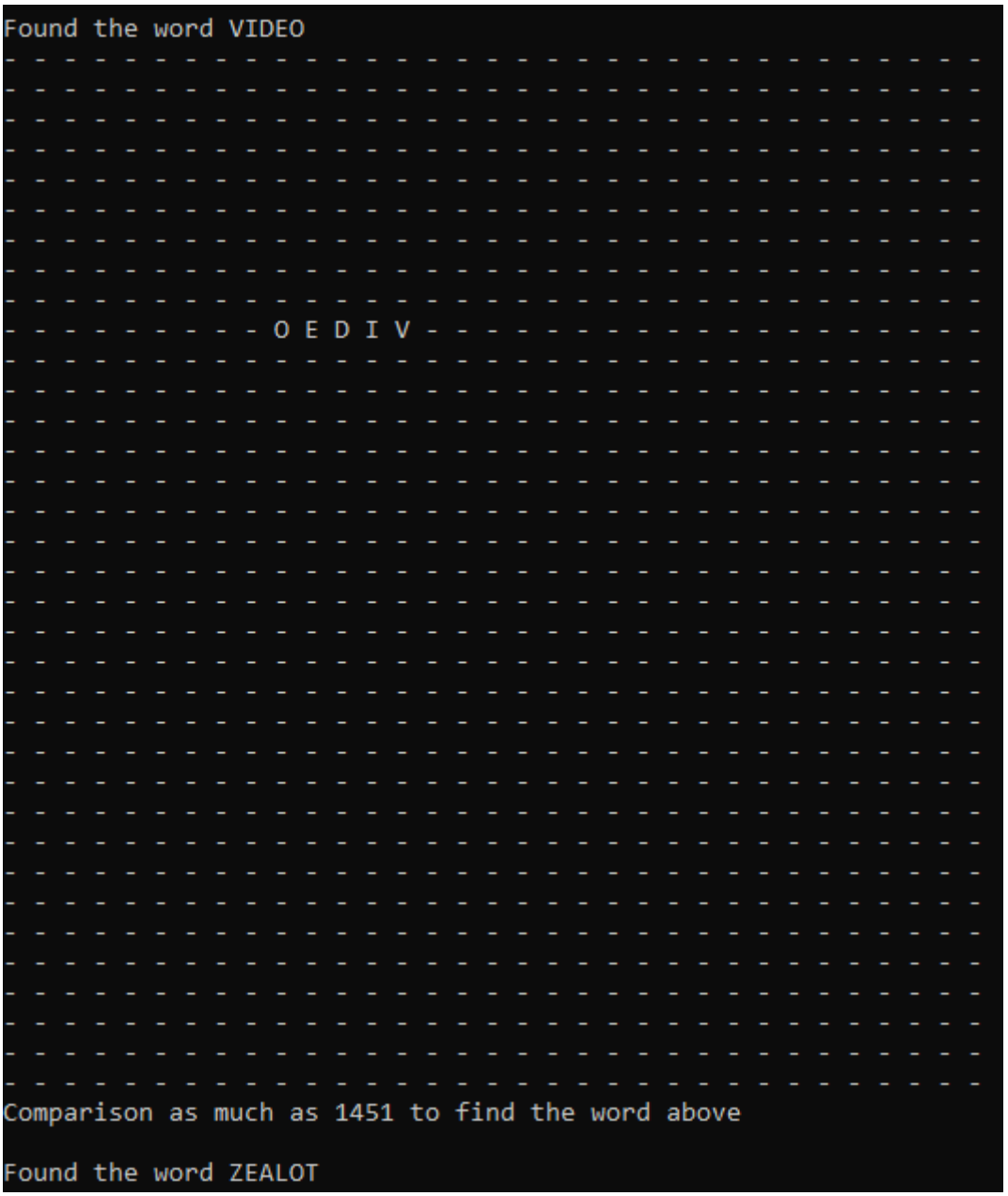

Found the word SPOOKY
Y
K
O
O
P
S
Comparison as much as 1550 to find the word above
Found the word SYNERGY

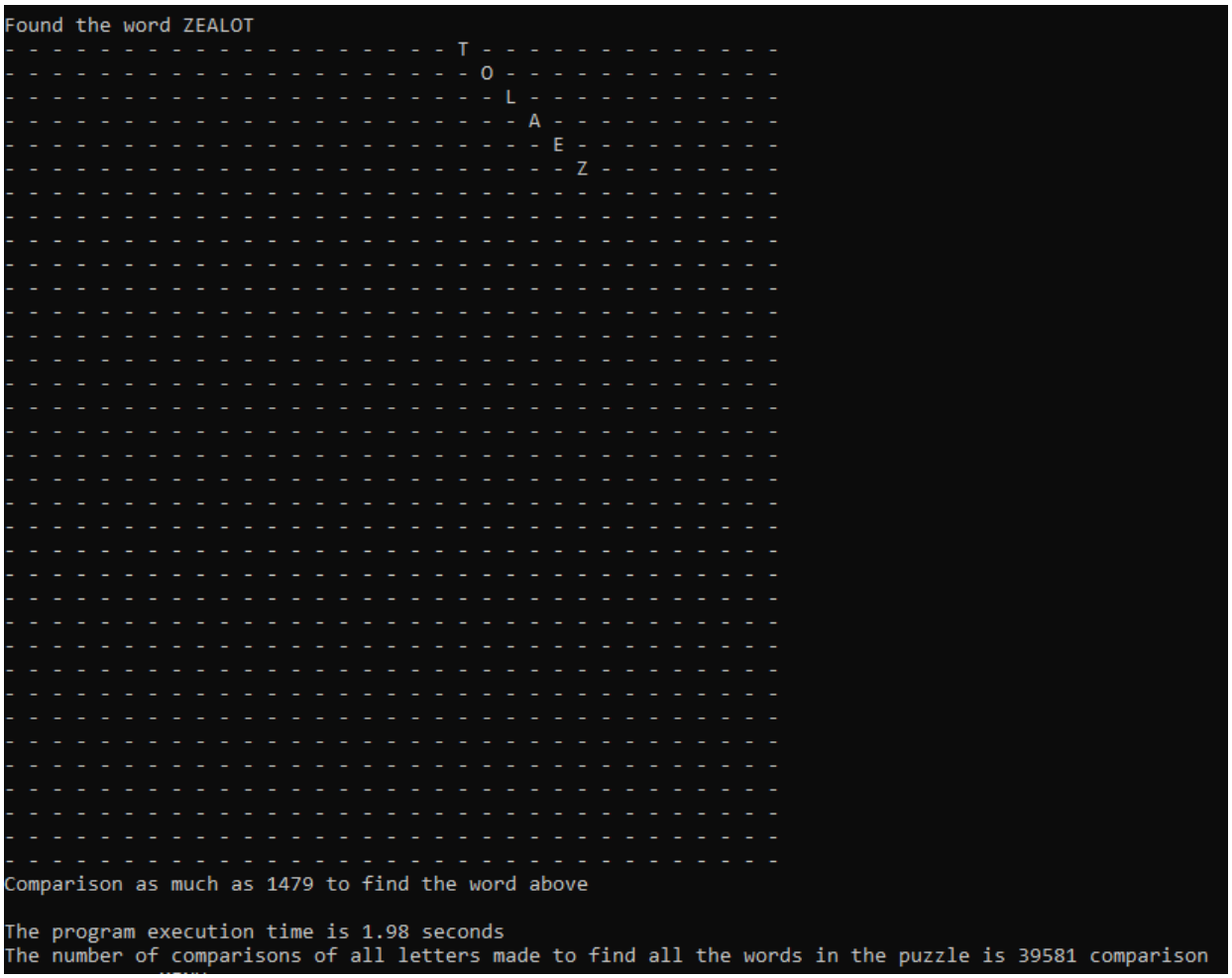

Found the word SYNERGY
Y
G
R
E
N
Y
S
Comparison as much as 1538 to find the word above
Found the word TANG


Found the word TANG
T A N G
Comparison as much as 1512 to find the word above
Found the word UNIFYING


Found the word UNIFYING
U
N
I
F
Y
I
N
G
Comparison as much as 1510 to find the word above
Found the word UTAH


Found the word UTAH
U
T
A
H
Comparison as much as 1503 to find the word above
Found the word VIDEO


Found the word VIDEO
O E D I V
Comparison as much as 1451 to find the word above
Found the word ZEALOT


Found the word ZEALOT
Comparison as much as 1479 to find the word above
The program execution time is 1.98 seconds
The number of comparisons of all letters made to find all the words in the puzzle is 39581 comparison

D. Alamat Kode Program

Program dapat diunduh dari alamat berikut:

https://drive.google.com/drive/folders/1R3NU-4R0aAFGzqbXvf5gf6UzQK409GI2?usp=sharing

Atau dapat melalui

https://github.com/shdiqq/Tucil1_13520038.git

E. Tabel Penilaian

Poin	Ya	Tidak
1. Program berhasil dikompilasi tanpa kesalahan (no syntax error).	☒	☐
2. Program berhasil *running.*	☒	☐
3. Program dapat membaca file masukan dan menuliskan luaran.	☒	☐
4. Program berhasil menemukan semua kata di dalam puzzle.	☒	☐