LAPORAN TUGAS KECIL 1 IF2211 STRATEGI ALGORITMA

SEMESTER II 2021/2022

Penyesaian *Word Search Puzzle* Menggunakan Algoritma *Brute Force*

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PROGRAM STUDI TEKNIK INFORMATIKA

SEKOLAH TEKNIK ELEKTRO DAN INFORMATIKA

INSTITUT TEKNOLOGI BANDUNG

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1. Deskripsi Singkat
   Word search puzzle merupakan sebuah permainan kata yang memiliki objektif “mencari kata-kata yang tersedia pada susunan huruf-huruf acak berbentuk segiempat”. Kata-kata dapat ditemukan dalam delapan arah, yaitu atas, bawah, kiri, kanan, kiri atas, kanan atas, kiri bawah, dan kanan bawah.

2. Penjelasan Algoritma Brute Force
   Berikut langkah-langkah implementasi algoritma *brute force* pada program ini.
   a. Program meminta *input* susunan huruf-huruf acak (yang selanjutnya akan disebut *puzzle*) dan daftar kata yang akan dicari
   b. Ambil kata di daftar yang paling atas
   c. Cek satu per satu pada *puzzle* sampai menemukan huruf pertama pada kata yang ingin dicari
   d. Cek apakah panjang kata yang dicari cukup agar memungkinkan ditemukan kata ke arah atas, bawah, kiri, atau kanan. Jika ada arah yang tidak mungkin, maka dua arah diagonal dari arah tersebut juga tidak mungkin ditemukan. Contohnya, jika tidak mungkin kata ditemukan ke arah atas, maka kata juga tidak akan ditemukan ke arah atas kanan dan atas kiri.
   e. Jika panjang kata mencukupi pada arah tertentu, cocokkan huruf keduanya. Lakukan pencocokkan sampai ditemukan huruf yang tidak cocok atau semua huruf pada kata telah dicocokkan.
   f. Jika semua hurufnya cocok, maka posisi kata pada *puzzle* akan ditampilkan. Kemudian, kata akan dihapus dalam list dan kembali ke b sampai daftar kata habis. Jika ada huruf yang tidak cocok, cari arah lain sehingga ditemukan kata yang sesuai atau semua arah telah diperiksa.
   g. Jika semua arah telah diperiksa, kembali ke c sampai menemukan kata yang sesuai.
   h. Jika daftar kata sudah kosong, kita selesai.

   Kasus terburuk dari algoritma ini ialah ketika banyak huruf-huruf yang cocok ketika dibandingkan, namun kata yang cocok terdapat pada ujung *puzzle*, sehingga kompleksitas dari algoritma ini ialah O(NRCL), dengan N merupakan banyaknya kata, R merupakan banyak baris, C merupakan banyak kolom, dan L merupakan panjang kata terpanjang.

3. Source code
   Program dibuat menggunakan bahasa C++. Hanya terdapat satu buah program bernama **main.cpp**. Isi dari **main.cpp** ialah sebagai berikut.

```
#include<iostream>
#include<vector>
#include<queue>
#include<string>
#include<ostream>
#include<fstream>
#include<chrono>

using namespace std;

const string vertical_direction[3] = {" ATAS", "", " BAWAH"};
const string horizontal_direction[3] = {" KIRI" , "", " KANAN"};
int n,m;
int total_count = 0;
```

```
typedef struct {
    int i;
    int j;
    short direct_i;
    short direct_j;
} ans;
queue<string> words;
vector<vector<char>> puzzle;
fstream puzzle_stream;
vector<vector<char>> solution;

void readPuzzle(){
    char tmp;
    bool wordinput = false;
    string input;

    cout << "Input file name : " << flush;
    cin >> input;

    puzzle_stream.open("../test/" + input, ios::in);
    if(puzzle_stream.is_open()){
        while(!wordinput && getline(puzzle_stream,input)){
            vector<char> line;
            for(int i=0; i<input.size(); i++){
                if(input[i] != ' '){
                    line.push_back(input[i]);
                }
            }

            if(line.empty()) wordinput = true;
            else puzzle.push_back(line);
        }

        while(getline(puzzle_stream, input)){
            words.push(input);
        }
        puzzle_stream.close();
    }else{
        cout << "File name is not valid\n";
    }
}

void initializeSolution(){
    solution.clear();
    for(int i=0; i<puzzle.size(); i++){
        vector<char> sol;
        for(int j=0; j<puzzle[0].size(); j++){
            sol.push_back('-');
        }
        solution.push_back(sol);
```

```
    }
}

void showSolution(ans cur, int len){
    int solution_idx = 0;
    int i_ = cur.i;
    int j_ = cur.j;
    short direct_i = cur.direct_i;
    short direct_j = cur.direct_j;

    initializeSolution();
    while(solution_idx<len){
        solution[i_][j_] = puzzle[i_][j_];
        i_ += direct_i;
        j_ += direct_j;
        solution_idx++;
    }

    for(int i=0; i<solution.size(); i++){
        for(int j=0; j<solution[i].size(); j++){
            std::cout << solution[i][j] << " ";
        }
        std::cout << endl;
    }
}
void solvePuzzle(int ver, int hor){
    /*
    Proses Menyelesaikan Puzzle
    Ide : Ambil satu kata, cek tiap huruf sampai menemukan huruf
pertama dari kata tersebut,
          periksa empat arah apakah mungkin menemukan kata tersebut,
cek huruf kedua dari arah-arah yang mungkin,
          periksa huruf-huruf selanjutnya dari arah tersebut jika
huruf keduanya cocok, lakukan sampai ditemukan
    */

   auto start = chrono::high_resolution_clock::now();
    while(!words.empty()){
        string word = words.front();

        std::cout << "Processing word: " << word << "...\r" <<
flush;
        auto start_word = chrono::high_resolution_clock::now();
        int i=0;
        int j=0;
        int count = 0;
        bool found = false;
        ans current_answer;
        while(!found && i<ver){
            count++;
```

```
            if(puzzle[i][j] == word[0]){
                current_answer = {i,j,-1,-1};
                bool vertical_check[3] = {
                    word.length()<=i+1,
                    true,
                    word.length()<=ver-i,
                };
                bool horizontal_check[3] = {
                    word.length()<=j+1,
                    true,
                    word.length()<=hor-j
                };

                while(!found && current_answer.direct_i<=1){
                    int i_ = current_answer.i;
                    int j_ = current_answer.j;
                    short direct_i = current_answer.direct_i;
                    short direct_j = current_answer.direct_j;
                    if(horizontal_check[direct_j+1] &&
vertical_check[direct_i+1] && !(direct_i==0 && direct_j==0)){
                        count++;
                        i_ += direct_i;
                        j_ += direct_j;
                        int word_cocok = 1;
                        while(word_cocok<word.length() &&
word[word_cocok]==puzzle[i_][j_]){
                            count++;
                            word_cocok++;
                            i_ += direct_i;
                            j_ += direct_j;
                        }

                        if(word_cocok == word.length()) found =
true;
                    }

                    if(!found){
                        current_answer.direct_j++;
                        if(current_answer.direct_j>1){
                            current_answer.direct_i++;
                            current_answer.direct_j = -1;
                        }
                    }
                }
            }

            j++;
            if(j>=hor){
                i++;
                j%=hor;
```

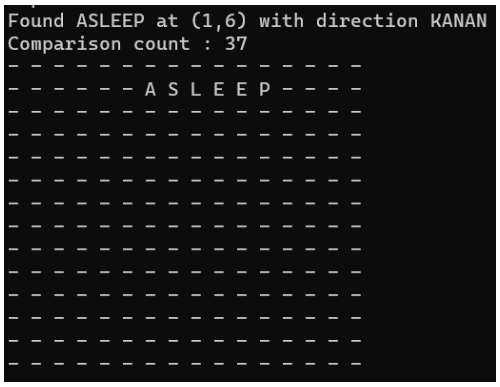
```
            }
        }

        if(found){
            auto end_word = chrono::high_resolution_clock::now();
            auto time_word =
chrono::duration_cast<chrono::milliseconds>(end_word-start_word);
            std::cout << "Found " << words.front() << " at (" <<
current_answer.i << "," << current_answer.j << ") with direction" <<
vertical_direction[current_answer.direct_i+1] <<
horizontal_direction[current_answer.direct_j+1] << "\nComparison
count : " << count << endl;
            showSolution(current_answer, word.length());
            std::cout << endl;

        }else{
            std::cout << "The word " << word << " is not found." <<
endl;
        }
        words.pop();
        total_count += count;
    }

    auto end = chrono::high_resolution_clock::now();
    auto time = chrono::duration_cast<chrono::milliseconds>(end-
start);
    std::cout << "Operation took " << time.count() << "ms\nTotal
comparison : " << total_count << endl;
}

int main(){
    readPuzzle();
    if(!puzzle.empty()) solvePuzzle(puzzle.size(),
puzzle[0].size());
}
```

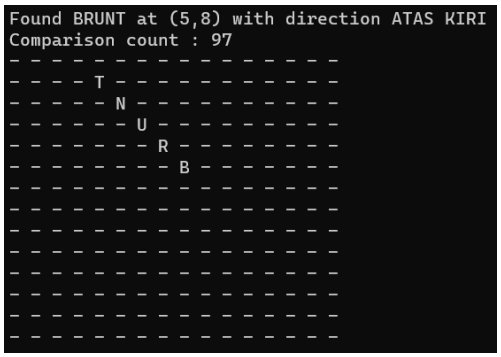
4. Alamat kode program
   Program dapat diakses dengan tautan berikut.
   https://github.com/DeeGeeDow/Tucil1_13520152

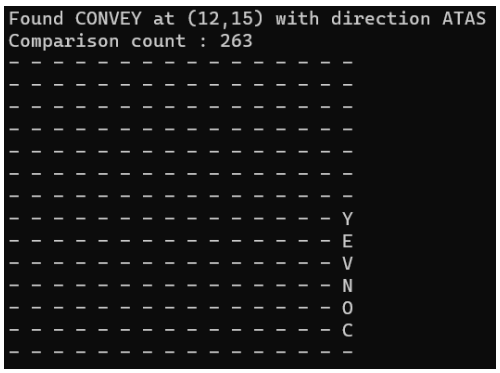
5. Keberjalanan Program
   Berikut merupakan tangkapan layar saat program dijalankan.
   a. Masukan nama file

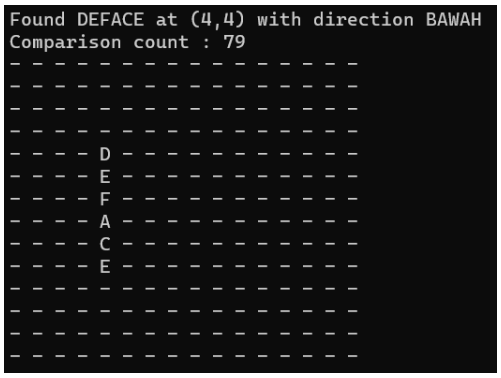
```
PS D:\FAHMI\KULIAH\SEMESTER 4\IF2211 STRATEGI ALGORITMA\Tucil\TUCIL 1 -
 WORD SEARCH PUZZLE\Tucil1_13520152\Tucil1_13520152\bin> ./main
Input file name : medium1.txt
```

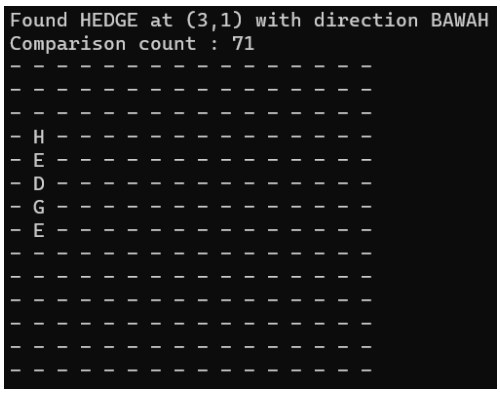
   b. Luaran program dengan *file input* **small1.txt**
      File **small1.txt** berisi *puzzle* berukuran 14x16 dengan 14 kata. Berikut merupakan hasil tangkapan layar ketika program ini dijalankan.

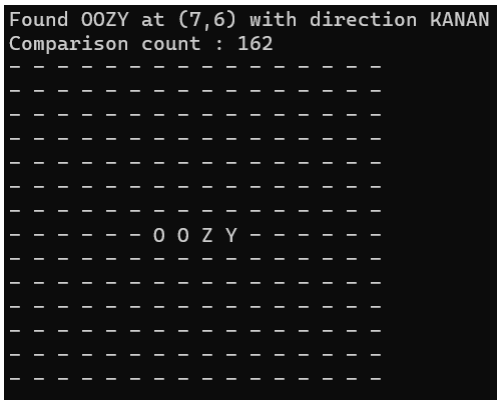

Found ASLEEP at (1,6) with direction KANAN
Comparison count : 37
A S L E E P

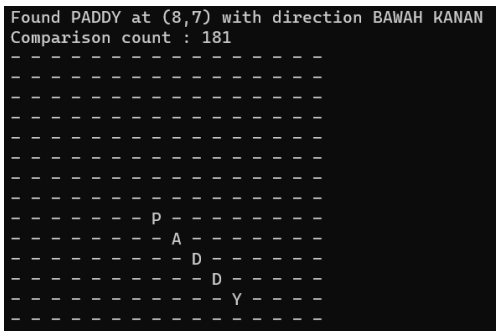

Found BRUNT at (5,8) with direction ATAS KIRI
Comparison count : 97
T
N
U
R
B

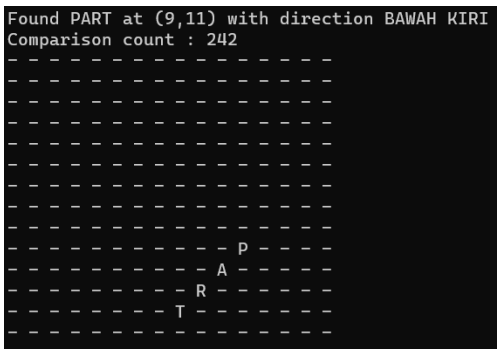

Found CONVEY at (12,15) with direction ATAS
Comparison count : 263
Y
E
V
N
O
C

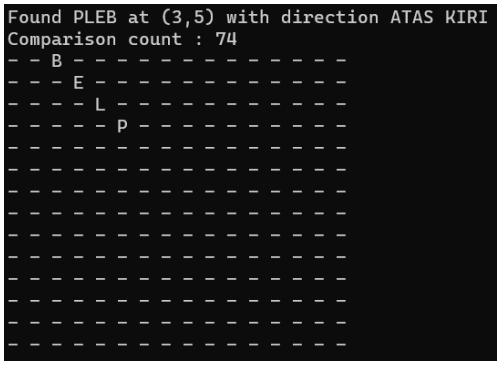

Found DEFACE at (4,4) with direction BAWAH
Comparison count : 79
D
E
F
A
C
E

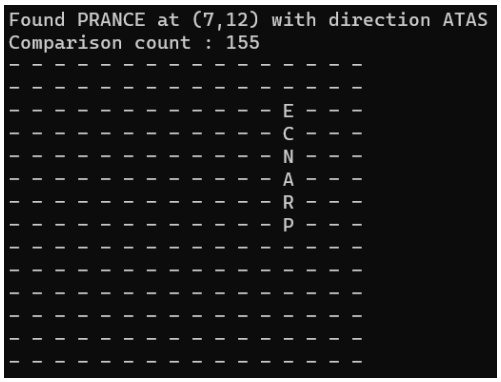

Found HEDGE at (3,1) with direction BAWAH
Comparison count : 71
H
E
D
G
E

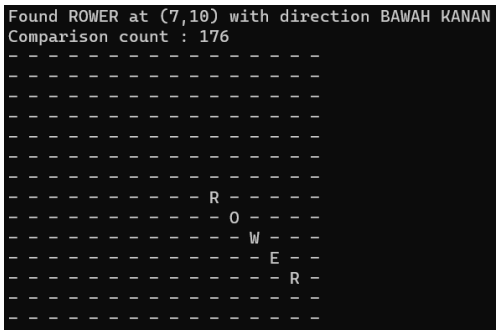

Found OOZY at (7,6) with direction KANAN
Comparison count : 162
O O Z Y

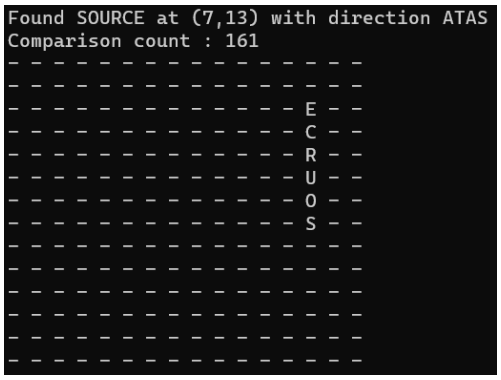

Found PADDY at (8,7) with direction BAWAH KANAN
Comparison count : 181
P
A
D
D
Y

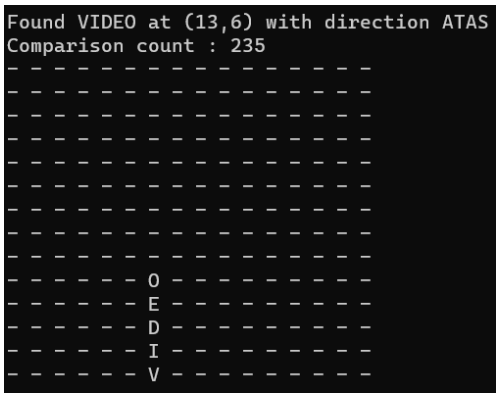

Found PART at (9,11) with direction BAWAH KIRI
Comparison count : 242
P
A
R
T

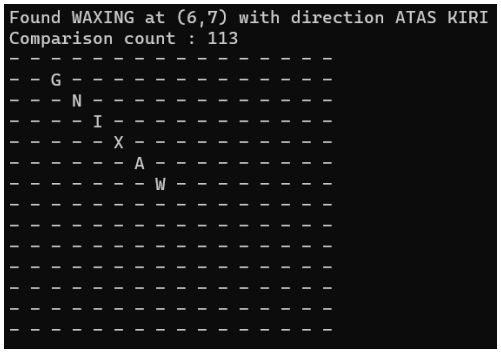




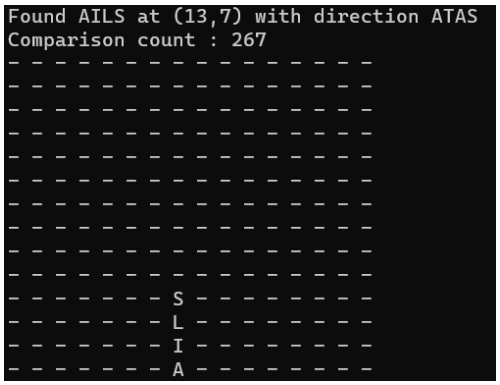


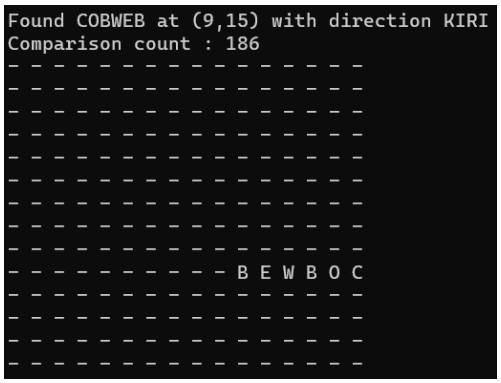


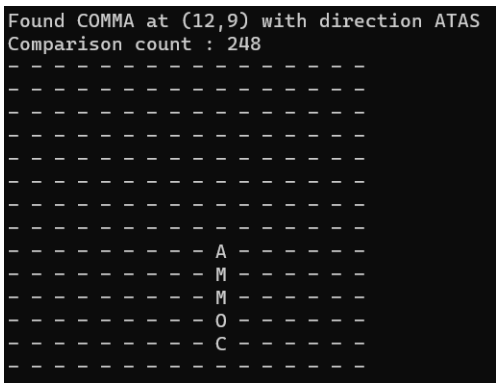


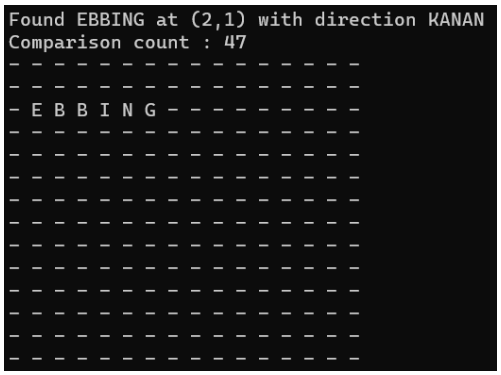


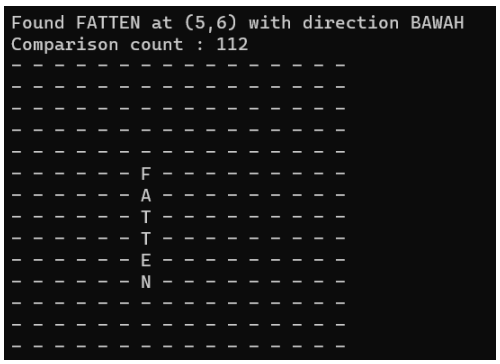
c. Luaran program dengan *file input* **small2.txt**
File **small2.txt** berisi *puzzle* berukuran 14x16 dengan 14 kata. Berikut merupakan hasil tangkapan layar ketika program ini dijalankan.

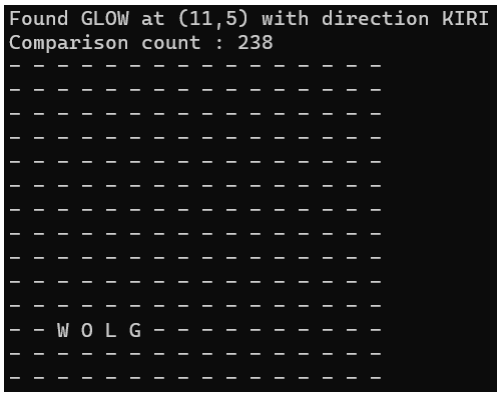

Found AILS at (13,7) with direction ATAS
Comparison count : 267
S
L
I
A

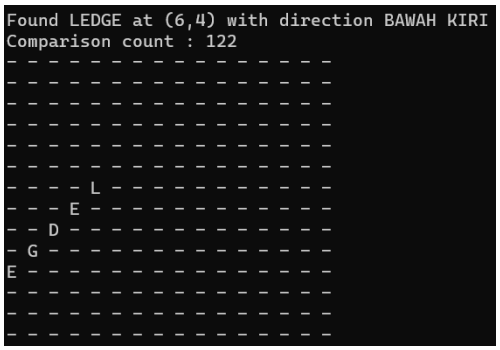

Found COBWEB at (9,15) with direction KIRI
Comparison count : 186
B E W B O C

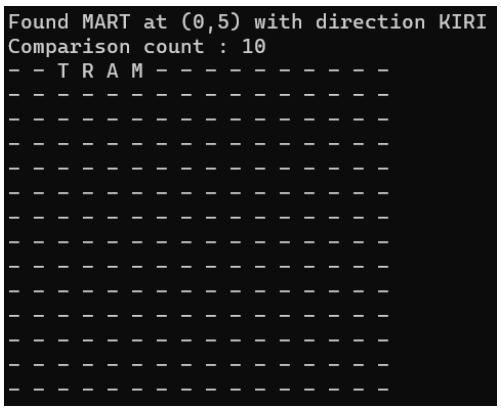

Found COMMA at (12,9) with direction ATAS
Comparison count : 248
A
M
M
O
C

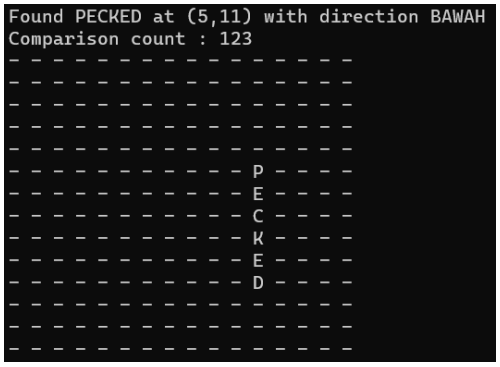

Found EBBING at (2,1) with direction KANAN
Comparison count : 47
E B B I N G

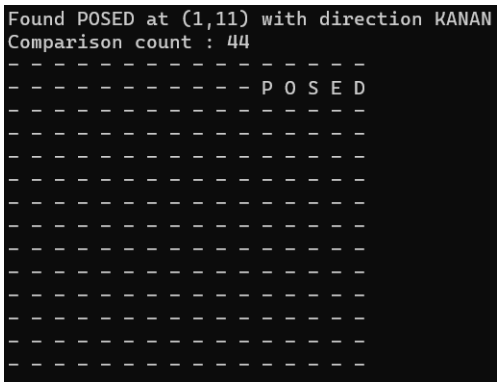

Found FATTEN at (5,6) with direction BAWAH
Comparison count : 112
F
A
T
T
E
N

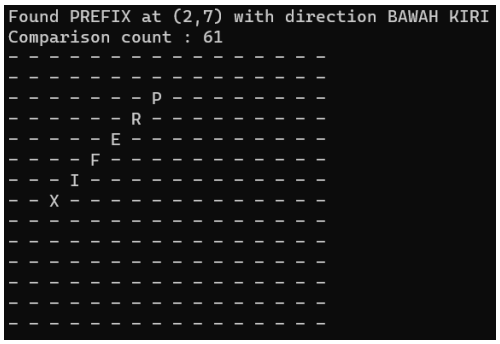

Found GLOW at (11,5) with direction KIRI
Comparison count : 238
W O L G

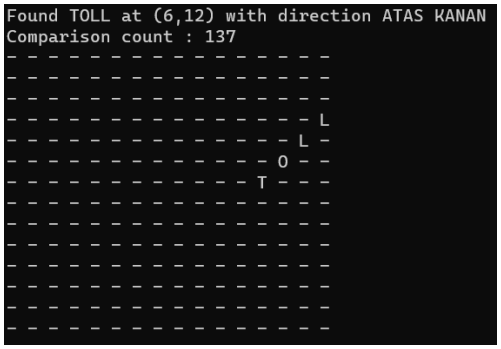

Found LEDGE at (6,4) with direction BAWAH KIRI
Comparison count : 122
L
E
D
G
E

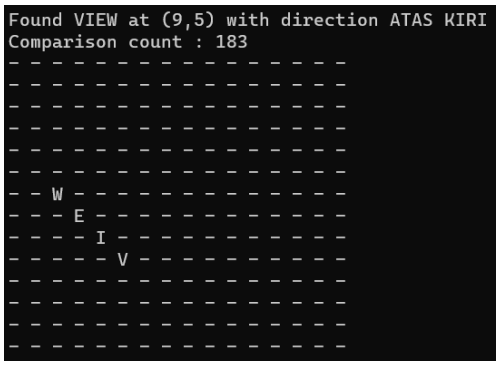

Found MART at (0,5) with direction KIRI
Comparison count : 10
T R A M

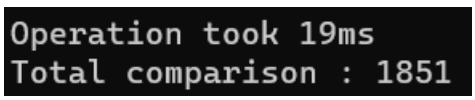




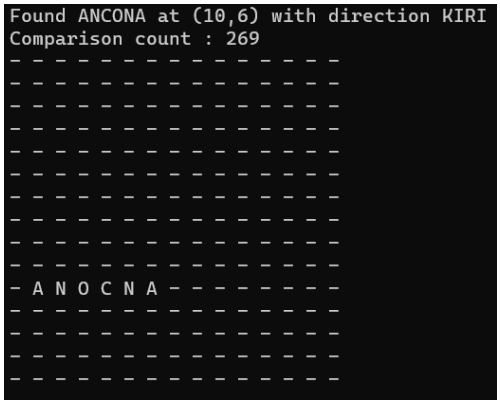


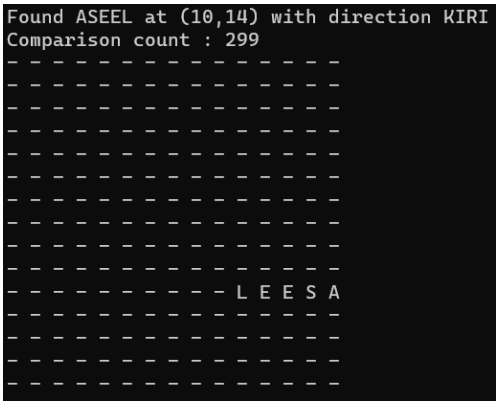


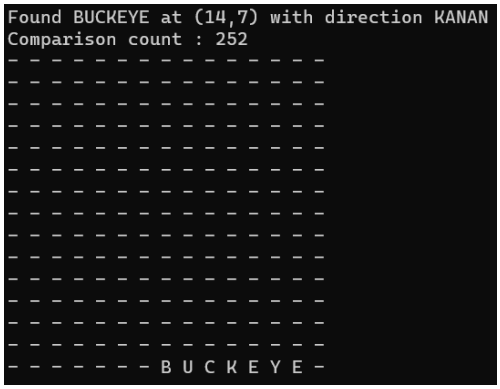


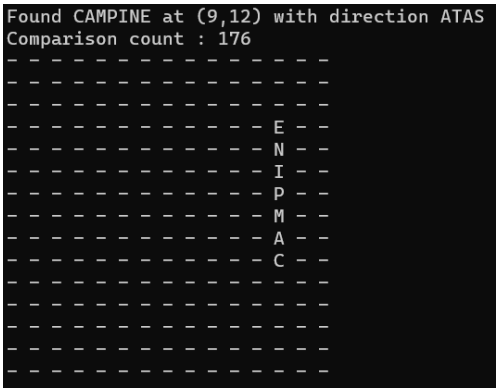


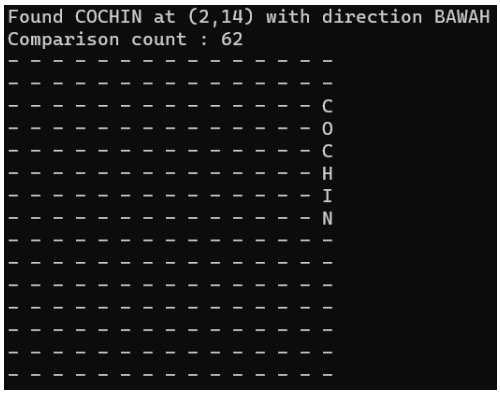
d. Luaran program dengan *file input* **small3.txt**
File **small3.txt** berisi *puzzle* berukuran 15x15 dengan 15 kata. Berikut merupakan hasil tangkapan layar ketika proram ini dijalankan.


Found ANCONA at (10,6) with direction KIRI
Comparison count : 269
- A N O C N A -


Found ASEEL at (10,14) with direction KIRI
Comparison count : 299
L E E S A

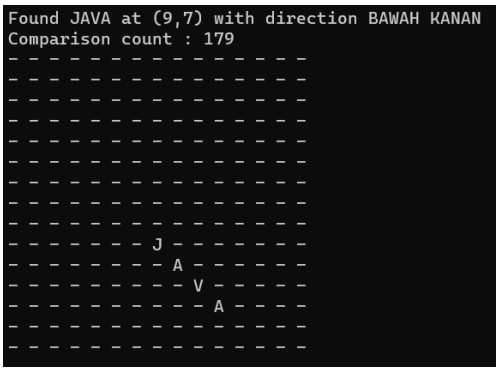

Found BUCKEYE at (14,7) with direction KANAN
Comparison count : 252
B U C K E Y E

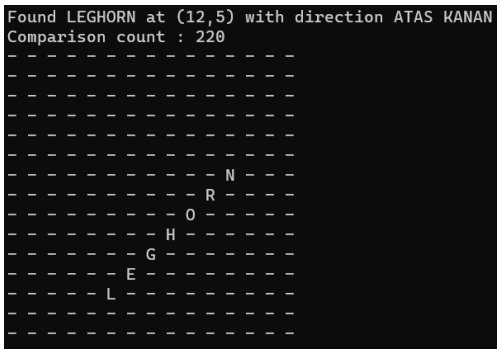

Found CAMPINE at (9,12) with direction ATAS
Comparison count : 176
E
N
I
P
M
A
C

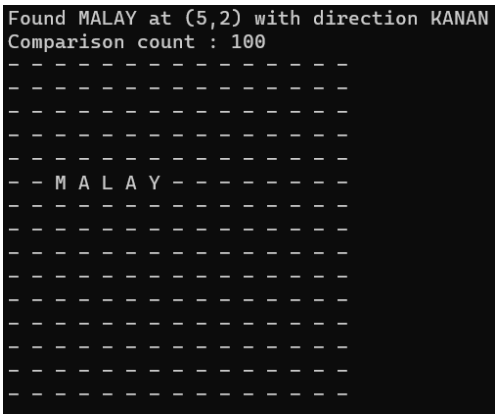

Found COCHIN at (2,14) with direction BAWAH
Comparison count : 62
C
O
C
H
I
N

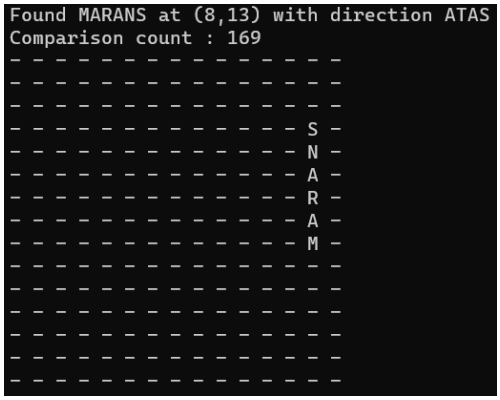

Found CORNISH at (1,13) with direction KIRI
Comparison count : 36
H S I N R O C

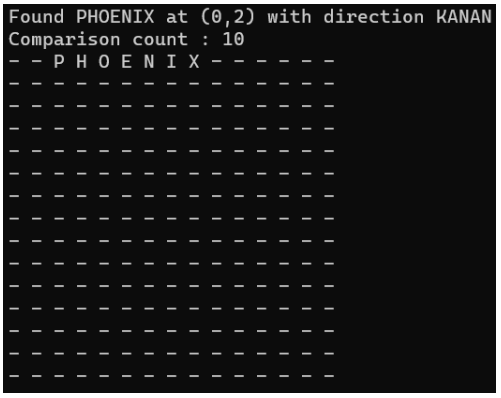

Found HOLLAND at (8,4) with direction ATAS
Comparison count : 149
D
N
A
L
L
O
H

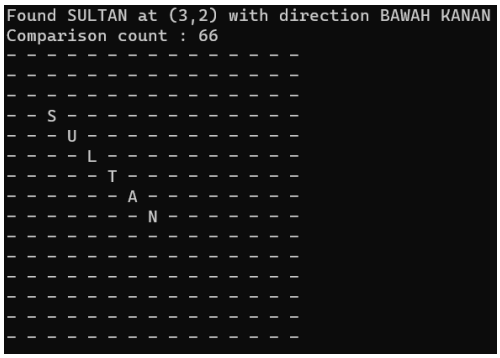

Found JAVA at (9,7) with direction BAWAH KANAN
Comparison count : 179
J
A
V
A

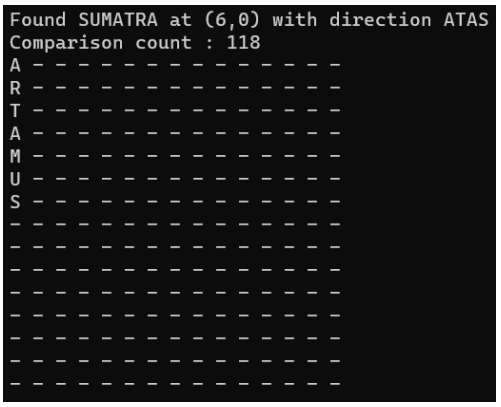


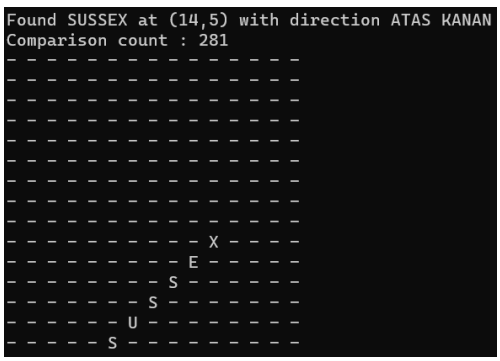




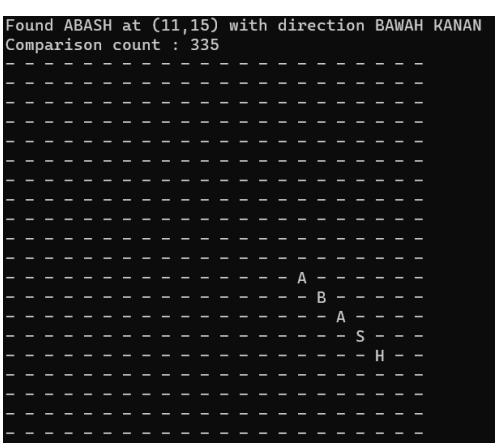


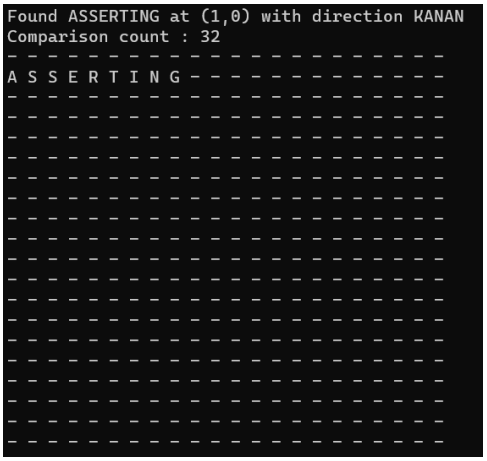






e. Luaran program dengan *file input* **medium1.txt**
File **medium1.txt** berisi *puzzle* berukuran 20x22 dengan 20 kata. Berikut merupakan hasil tangkapan layar ketika program ini dijalankan.


Found ABASH at (11,15) with direction BAWAH KANAN
Comparison count : 335

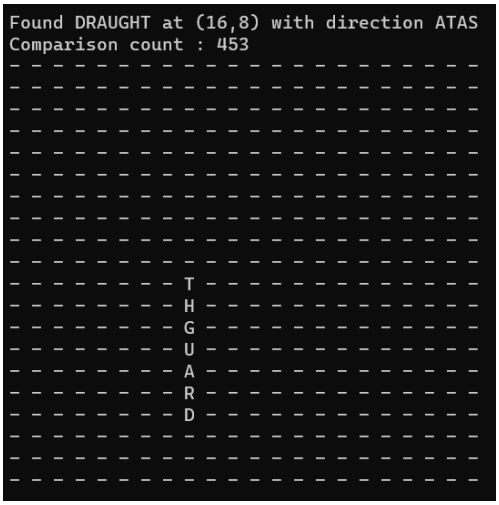

Found ASSERTING at (1,0) with direction KANAN
Comparison count : 32
A S S E R T I N G


Found ASTHMA at (16,4) with direction ATAS
Comparison count : 482


Found CELSIUS at (19,11) with direction KIRI
Comparison count : 536
S U I S L E C

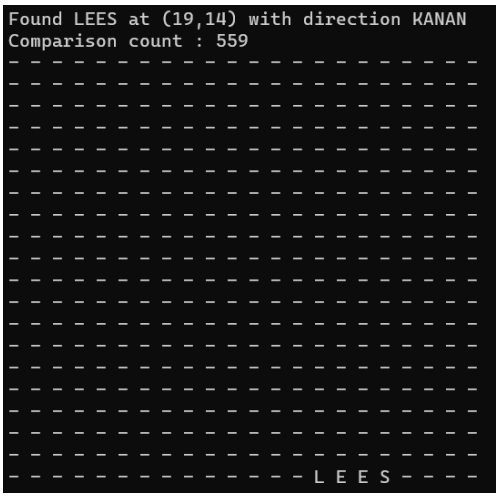

Found DECOMPRESS at (11,0) with direction ATAS KANAN
Comparison count : 300


Found DESPISING at (4,18) with direction KIRI
Comparison count : 122
G N I S I P S E D


Found DRAUGHT at (16,8) with direction ATAS
Comparison count : 453

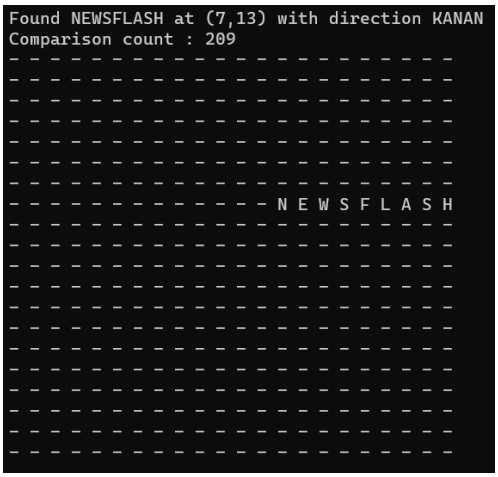

Found GLANCE at (2,0) with direction BAWAH KANAN
Comparison count : 58

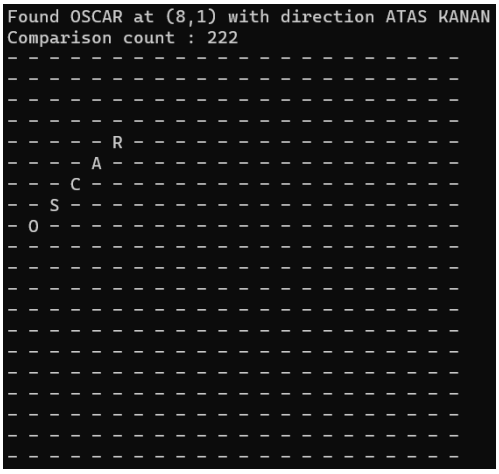

Found LAUGH at (18,9) with direction ATAS
Comparison count : 507


Found LEES at (19,14) with direction KANAN
Comparison count : 559

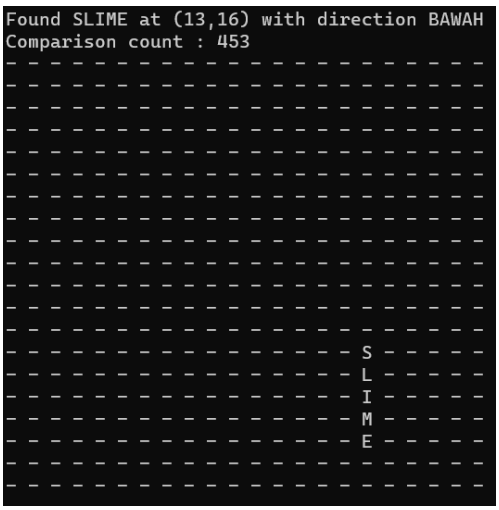

Found LEFTY at (13,21) with direction ATAS KIRI
Comparison count : 366


Found MIGHT at (11,5) with direction BAWAH
Comparison count : 297


Found NEWSFLASH at (7,13) with direction KANAN
Comparison count : 209

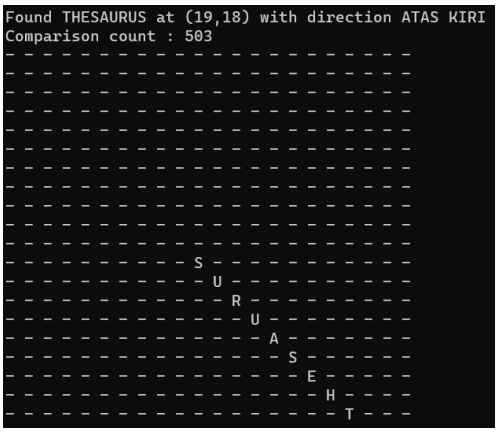

Found OSCAR at (8,1) with direction ATAS KANAN
Comparison count : 222

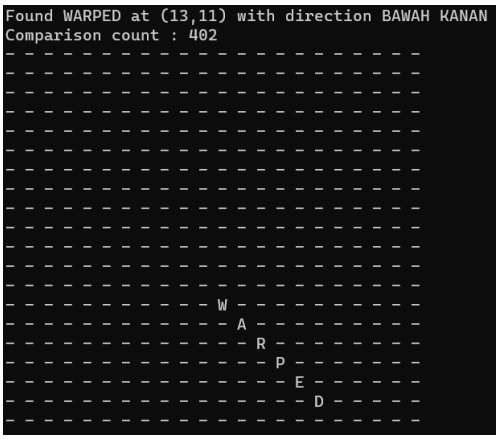

Found PASSPORT at (16,6) with direction ATAS
Comparison count : 418

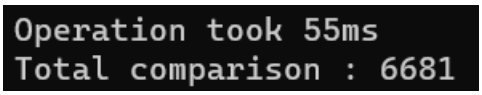

Found SLIME at (13,16) with direction BAWAH
Comparison count : 453


Found SMUG at (9,7) with direction ATAS
Comparison count : 311

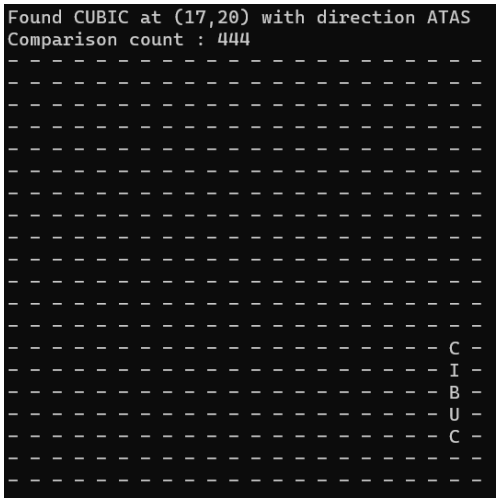

Found SOURCELESS at (3,16) with direction KIRI
Comparison count : 116







f. Luaran program dengan *file input* **medium2.txt**
File ini berisi *puzzle* berukuran 20x22 dengan 20 kata. Berikut merupakan hasil tangkapan layar dari luaran program ini.


Found CUBIC at (17,20) with direction ATAS
Comparison count : 444
C
I
B
U
C


Found CUTLERY at (0,17) with direction KIRI
Comparison count : 25
Y R E L T U C


Found DEFLECTION at (12,11) with direction KIRI
Comparison count : 323
N O I T C E L F E D


Found DEPOSITED at (11,12) with direction BAWAH
Comparison count : 297
D
E
P
O
S
I
T
E
D


Found FUSION at (11,0) with direction BAWAH
Comparison count : 306
F
U
S
I
O
N

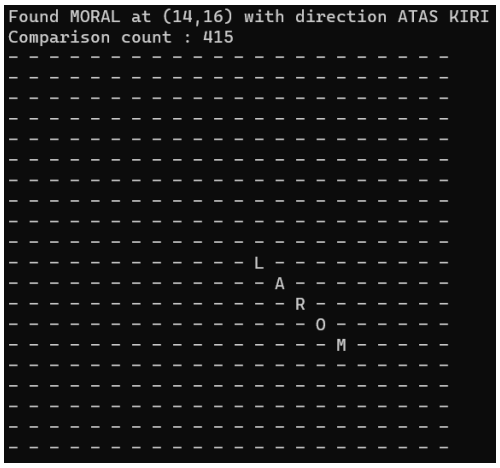

Found GARMENT at (9,1) with direction KANAN
Comparison count : 259
G A R M E N T


Found GENTLEFOLK at (6,8) with direction KANAN
Comparison count : 173
G E N T L E F O L K

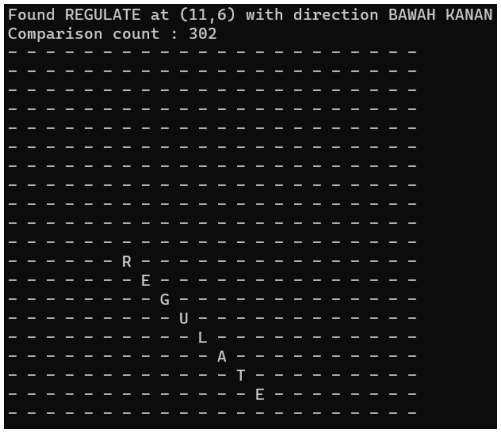

Found GUILLOTINE at (0,0) with direction BAWAH KANAN
Comparison count : 13
G
U
I
L
L
O
T
I
N
E

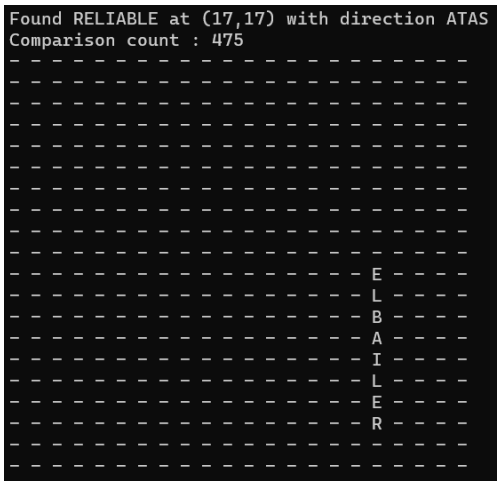

Found HAYFEVER at (0,1) with direction KANAN
Comparison count : 10
H A Y F E V E R

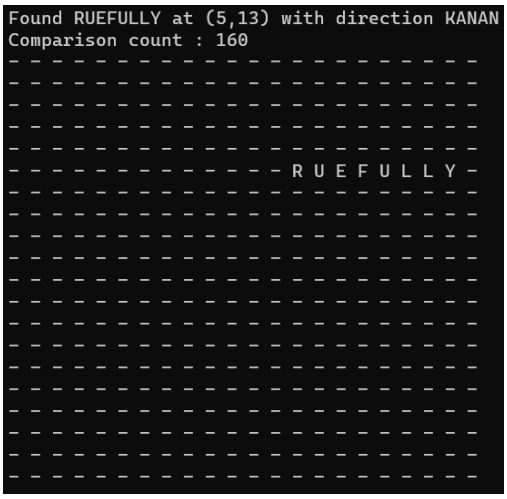

Found HAZINESS at (19,4) with direction KANAN
Comparison count : 513
H A Z I N E S S

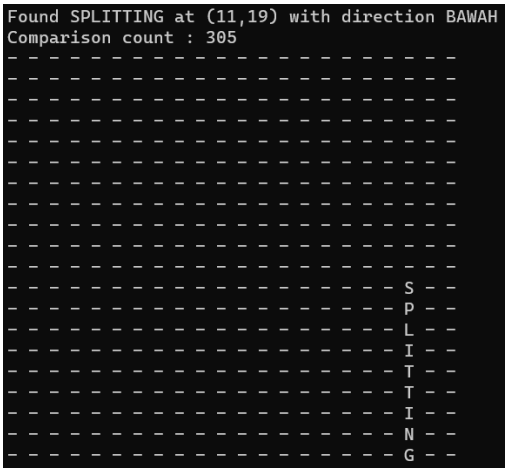

Found MORAL at (14,16) with direction ATAS KIRI
Comparison count : 415
L
A
R
O
M

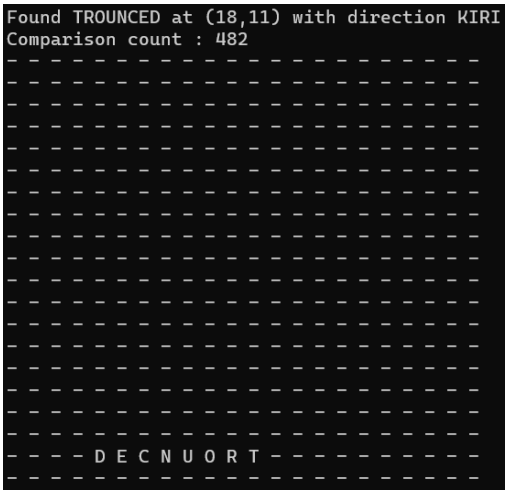

Found PAVILION at (7,12) with direction KIRI
Comparison count : 195
N O I L I V A P

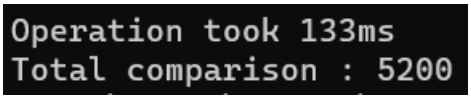






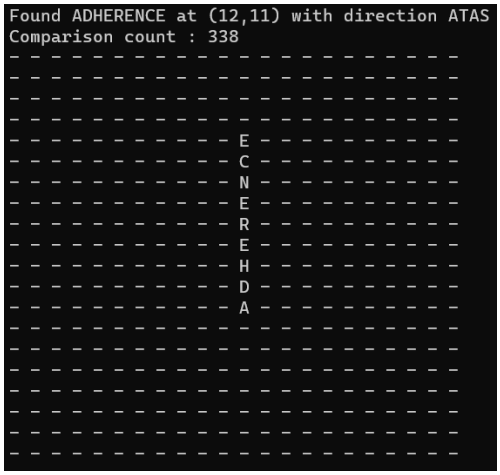


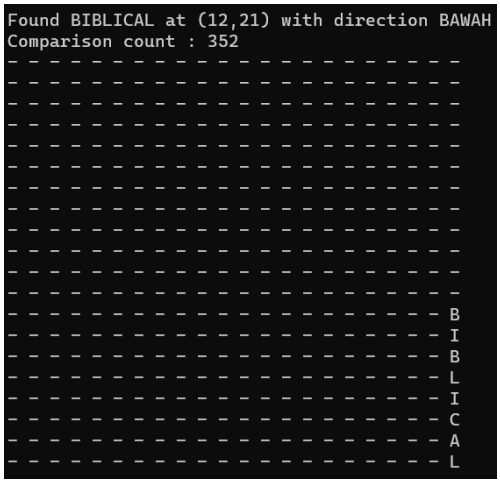


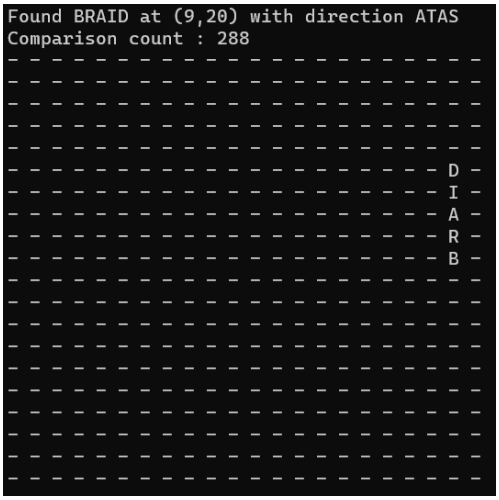


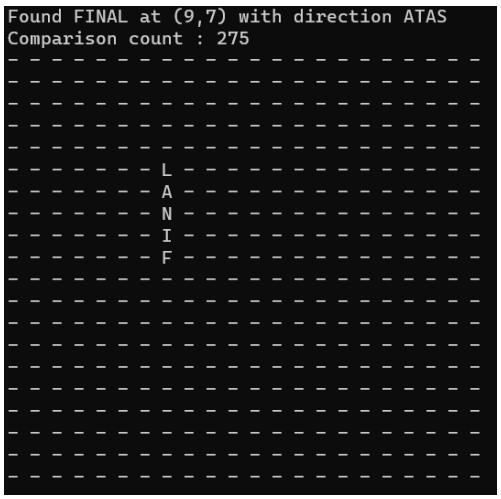
g. Luaran program dengan *file input* **medium3.txt**

File ini berisi *puzzle* berukuran 20x22 dengan 20 kata. Berikut merupakan hasil tangkapan layar dari luaran program ini ketika dijalankan.



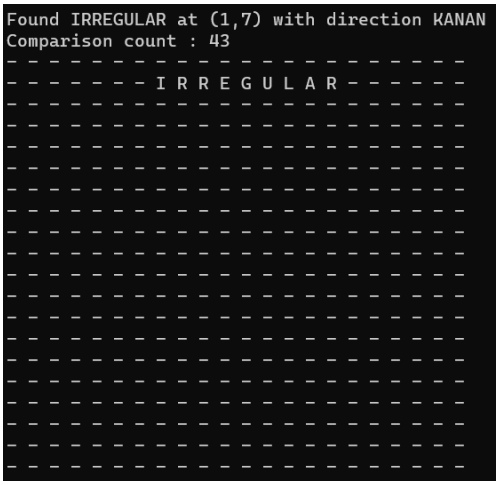





Found FINAL at (9,7) with direction ATAS
Comparison count : 275


Found INERTNESS at (4,1) with direction KANAN
Comparison count : 119


Found INSCRIBED at (12,17) with direction ATAS
Comparison count : 361


Found IRREGULAR at (1,7) with direction KANAN
Comparison count : 43


Found JUNE at (9,5) with direction KIRI
Comparison count : 261


Found PERJURY at (15,13) with direction ATAS
Comparison count : 393


Found PRESCRIBED at (10,0) with direction KANAN
Comparison count : 259
P R E S C R I B E D

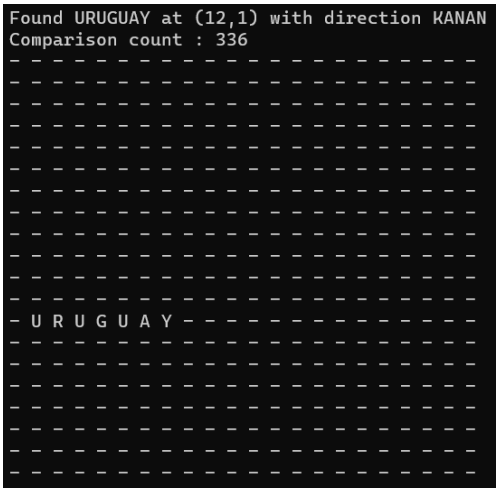

Found RECOVER at (1,21) with direction BAWAH
Comparison count : 80
R
E
C
O
V
E
R


Found SACKING at (18,19) with direction KIRI
Comparison count : 522
G N I K C A S

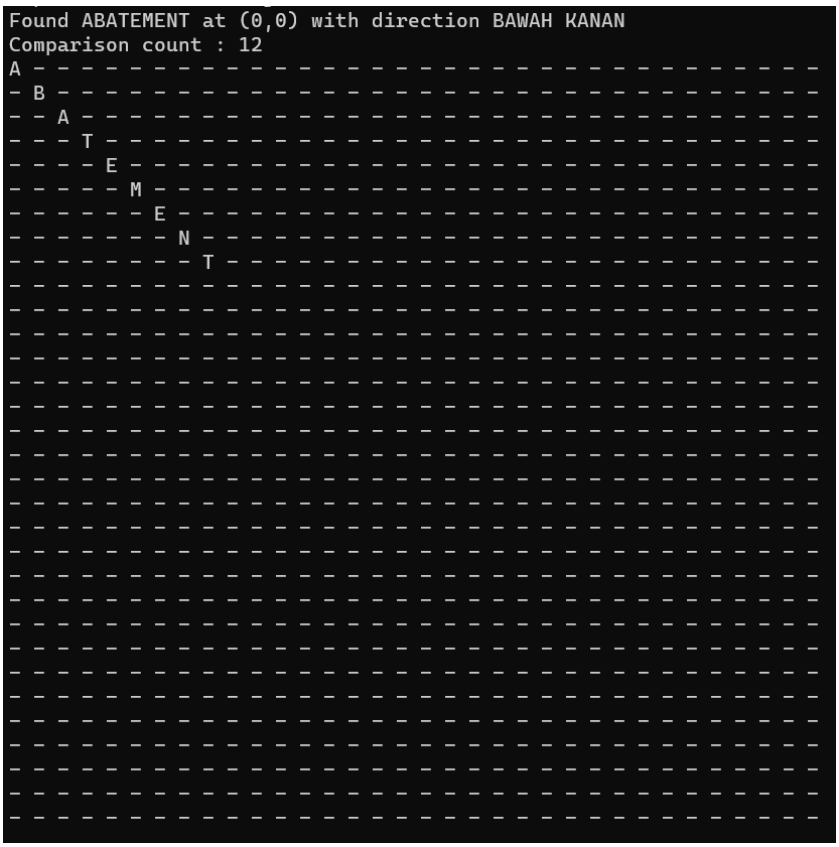

Found SHOWER at (15,9) with direction KIRI
Comparison count : 416
R E W O H S

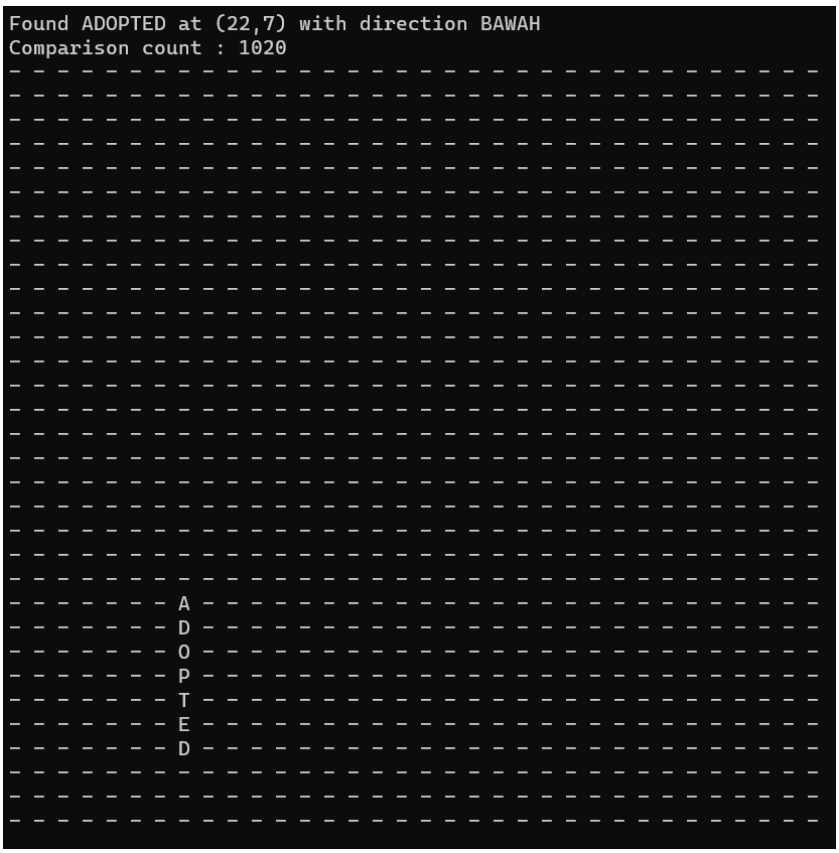

Found SOLID at (3,9) with direction KANAN
Comparison count : 82
S O L I D

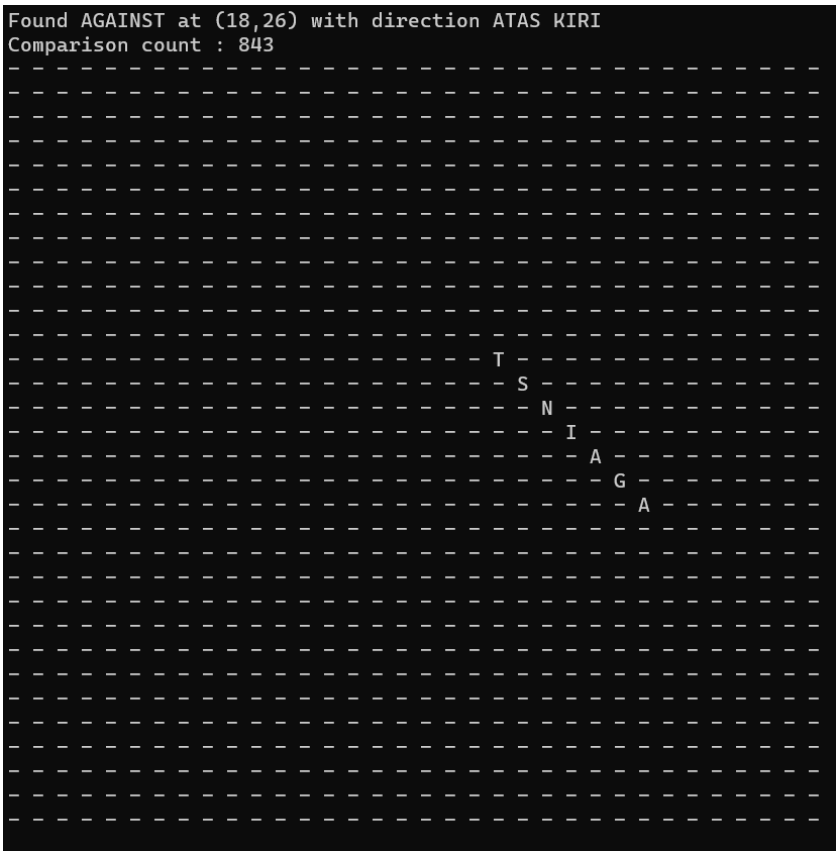

Found SPATULA at (16,14) with direction ATAS
Comparison count : 464
A
L
U
T
A
P
S



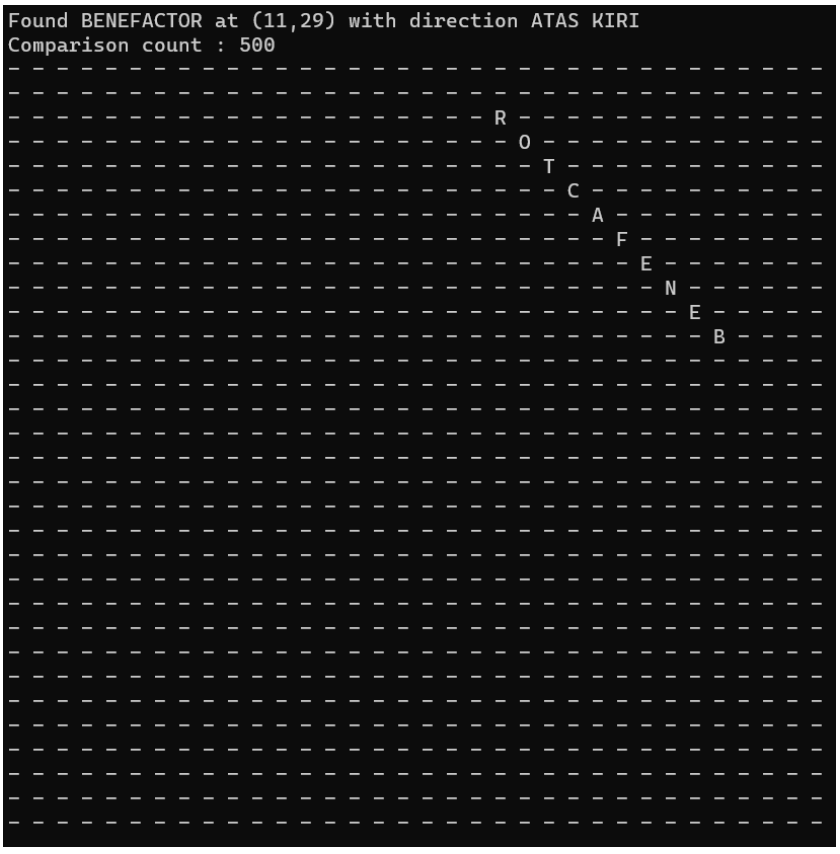
h. Luaran program dengan *file input* **large1.txt**
File ini berisi *puzzle* berukuran 32x34 dengan 48 kata. Berikut merupakan hasil tangkapan layar dari luaran program ini.

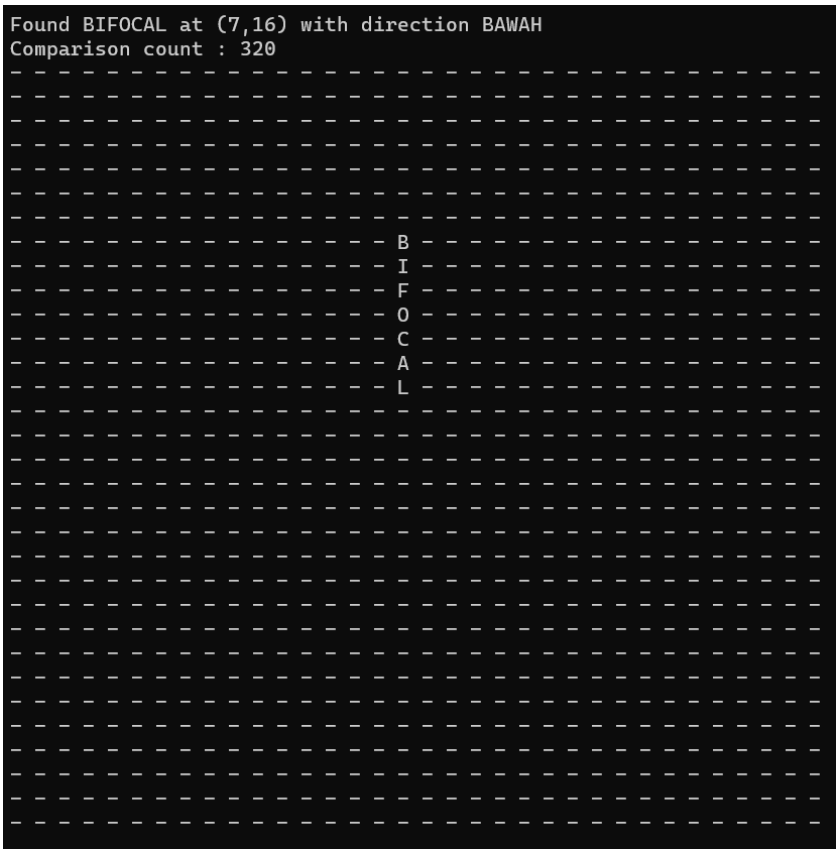


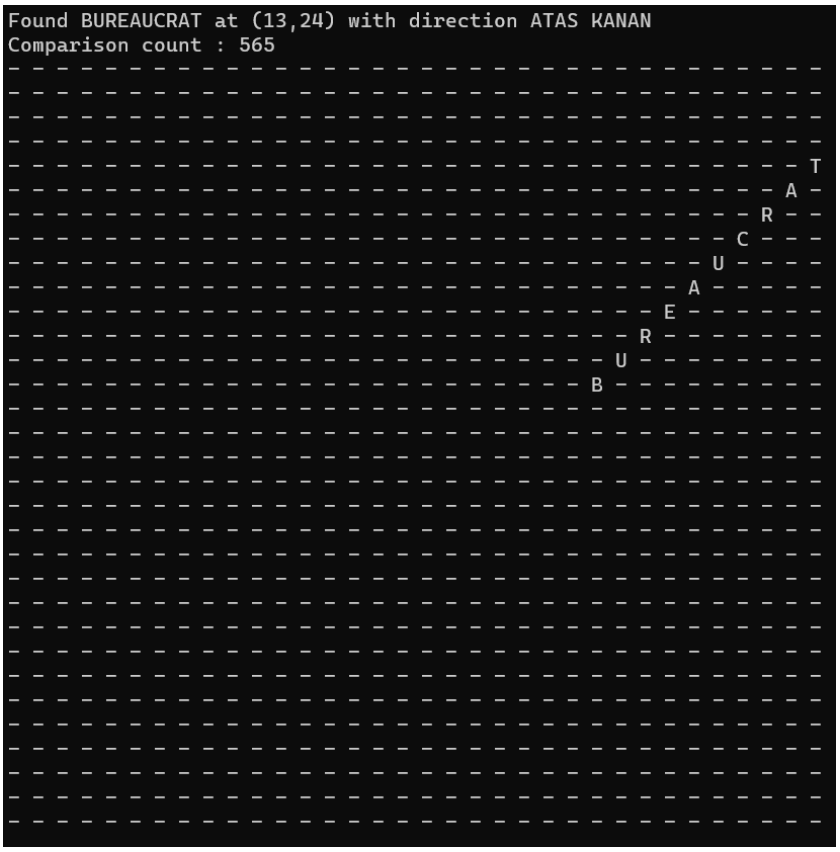

Found ADOPTED at (22,7) with direction BAWAH
Comparison count : 1020
A
D
O
P
T
E
D


Found AGAINST at (18,26) with direction ATAS KIRI
Comparison count : 843
T
S
N
I
A
G
A


Found AMBIDEXTROUS at (31,1) with direction KANAN
Comparison count : 1318
A M B I D E X T R O U S


Found BENEFACTOR at (11,29) with direction ATAS KIRI
Comparison count : 500
R
O
T
C
A
F
E
N
E
B


Found BIFOCAL at (7,16) with direction BAWAH
Comparison count : 320
B
I
F
O
C
A
L


Found BUREAUCRAT at (13,24) with direction ATAS KANAN
Comparison count : 565
T
A
R
C
U
A
E
R
U
B

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Found CANNERY at (0,11) with direction KIRI
Comparison count : 19
- - - - - Y R E N N A C - - - - - - - - - - - - - - - - - - - - - -
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Found CHEF at (27,33) with direction ATAS
Comparison count : 1278
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - C
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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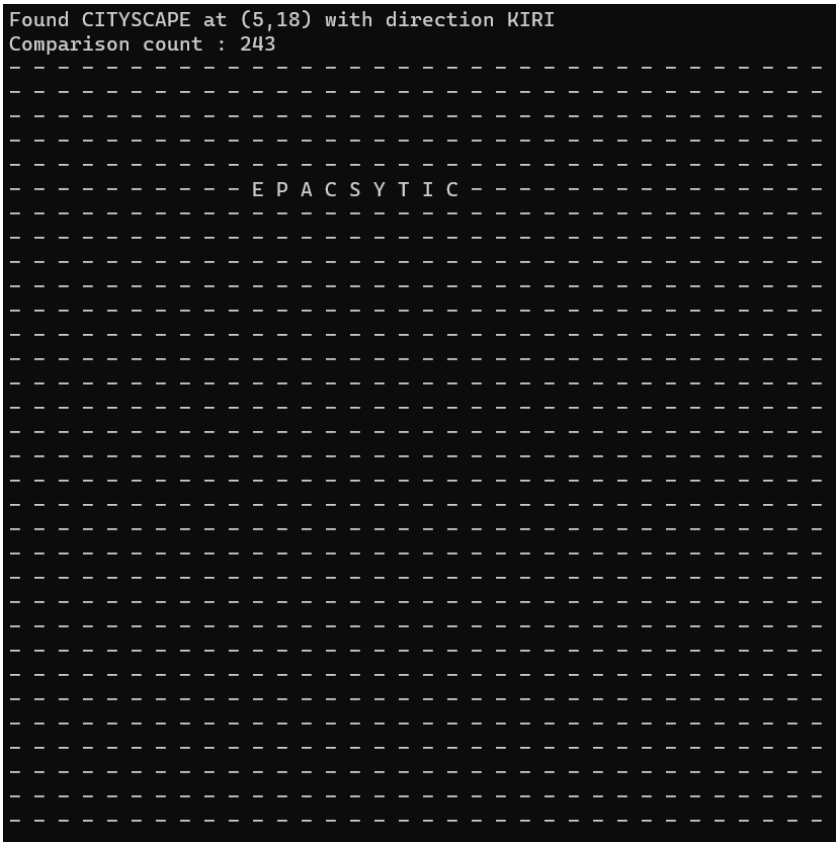
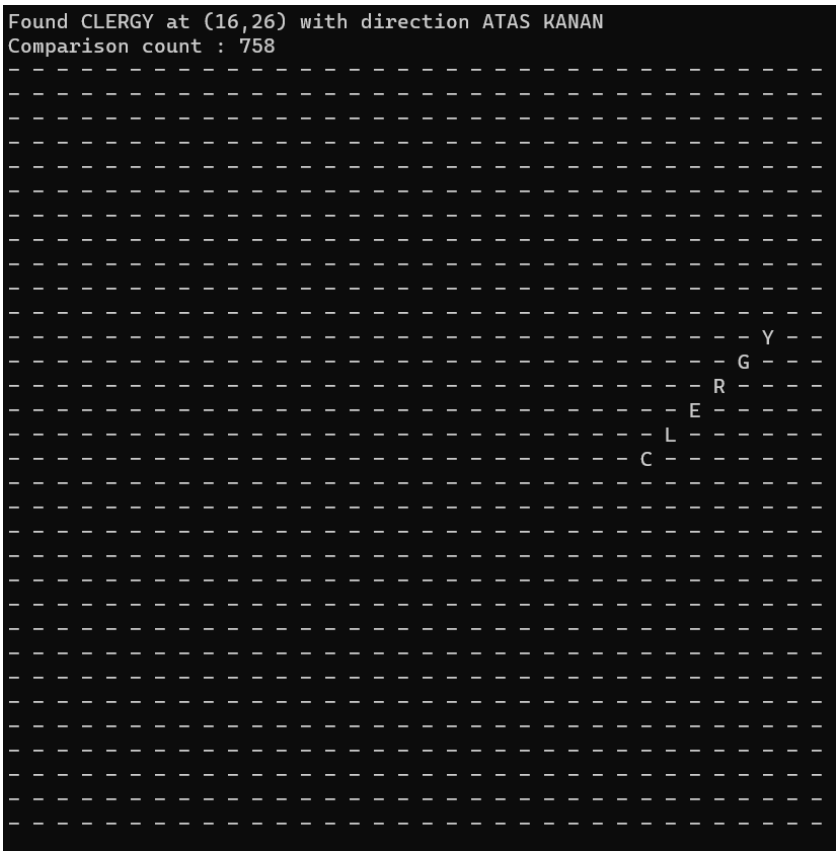
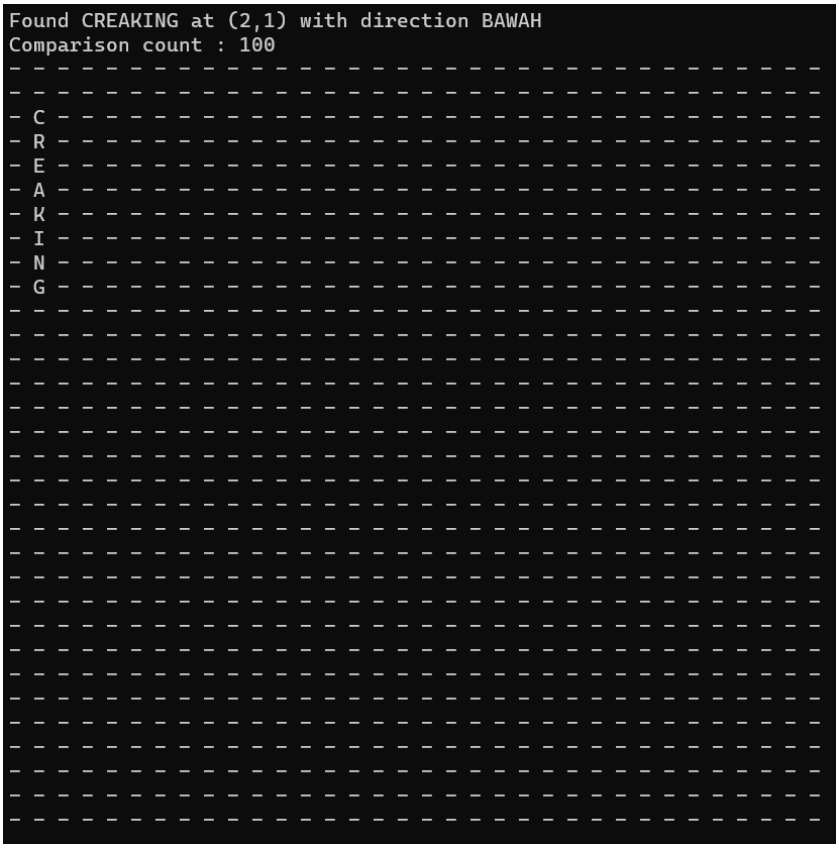
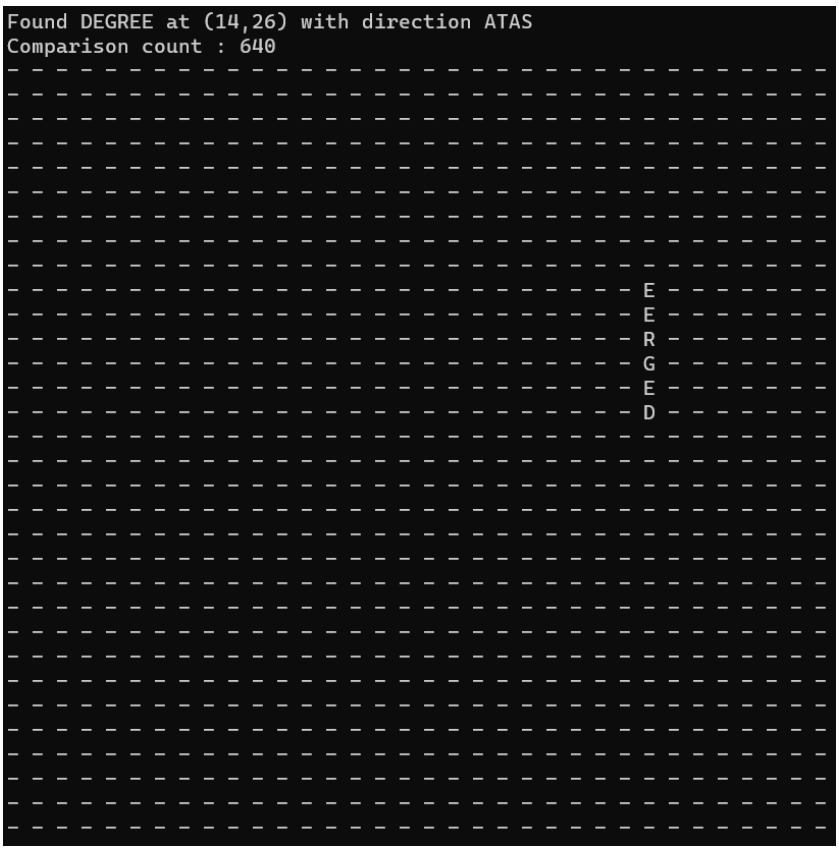
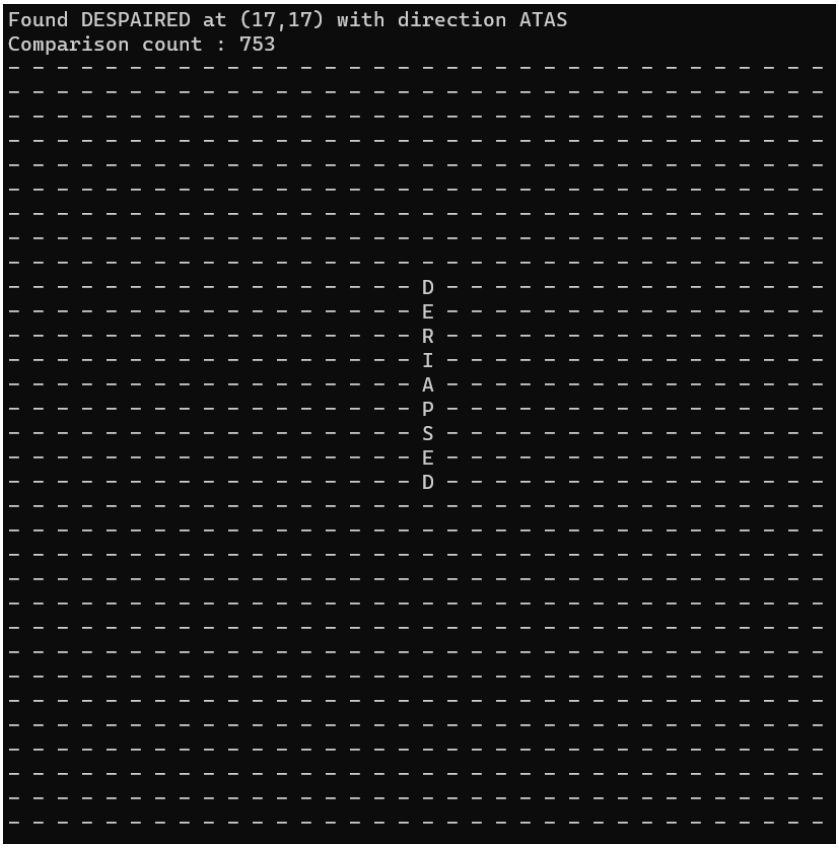
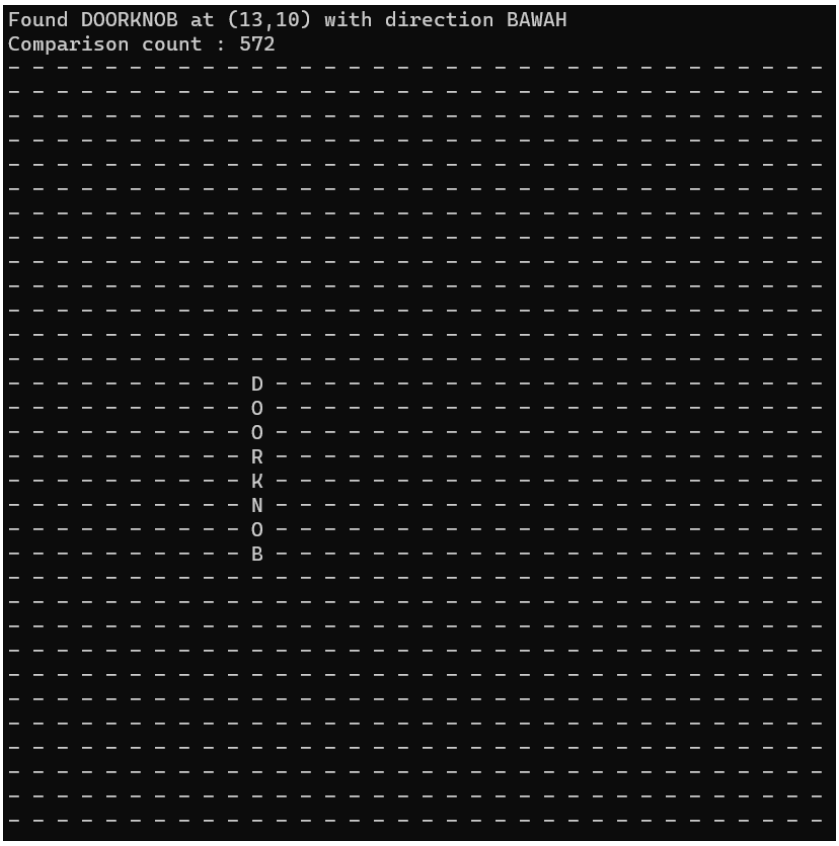

Found CITYSCAPE at (5,18) with direction KIRI
Comparison count : 243
E P A C S Y T I C


Found CLERGY at (16,26) with direction ATAS KANAN
Comparison count : 758
Y
G
R
E
L
C


Found CREAKING at (2,1) with direction BAWAH
Comparison count : 100


Found DEGREE at (14,26) with direction ATAS
Comparison count : 640


Found DESPAIRED at (17,17) with direction ATAS
Comparison count : 753
D
E
R
I
A
P
S
E
D


Found DOORKNOB at (13,10) with direction BAWAH
Comparison count : 572
D
O
O
R
K
N
O
B

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Found DRAMATIZING at (30,23) with direction KIRI
Comparison count : 1245
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Found DRAT at (2,5) with direction BAWAH KIRI
Comparison count : 91
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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- - - - - D - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - R - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - A - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - T - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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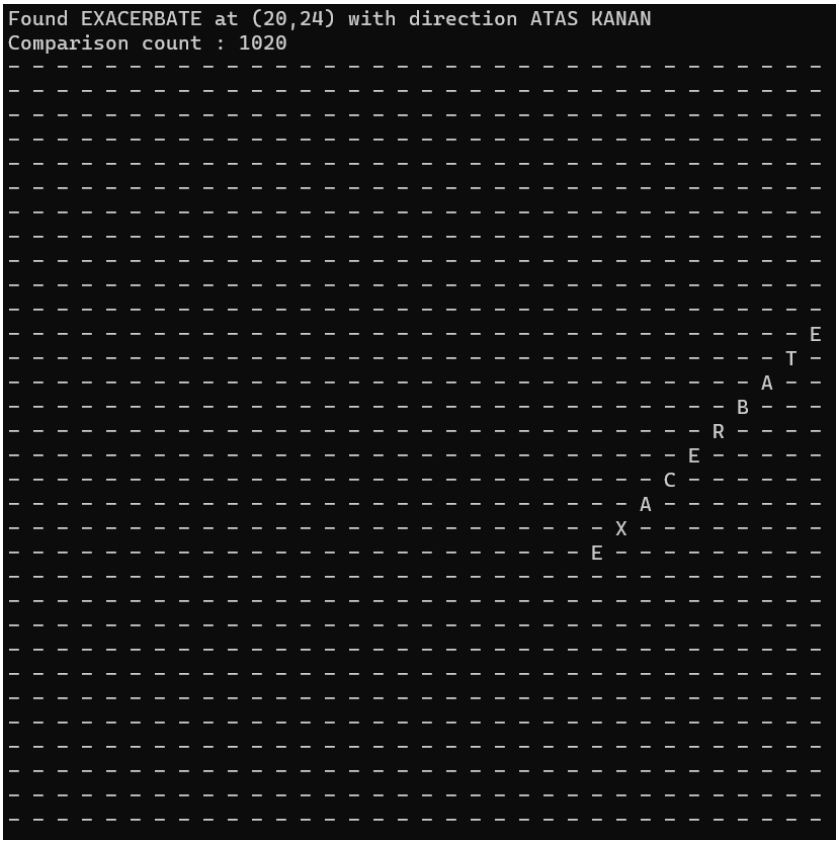
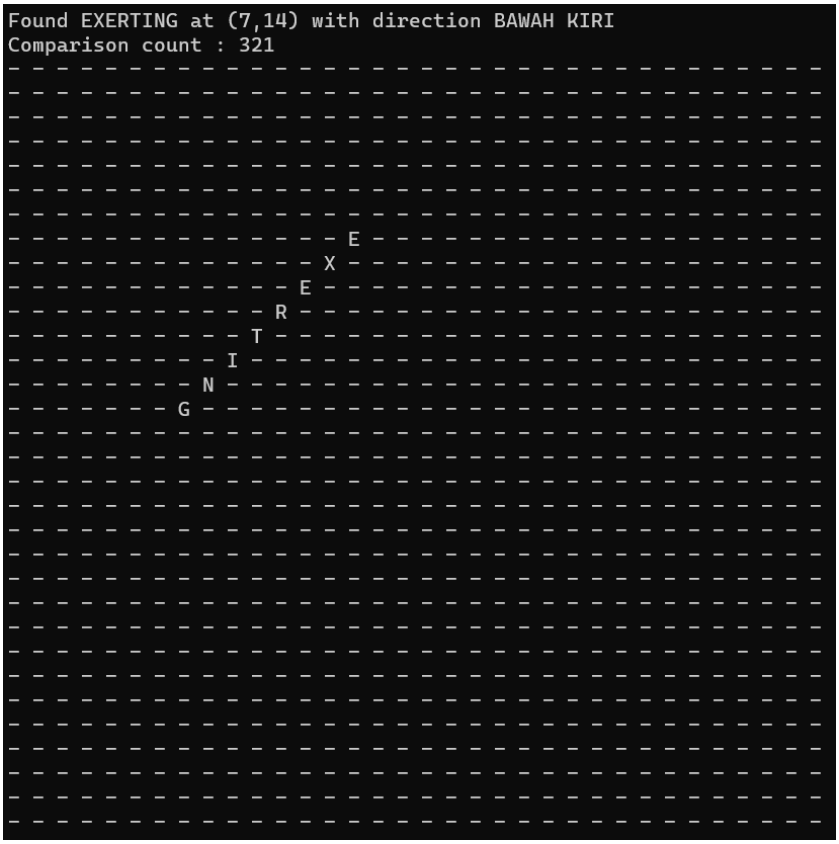
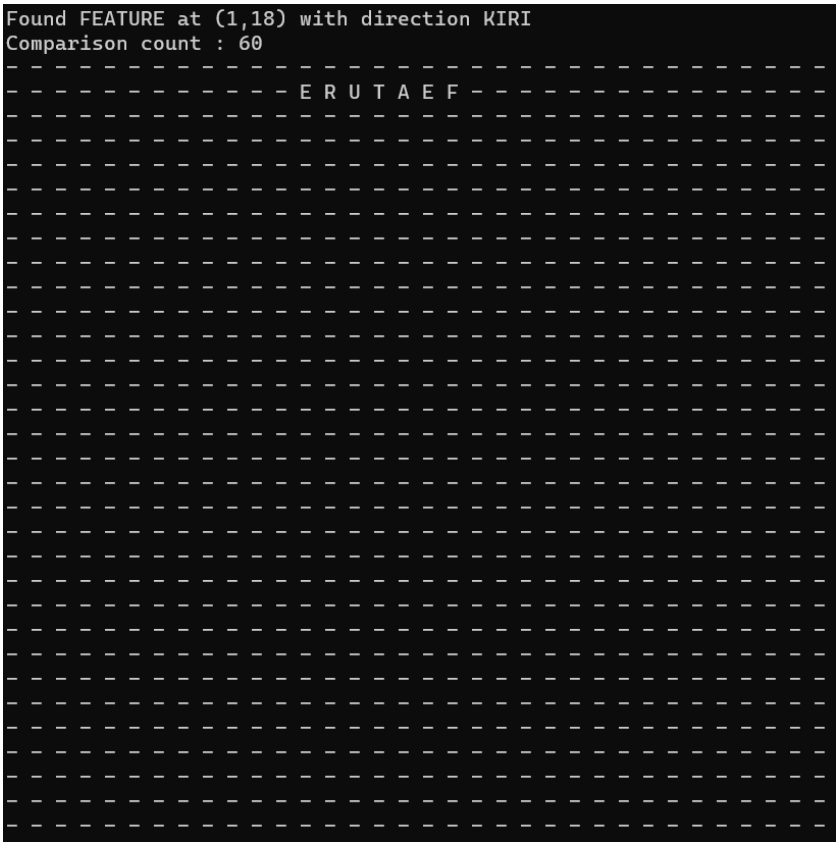
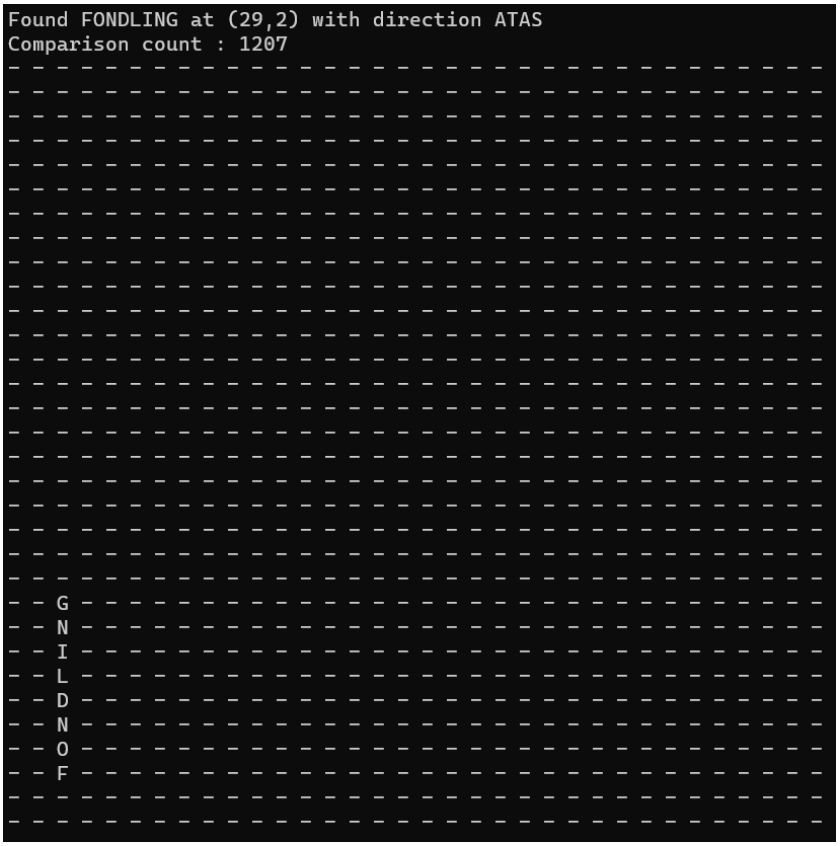

Found EXACERBATE at (20,24) with direction ATAS KANAN
Comparison count : 1020
E
T
A
B
R
E
C
A
X
E

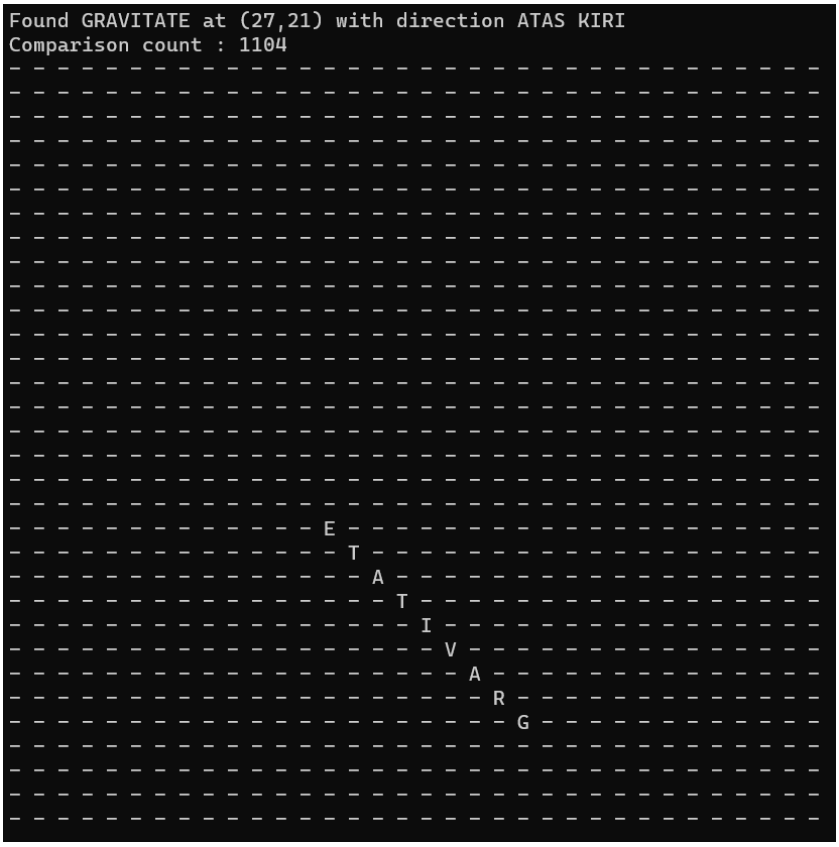

Found EXCEEDING at (16,18) with direction ATAS
Comparison count : 816
G
N
I
D
E
E
C
X
E

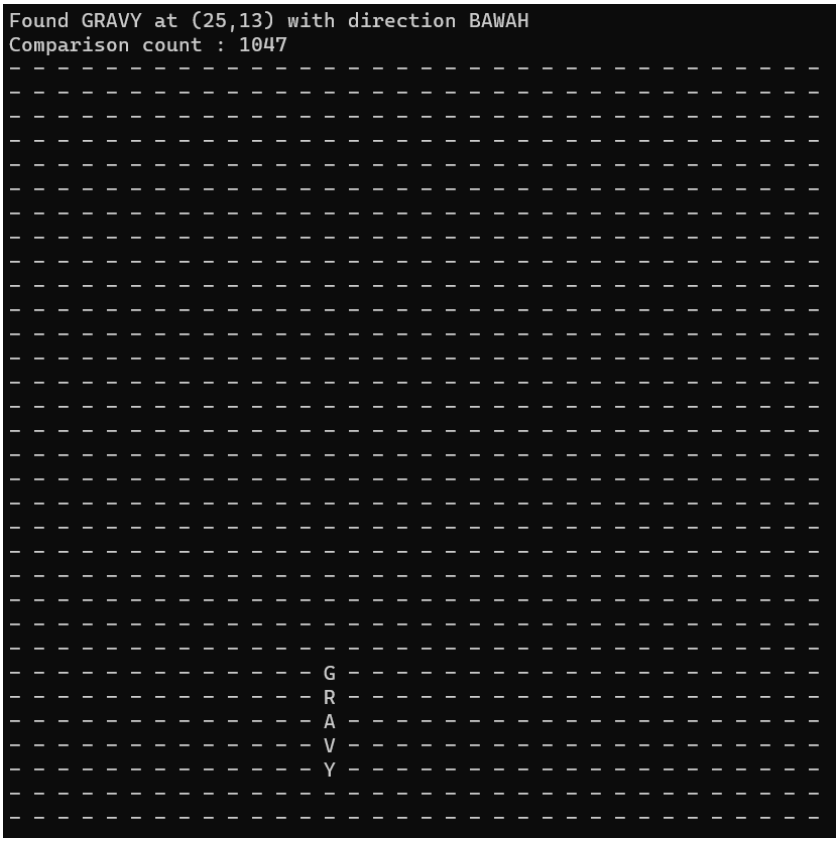

Found EXERTING at (7,14) with direction BAWAH KIRI
Comparison count : 321
E
X
E
R
T
I
N
G


Found FEATURE at (1,18) with direction KIRI
Comparison count : 60
E R U T A E F

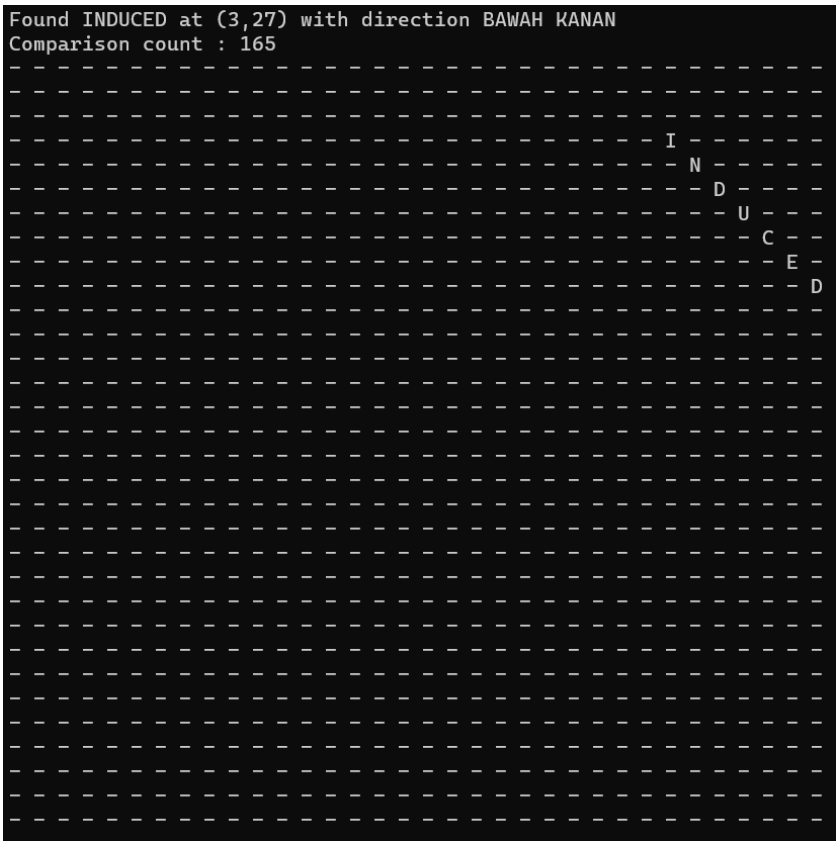

Found FEEBLY at (6,18) with direction KANAN
Comparison count : 281
F E E B L Y

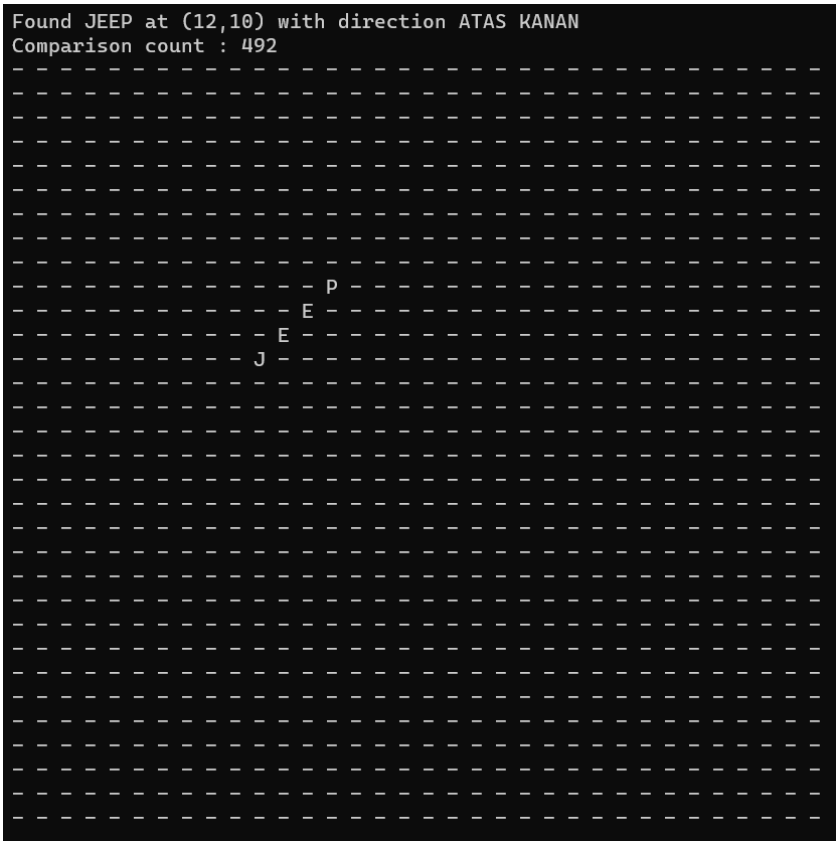

Found FONDLING at (29,2) with direction ATAS
Comparison count : 1207
G
N
I
L
D
N
O
F

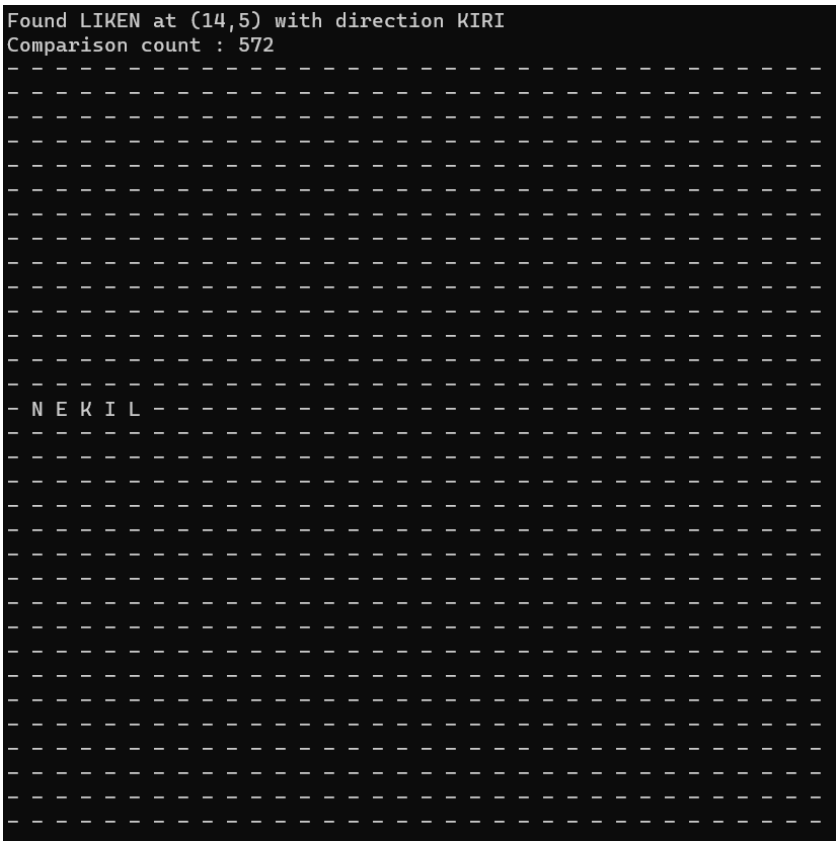

Found GRAVITATE at (27,21) with direction ATAS KIRI
Comparison count : 1104
E
T
A
T
I
V
A
R
G

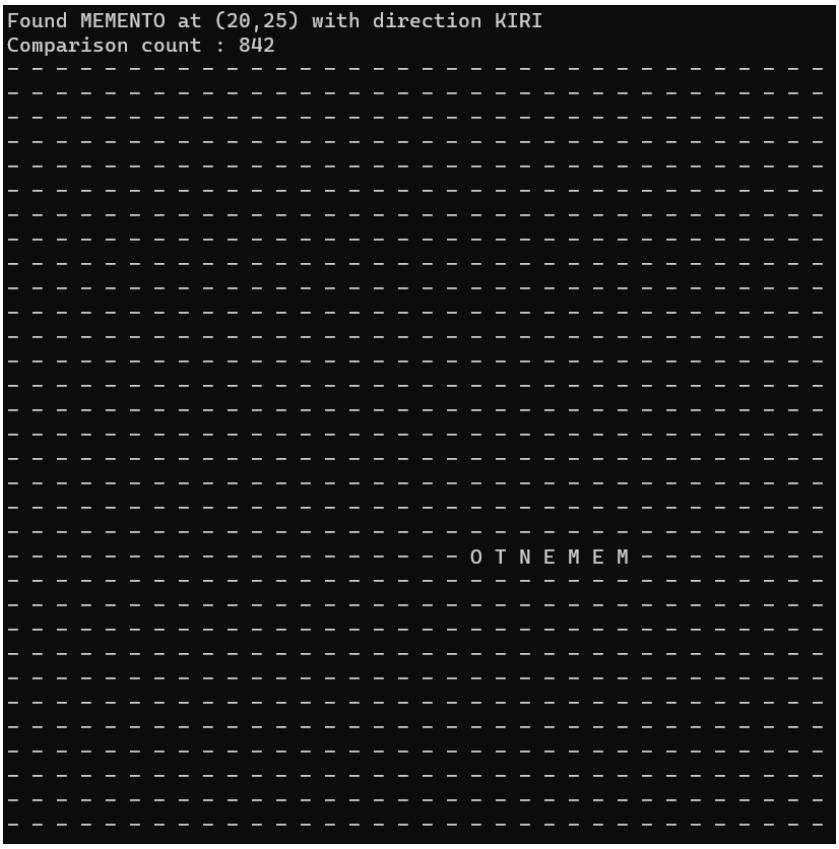

Found GRAVY at (25,13) with direction BAWAH
Comparison count : 1047
G
R
A
V
Y

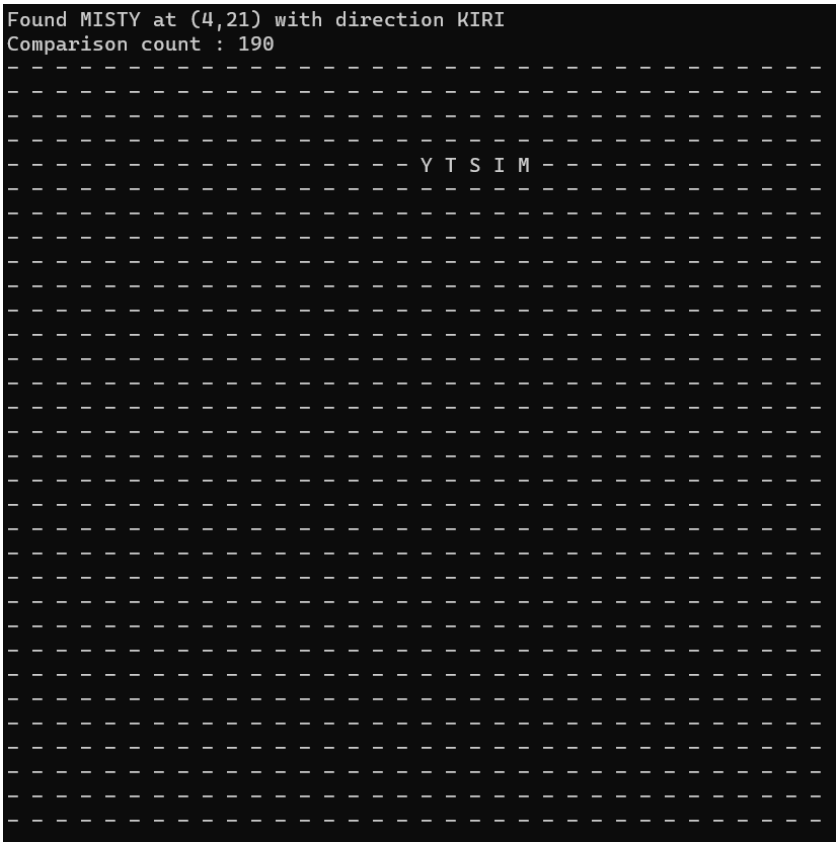

Found HIND at (17,8) with direction KIRI
Comparison count : 779
D N I H

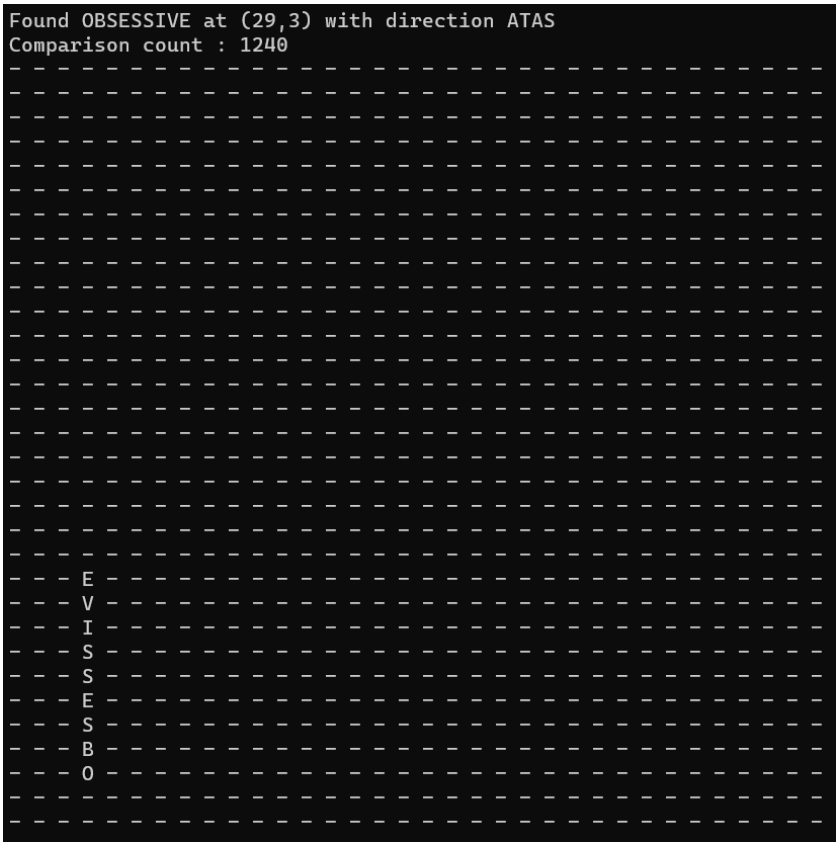

Found INDUCED at (3,27) with direction BAWAH KANAN
Comparison count : 165
I
N
D
U
C
E
D

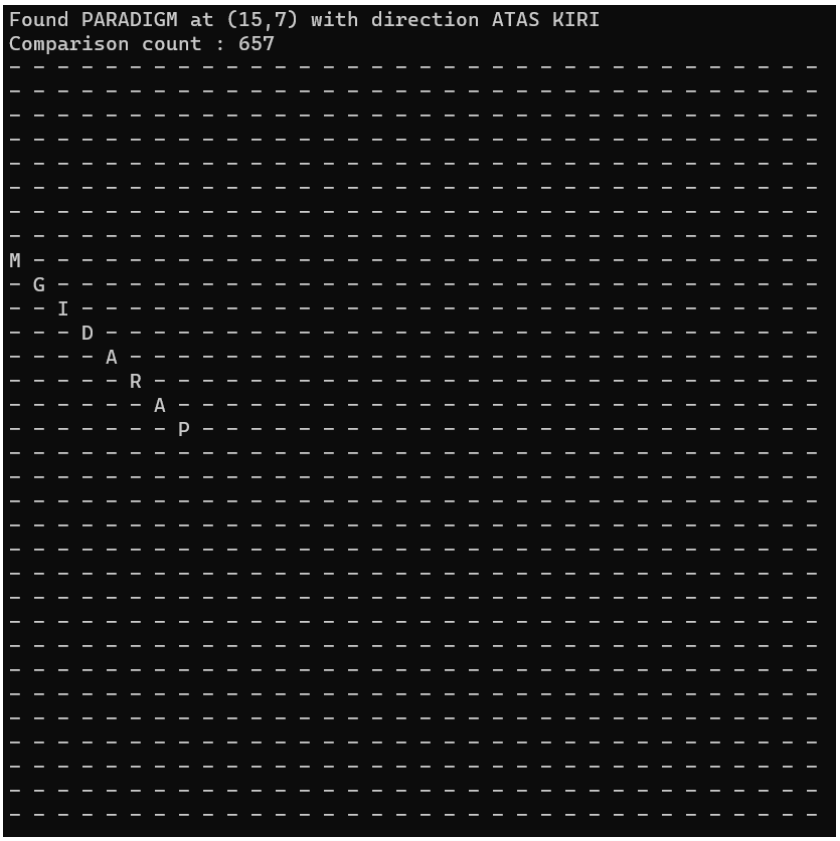

Found JEEP at (12,10) with direction ATAS KANAN
Comparison count : 492

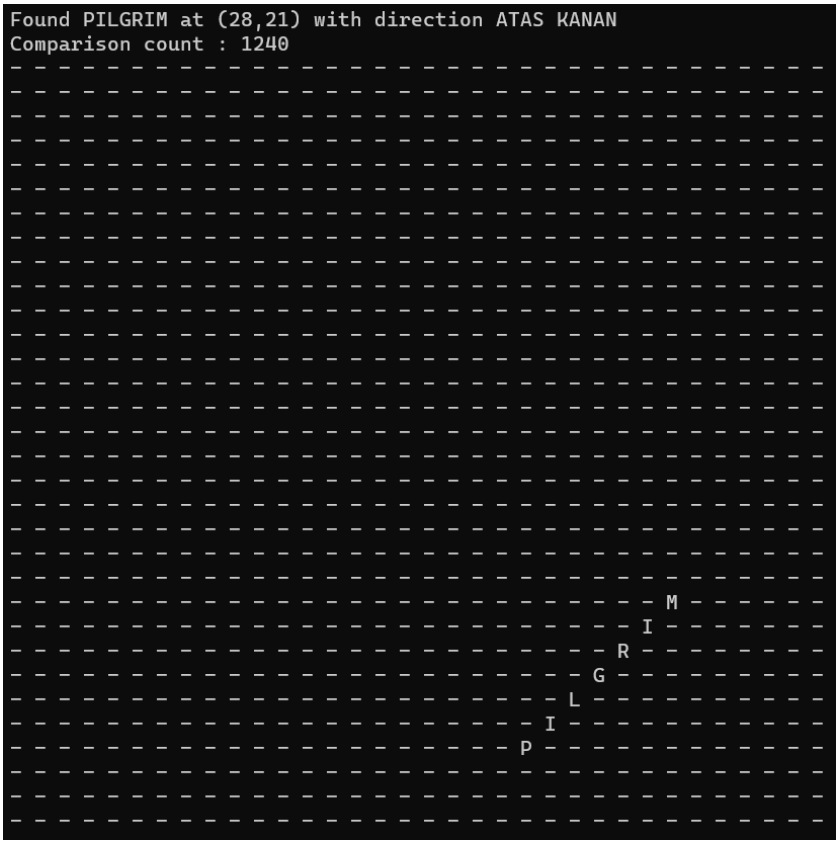

Found LIKEN at (14,5) with direction KIRI
Comparison count : 572

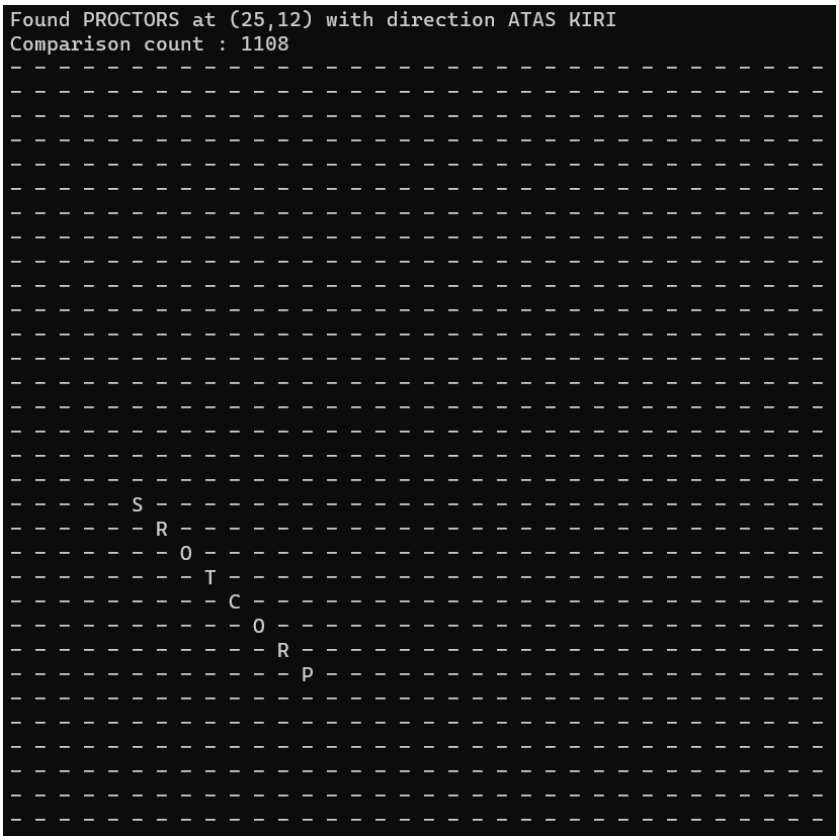

Found MEMENTO at (20,25) with direction KIRI
Comparison count : 842
O T N E M E M


Found MISTY at (4,21) with direction KIRI
Comparison count : 190
Y T S I M

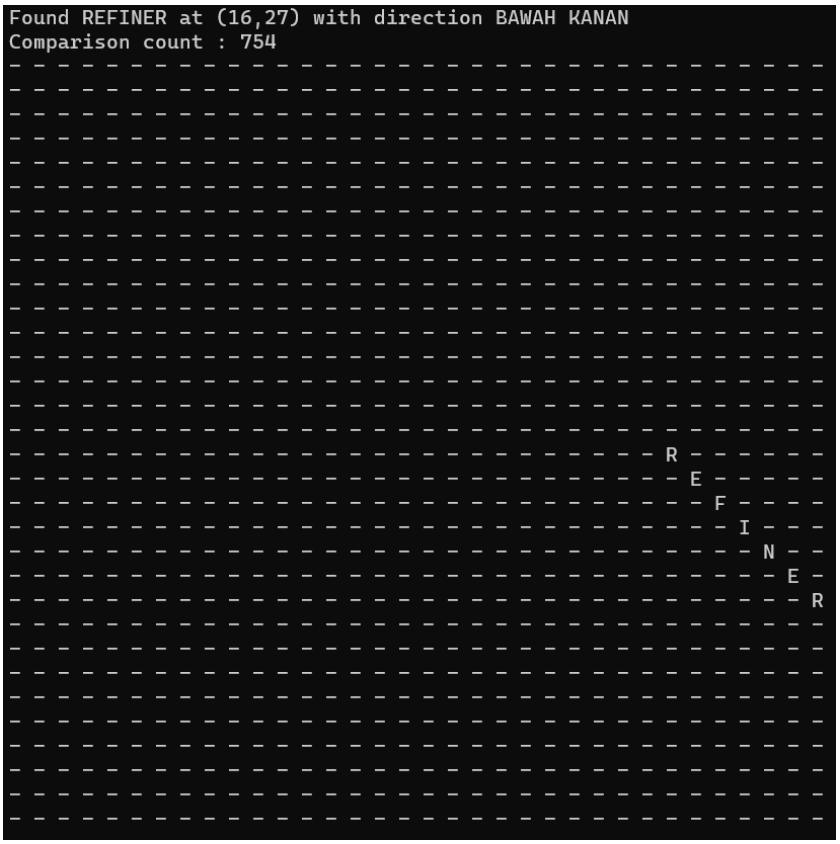

Found OBSESSIVE at (29,3) with direction ATAS
Comparison count : 1240


Found PARADIGM at (15,7) with direction ATAS KIRI
Comparison count : 657


Found PILGRIM at (28,21) with direction ATAS KANAN
Comparison count : 1240


Found PROCTORS at (25,12) with direction ATAS KIRI
Comparison count : 1108


Found PUNISHING at (16,1) with direction KANAN
Comparison count : 692
P U N I S H I N G


Found REFINER at (16,27) with direction BAWAH KANAN
Comparison count : 754
R
E
F
I
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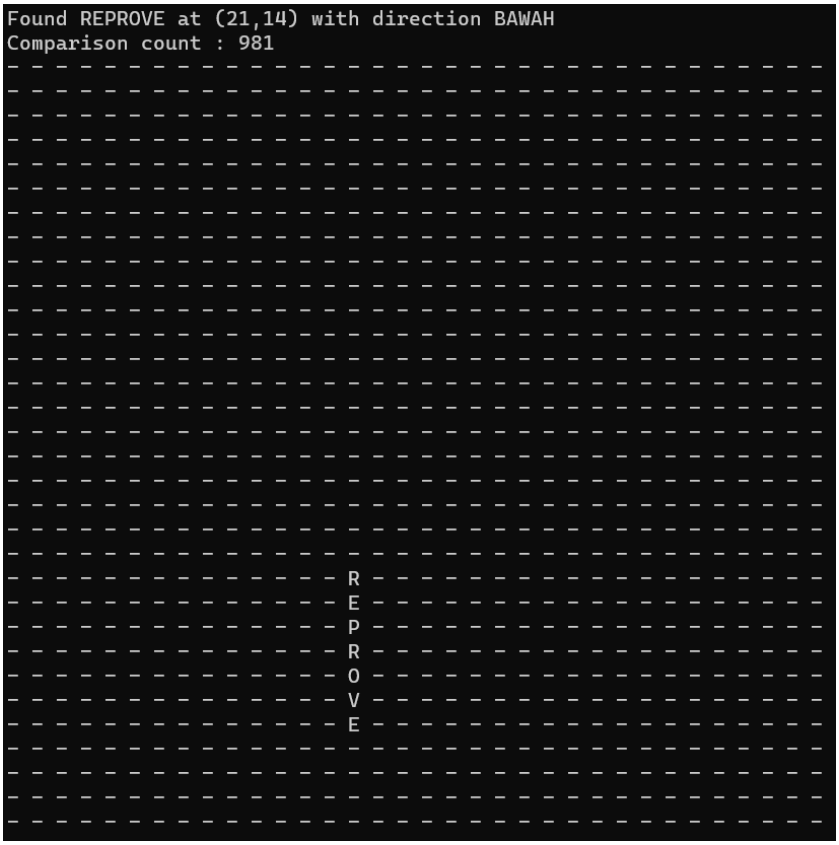
Found REPROVE at (21,14) with direction BAWAH
Comparison count : 981
R
E
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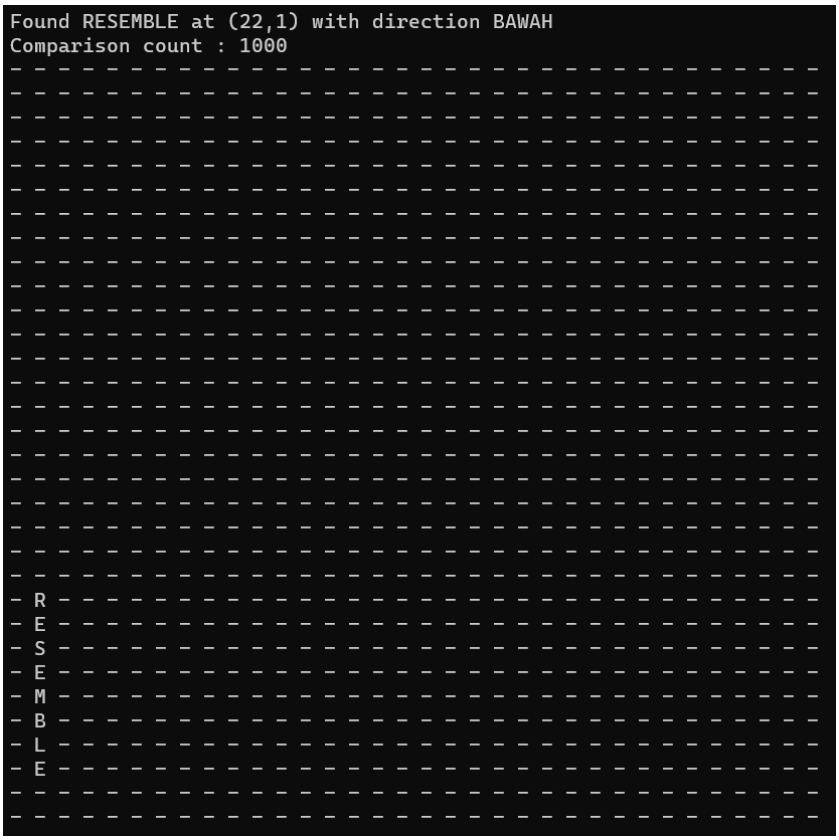
Found RESEMBLE at (22,1) with direction BAWAH
Comparison count : 1000
R
E
S
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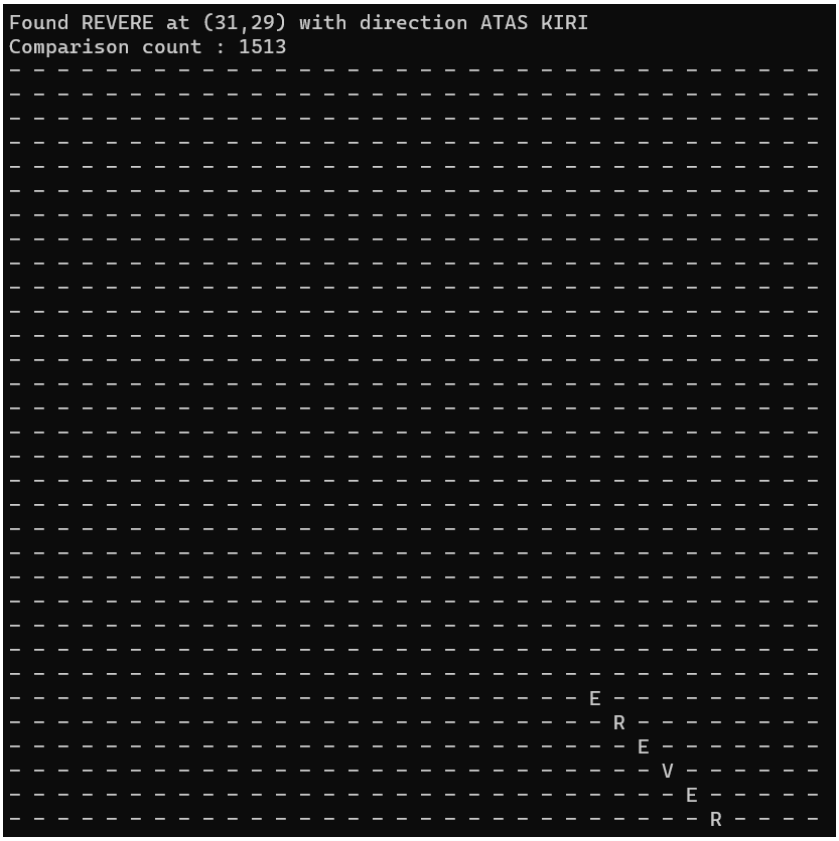
Found REVERE at (31,29) with direction ATAS KIRI
Comparison count : 1513
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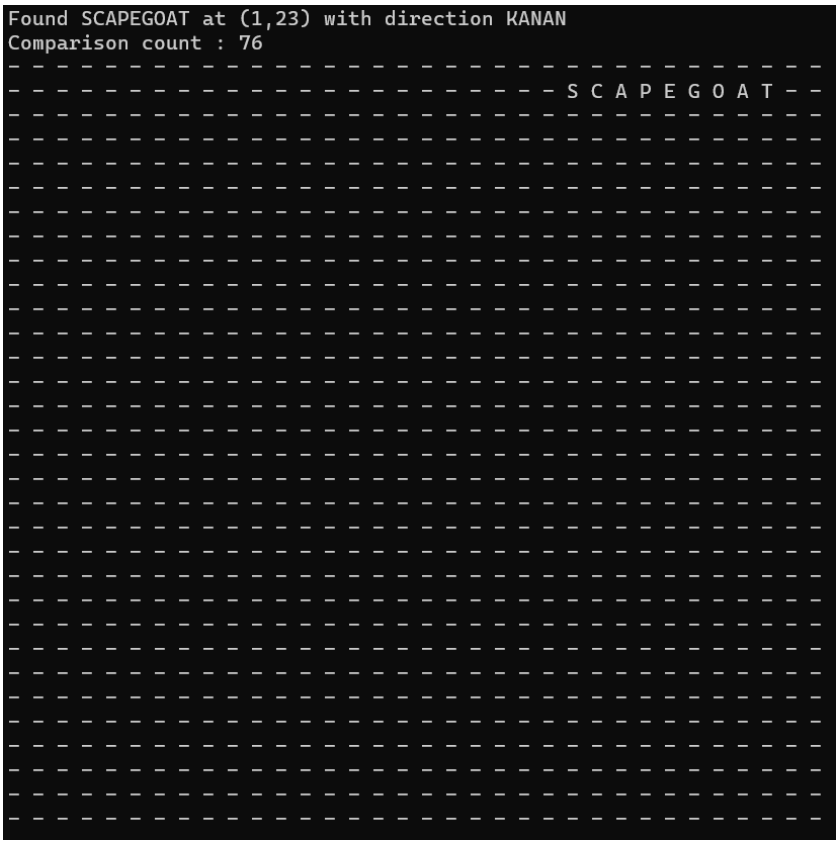
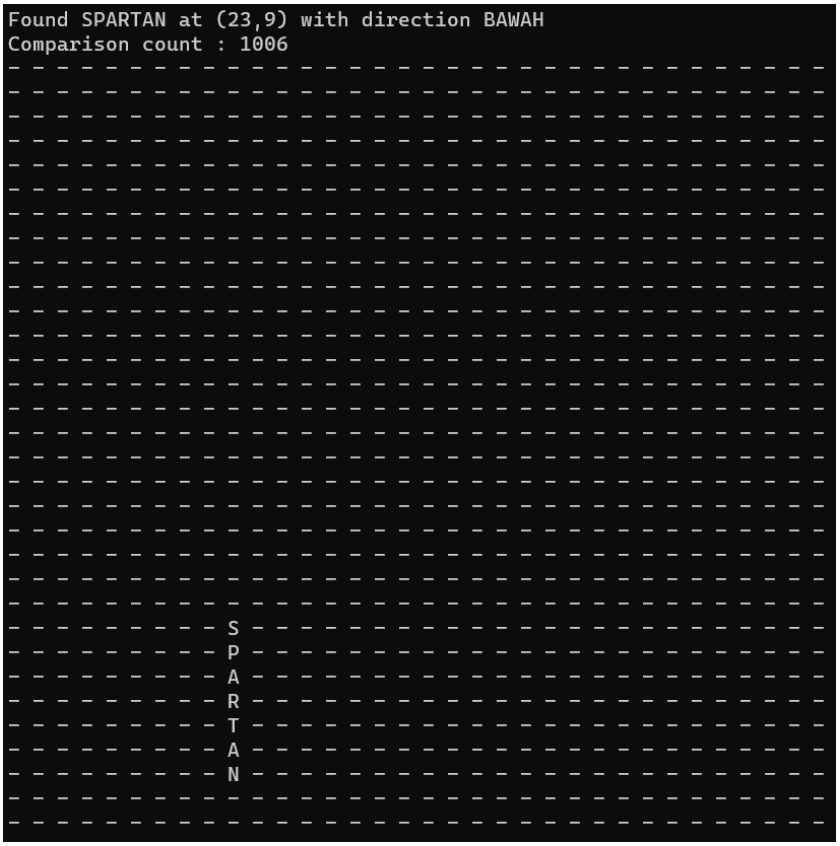

Found SCAPEGOAT at (1,23) with direction KANAN
Comparison count : 76
S C A P E G O A T


Found SINCERITY at (23,20) with direction KANAN
Comparison count : 1019
S I N C E R I T Y


Found SPARTAN at (23,9) with direction BAWAH
Comparison count : 1006
S
P
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Found SURPASS at (30,9) with direction KIRI
Comparison count : 1295
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Found SYNCHRONIZE at (9,2) with direction KANAN
Comparison count : 374
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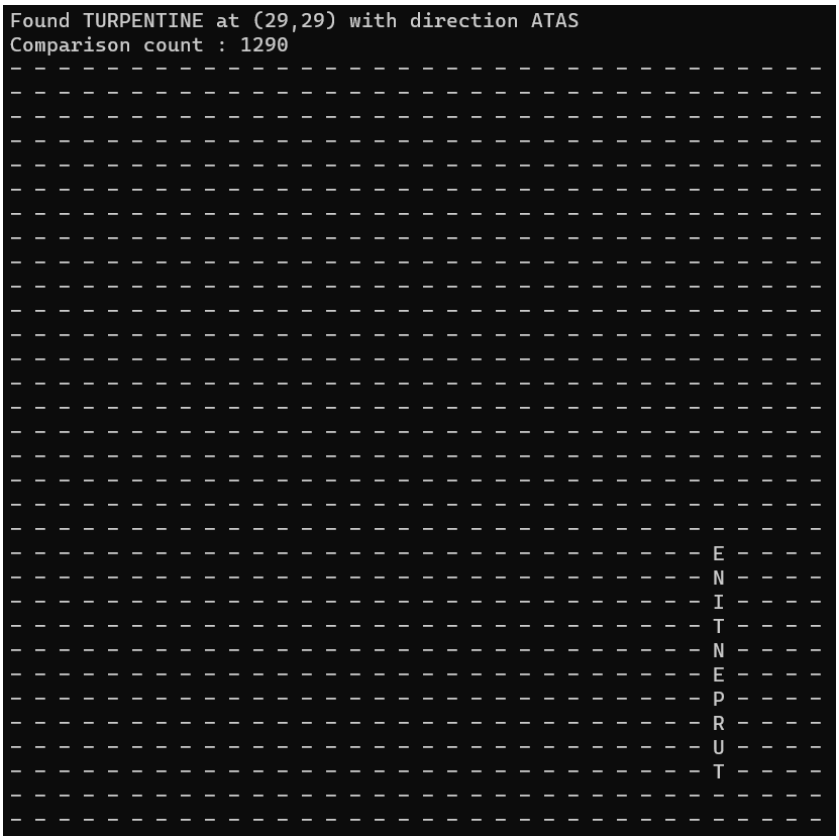
Found TURPENTINE at (29,29) with direction ATAS
Comparison count : 1290
E
N
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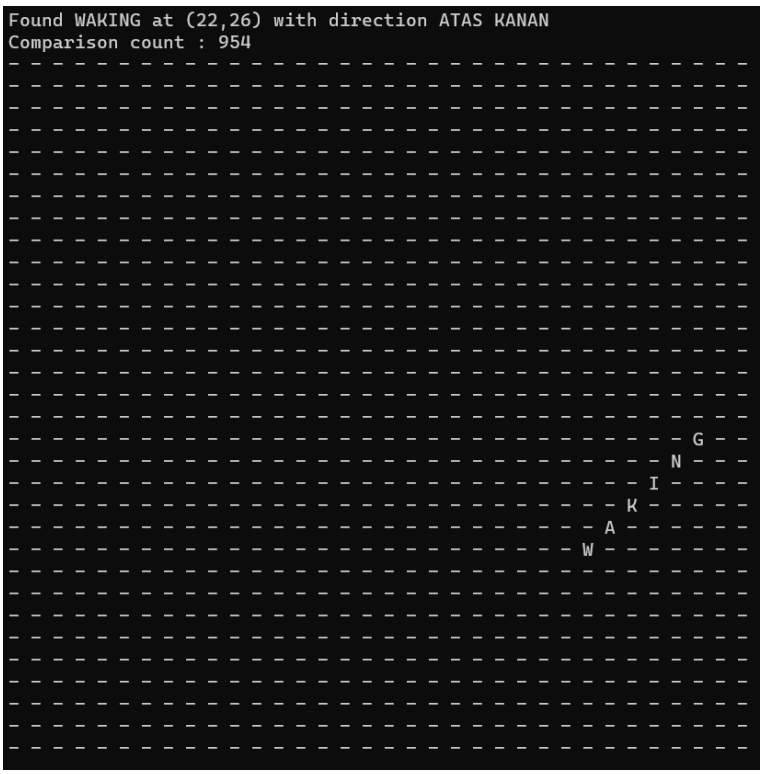
T
N
E
P
R
U
T


Found WAKING at (22,26) with direction ATAS KANAN
Comparison count : 954
G
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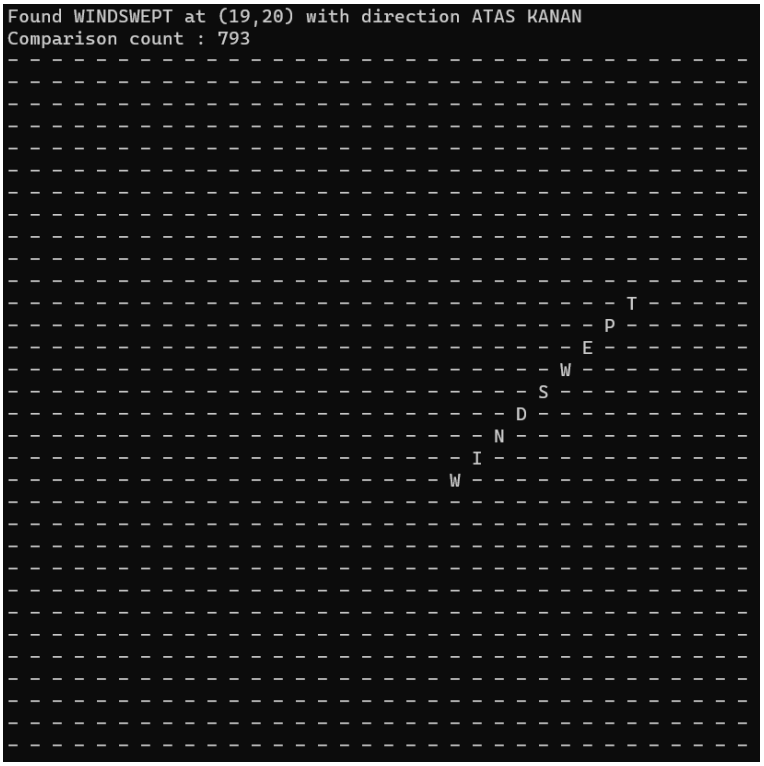
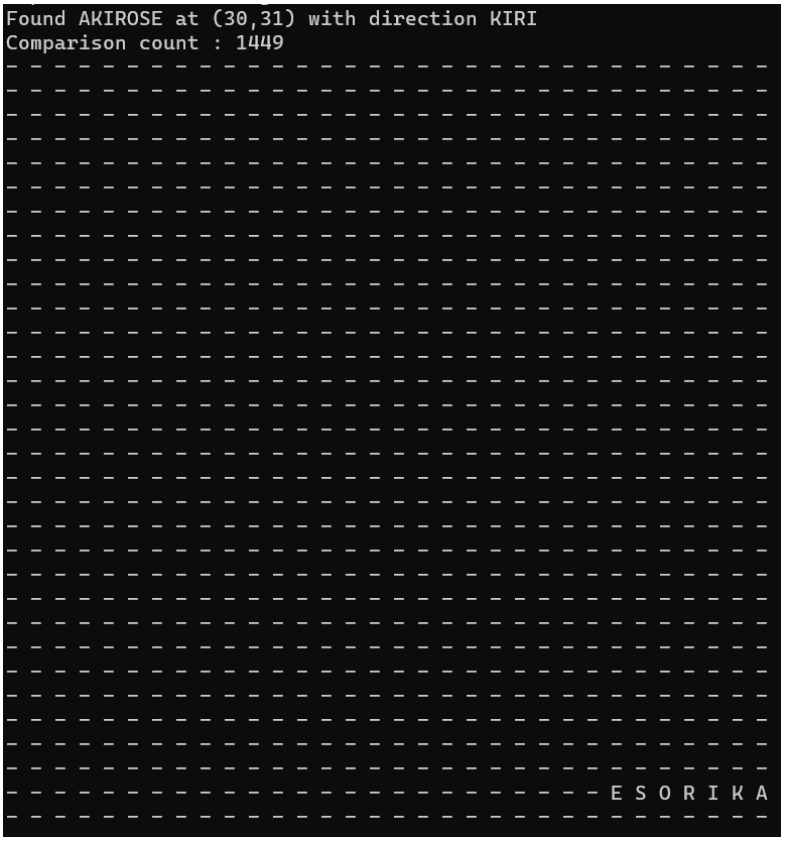
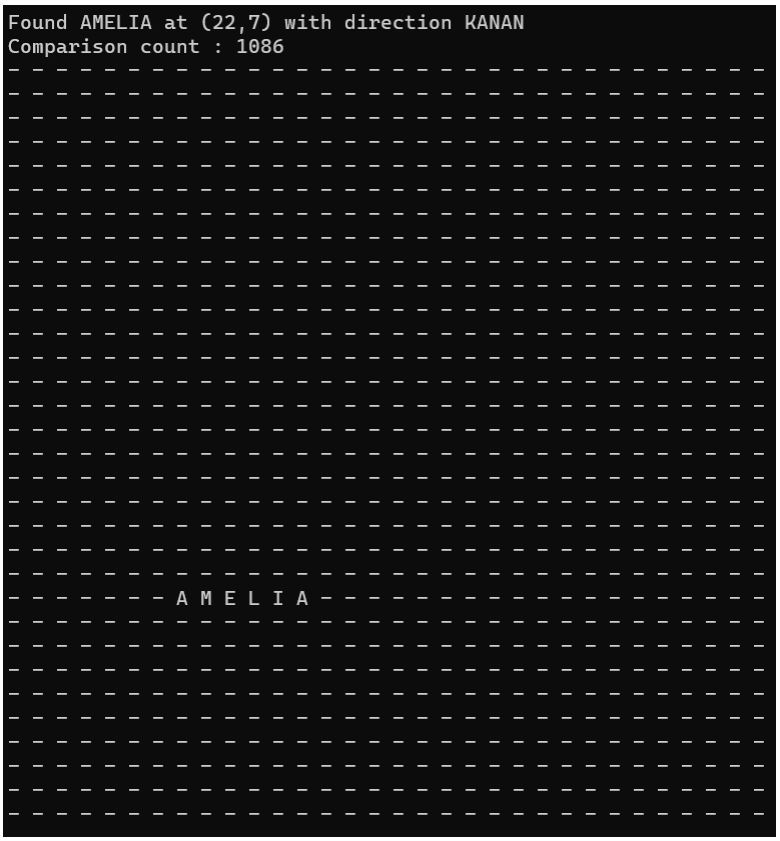
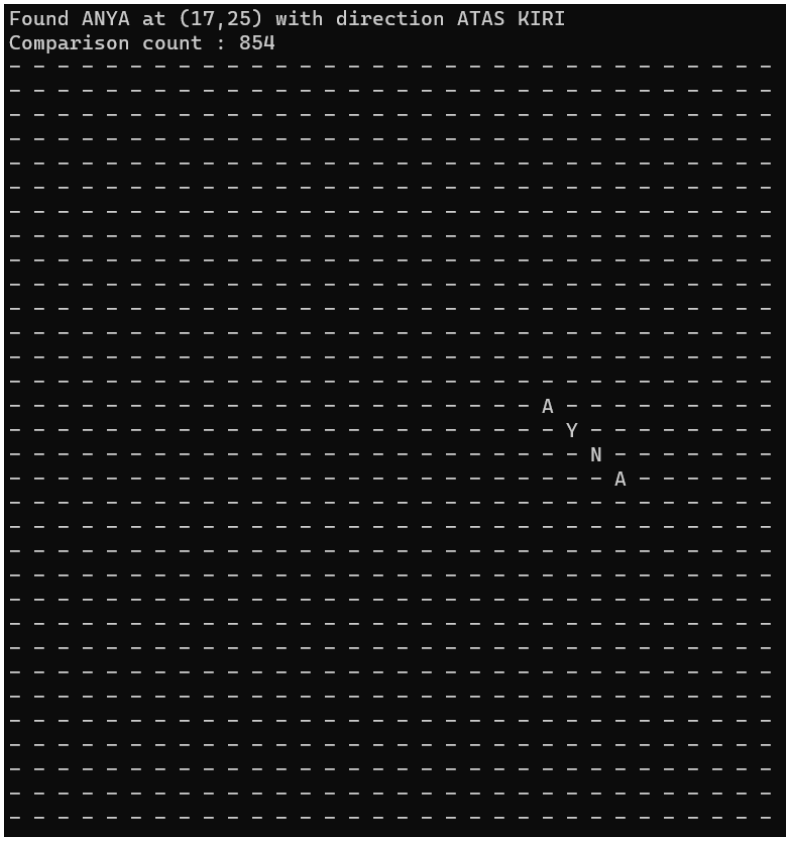
K
A
W



i. Hasil luaran dengan *file input* **large2.txt**
File input **large2.txt** berisi *puzzle* berukuran 32x32 dengan 54 kata. Berikut merupakan hasil tangkapan layar dari program ini ketika dijalankan.


Found AKIROSE at (30,31) with direction KIRI
Comparison count : 1449
E S O R I K A


Found AMELIA at (22,7) with direction KANAN
Comparison count : 1086
A M E L I A


Found ANYA at (17,25) with direction ATAS KIRI
Comparison count : 854
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Y
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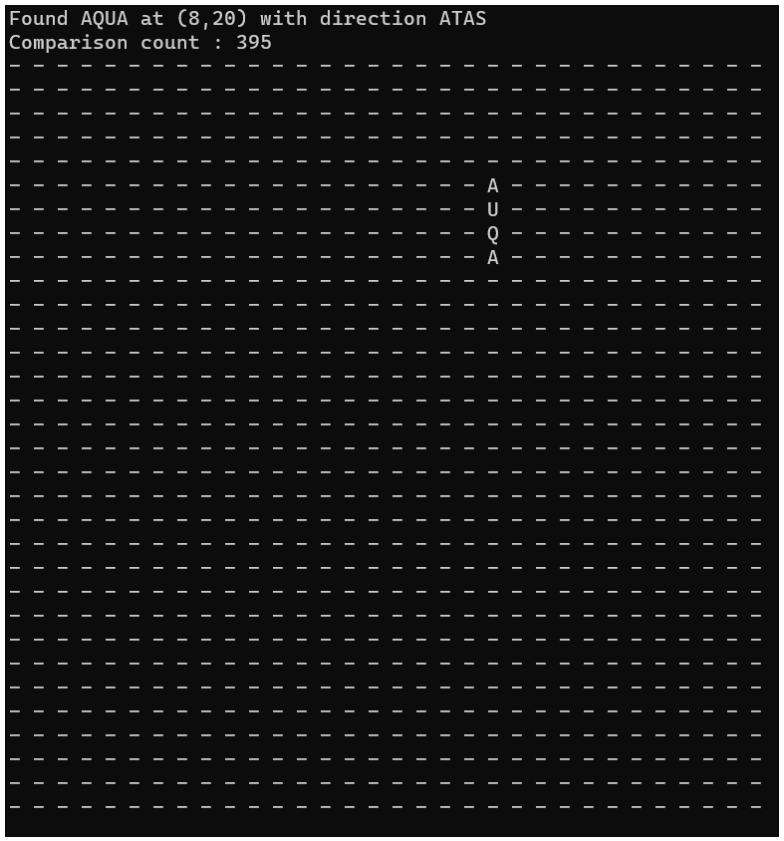
A


Found AQUA at (8,20) with direction ATAS
Comparison count : 395
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U
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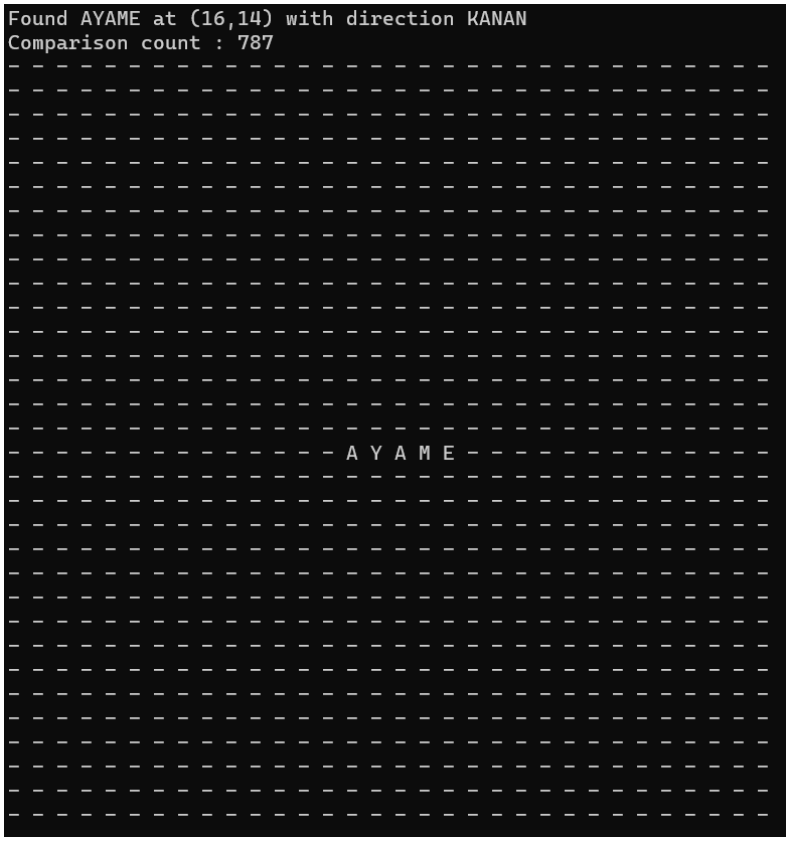
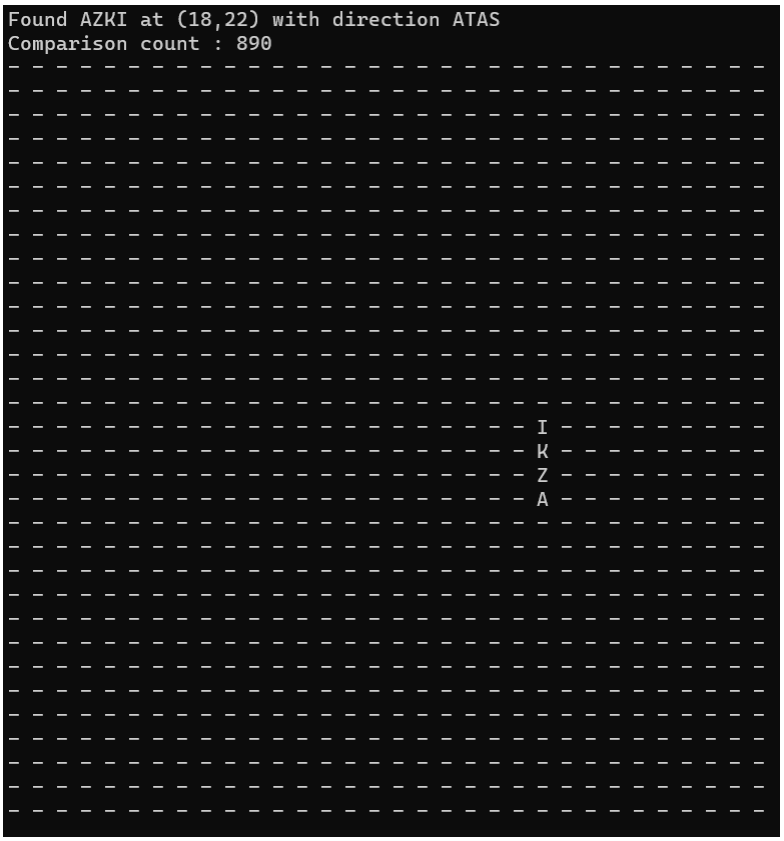

Found AYAME at (16,14) with direction KANAN
Comparison count : 787
A Y A M E


Found AZKI at (18,22) with direction ATAS
Comparison count : 890
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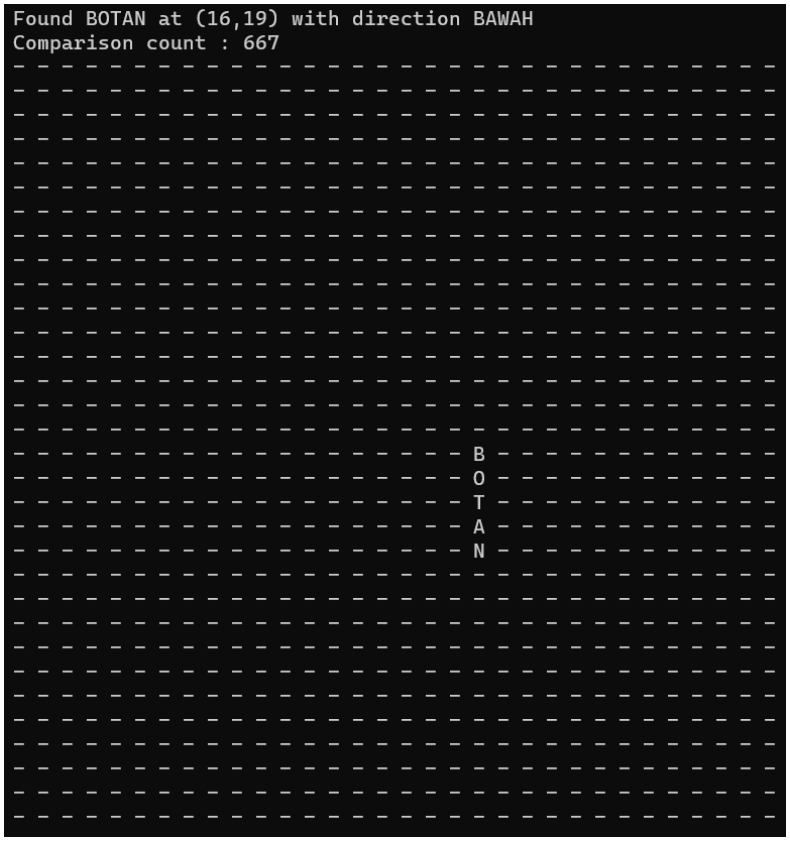
Found BOTAN at (16,19) with direction BAWAH
Comparison count : 667
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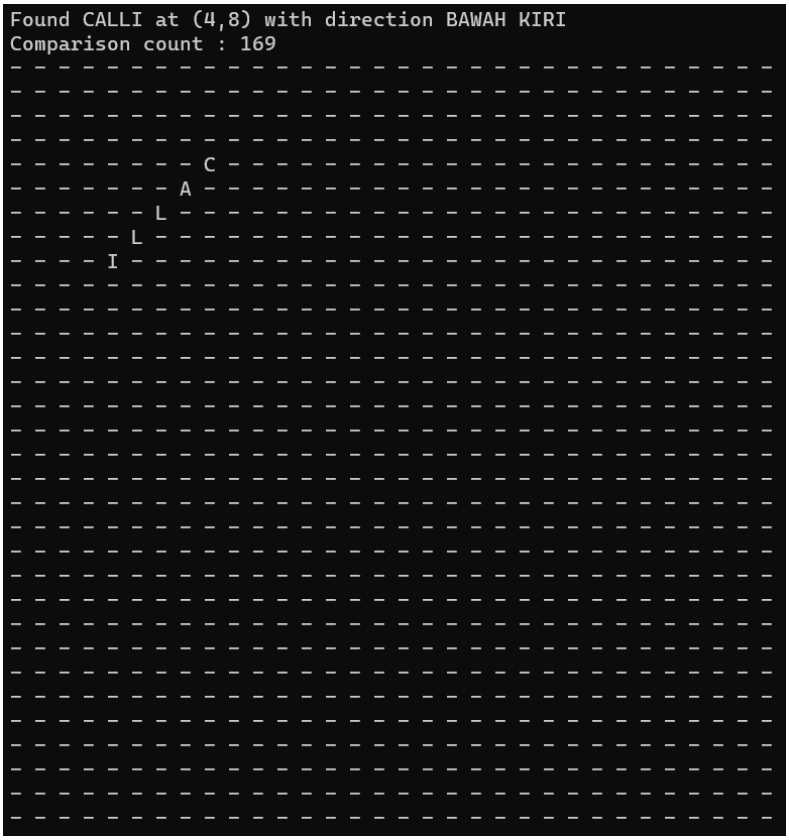
Found CALLI at (4,8) with direction BAWAH KIRI
Comparison count : 169
C
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Found CHLOE at (20,9) with direction ATAS KANAN
Comparison count : 804
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```
Found CHOCO at (0,1) with direction BAWAH KANAN
Comparison count : 9
- C - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - H - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - O - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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```
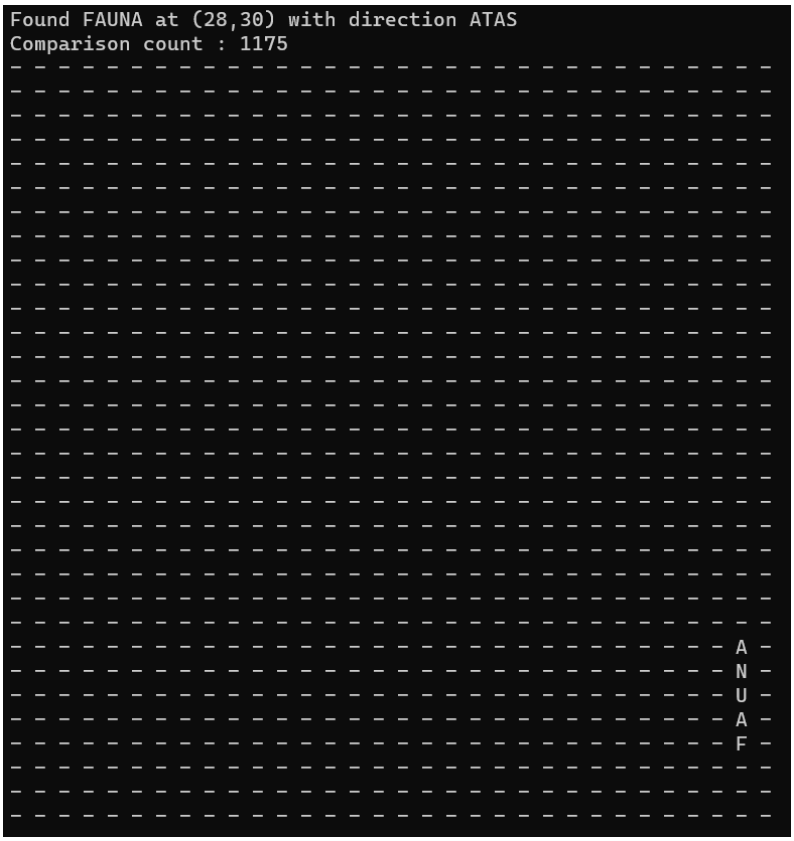
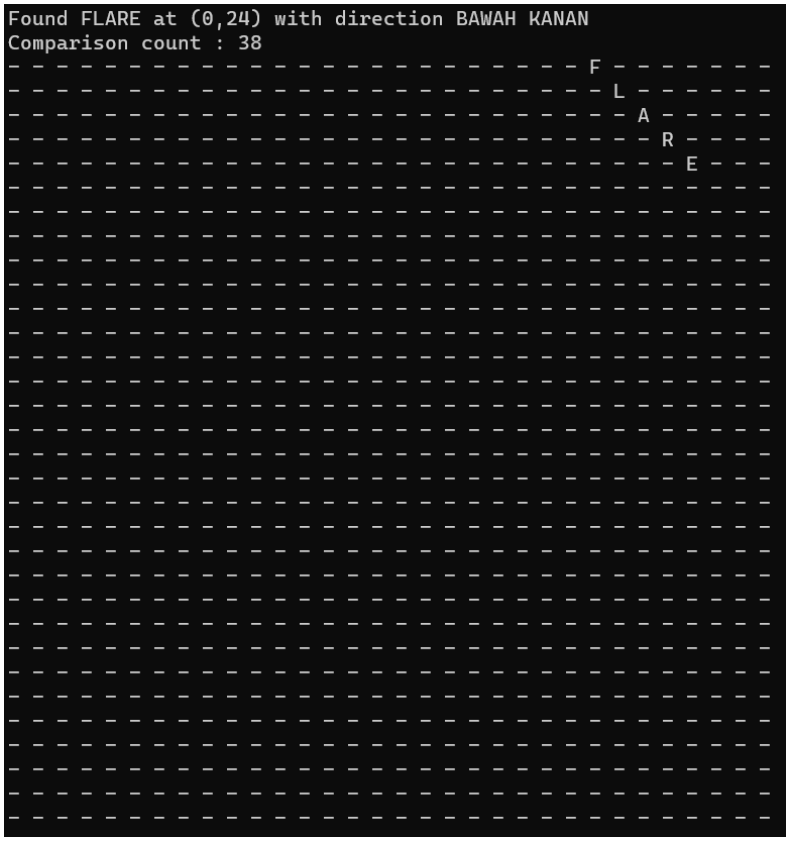
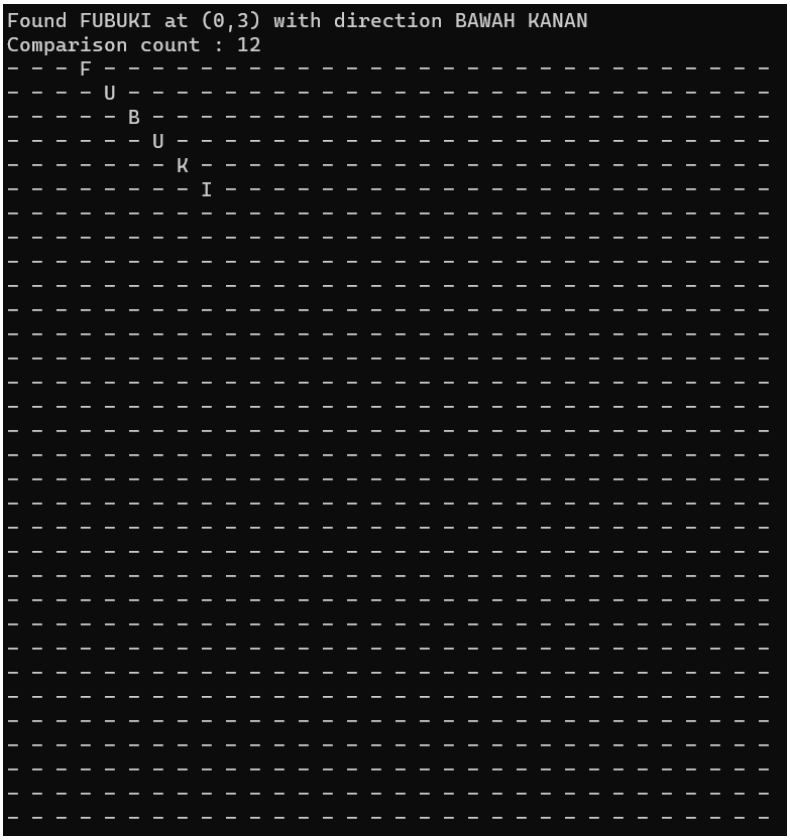
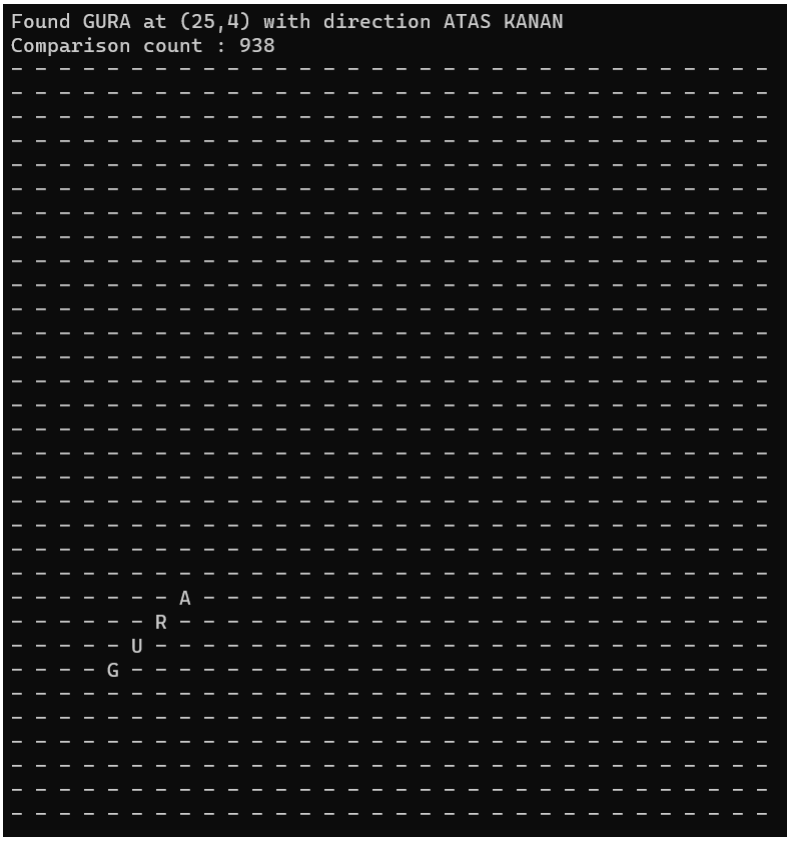


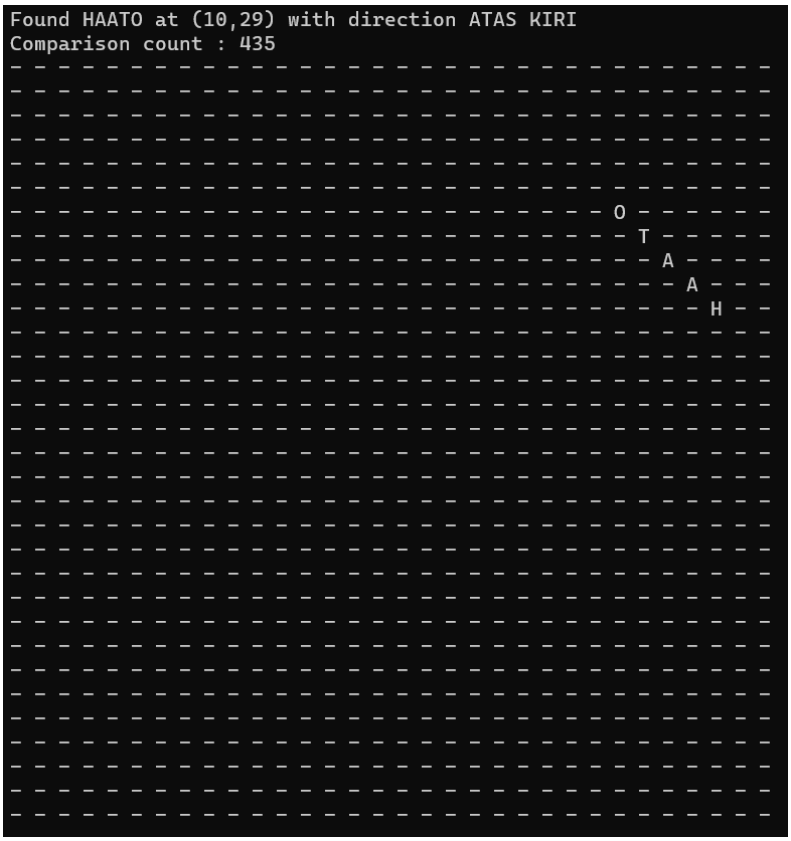
Found COCO at (13,2) with direction KANAN
Comparison count : 535
C O C O

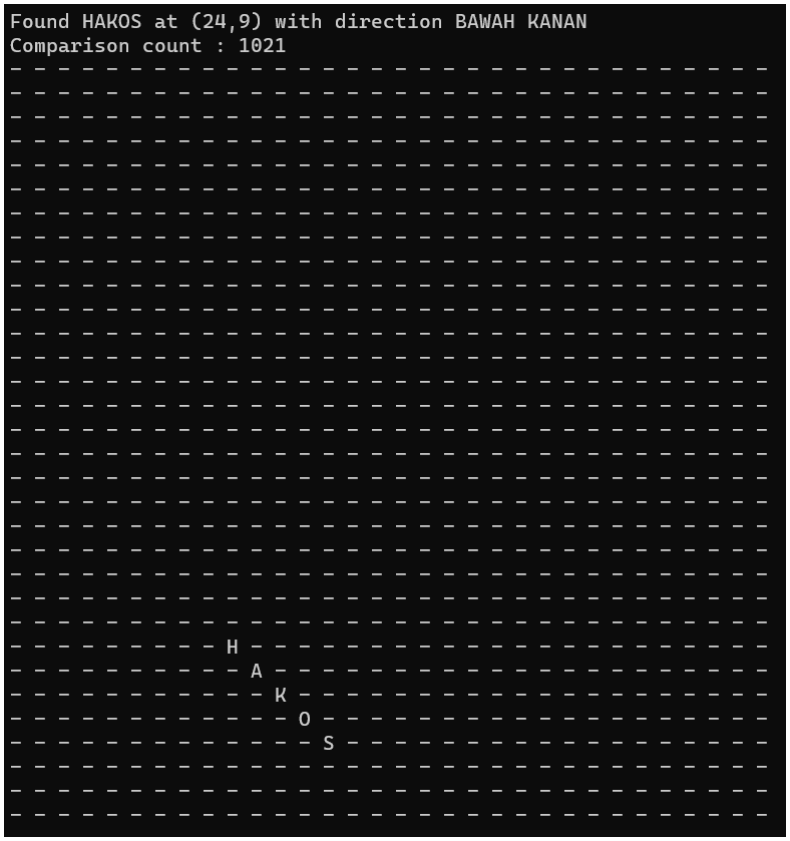

Found FAUNA at (28,30) with direction ATAS
Comparison count : 1175
A
N
U
A
F

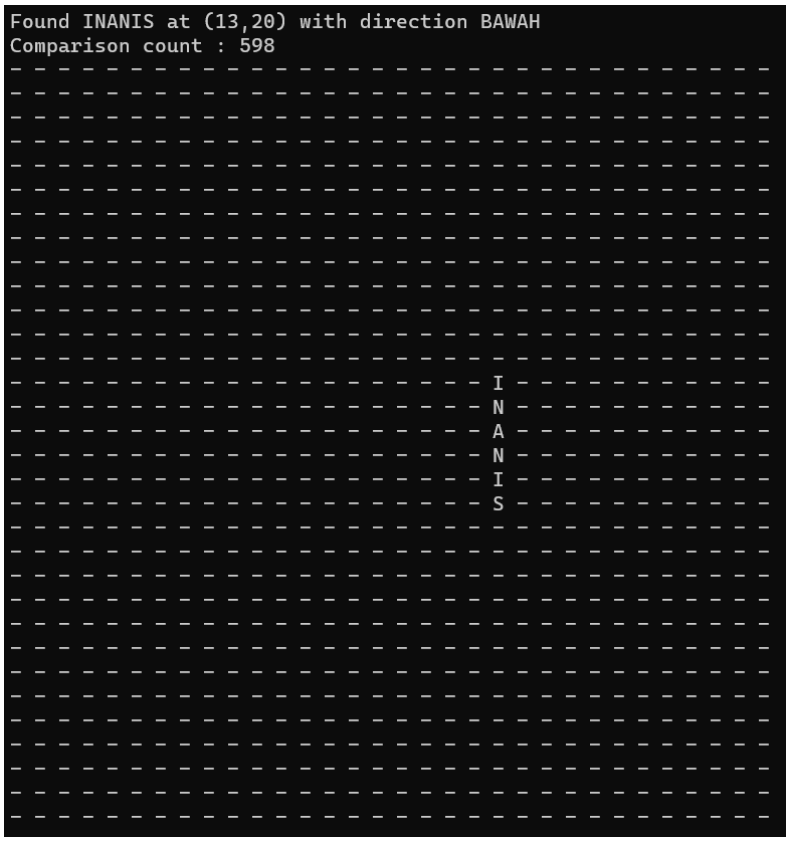

Found FLARE at (0,24) with direction BAWAH KANAN
Comparison count : 38
F
L
A
R
E

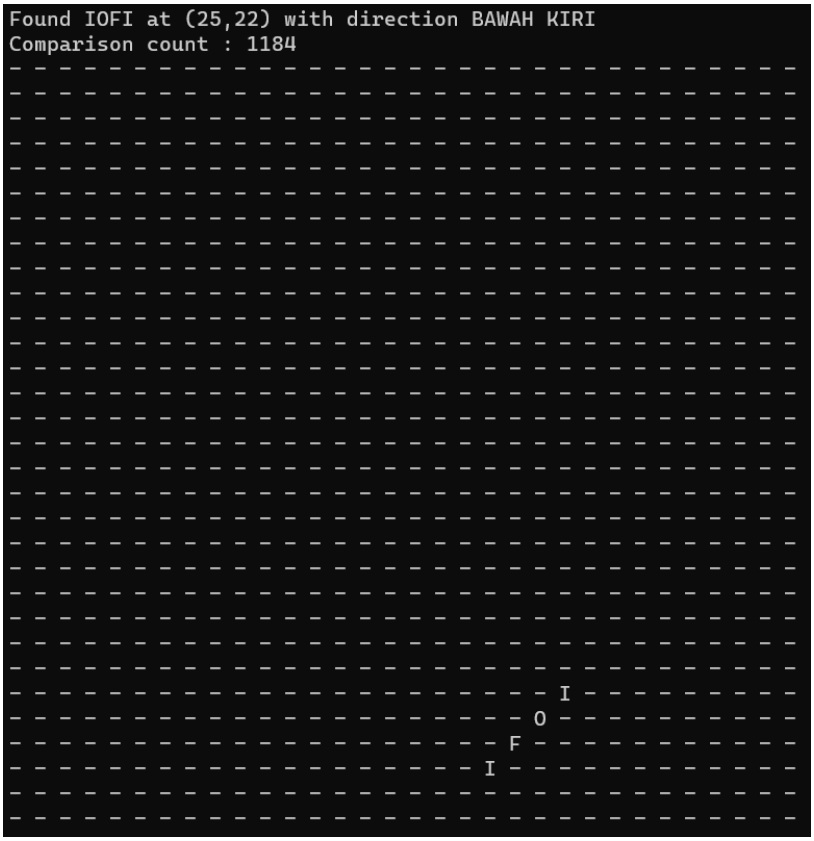

Found FUBUKI at (0,3) with direction BAWAH KANAN
Comparison count : 12
F
U
B
U
K
I

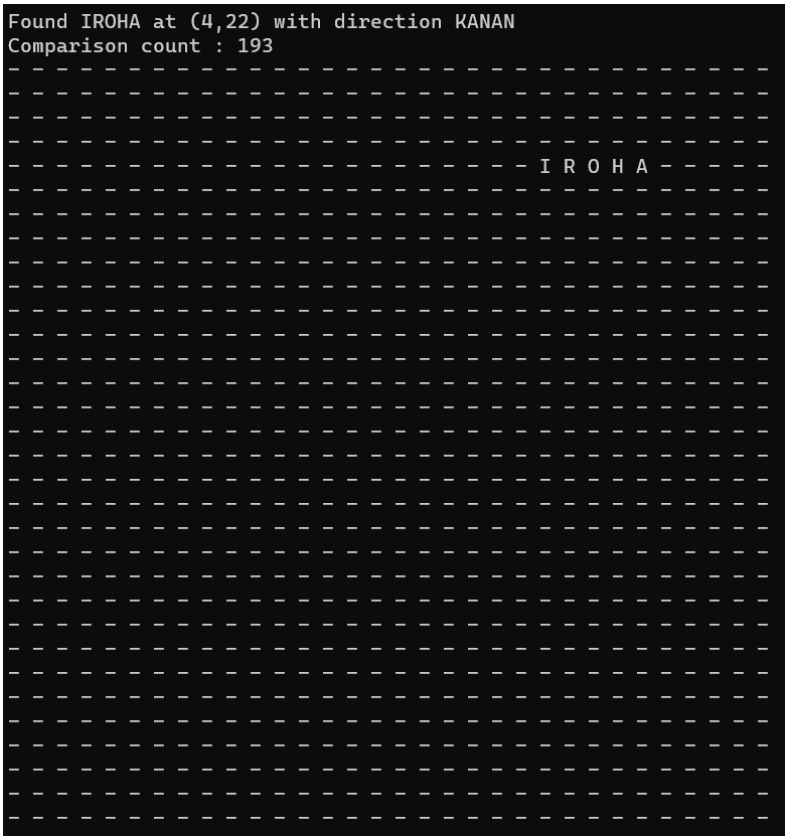

Found GURA at (25,4) with direction ATAS KANAN
Comparison count : 938
A
R
U
G

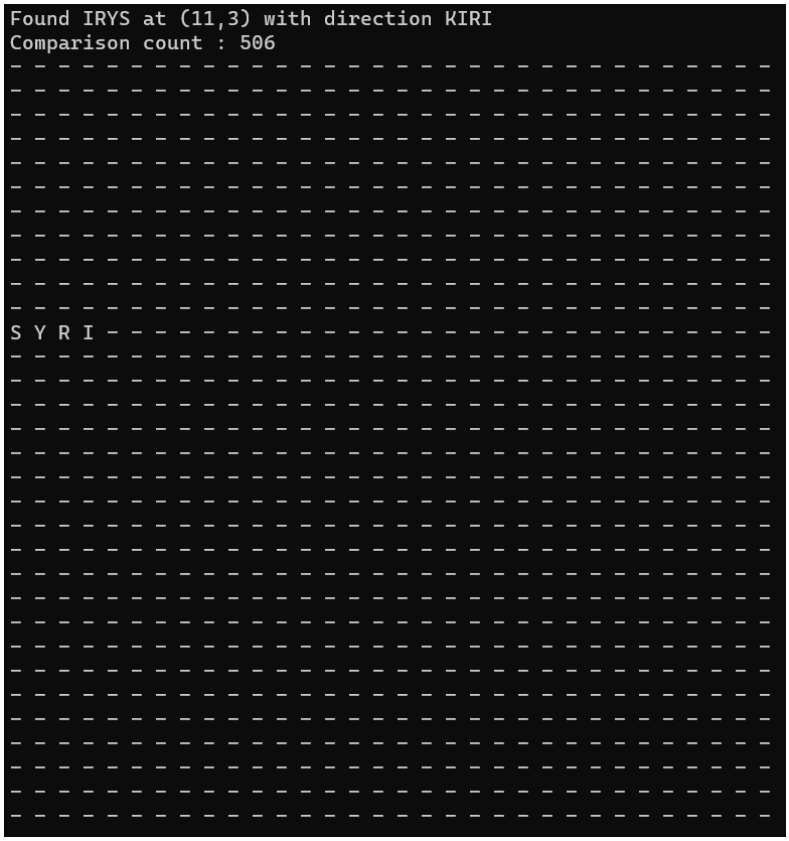

Found HAATO at (10,29) with direction ATAS KIRI
Comparison count : 435
O
T
A
A
H

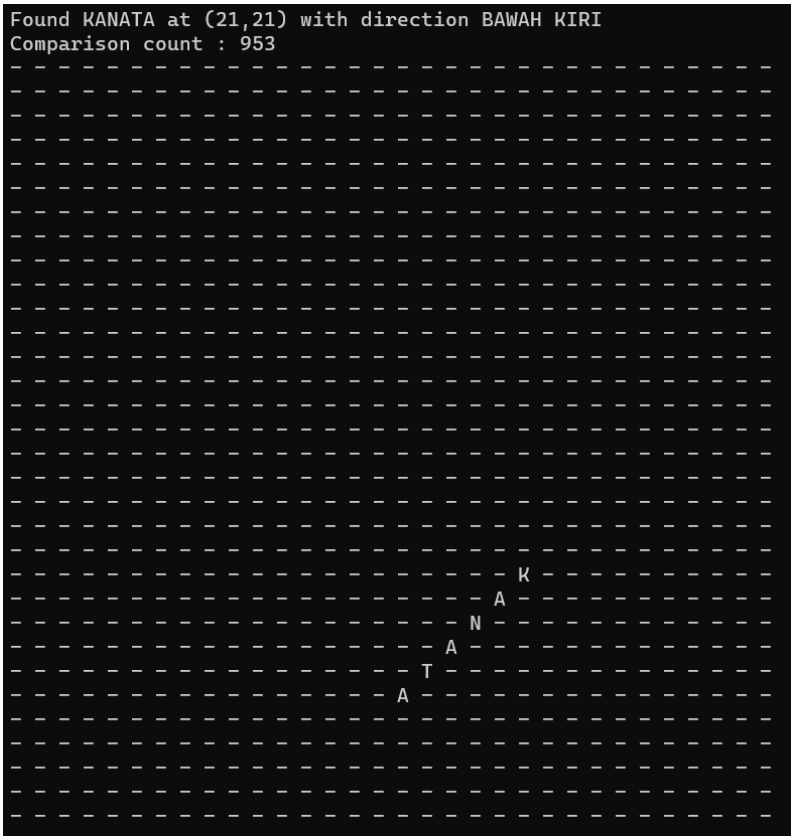

Found HAKOS at (24,9) with direction BAWAH KANAN
Comparison count : 1021
H
A
K
O
S

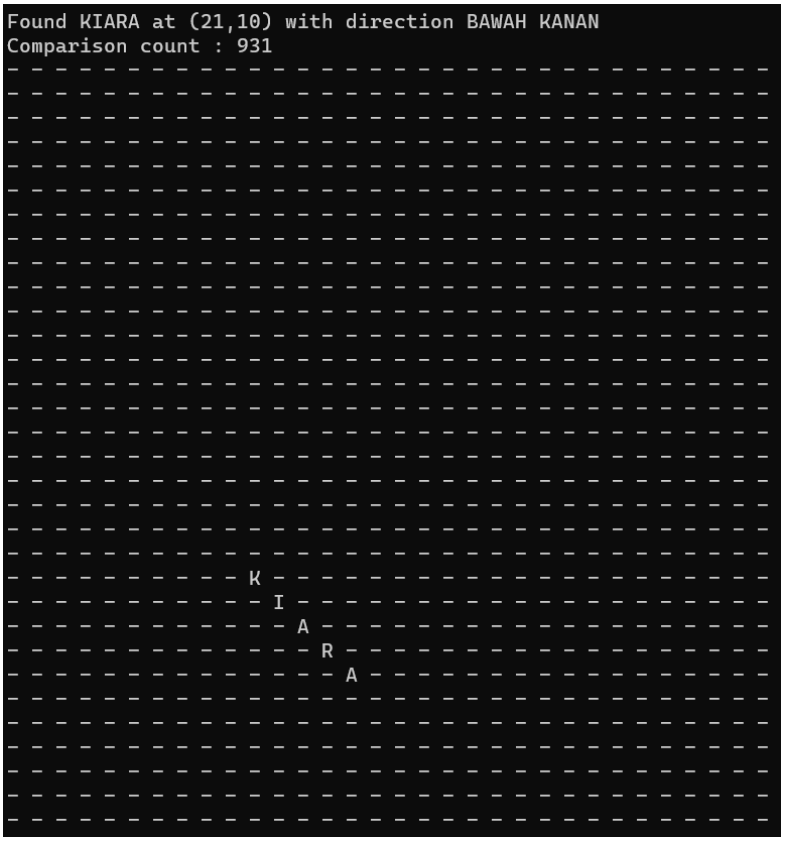

Found INANIS at (13,20) with direction BAWAH
Comparison count : 598
I
N
A
N
I
S

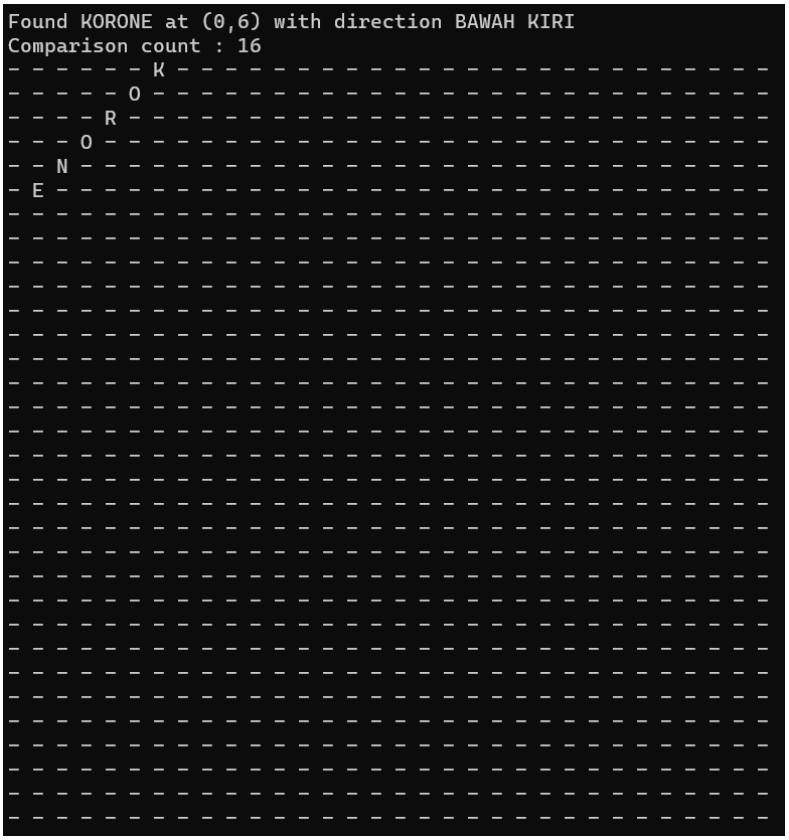

Found IOFI at (25,22) with direction BAWAH KIRI
Comparison count : 1184
I
O
F
I

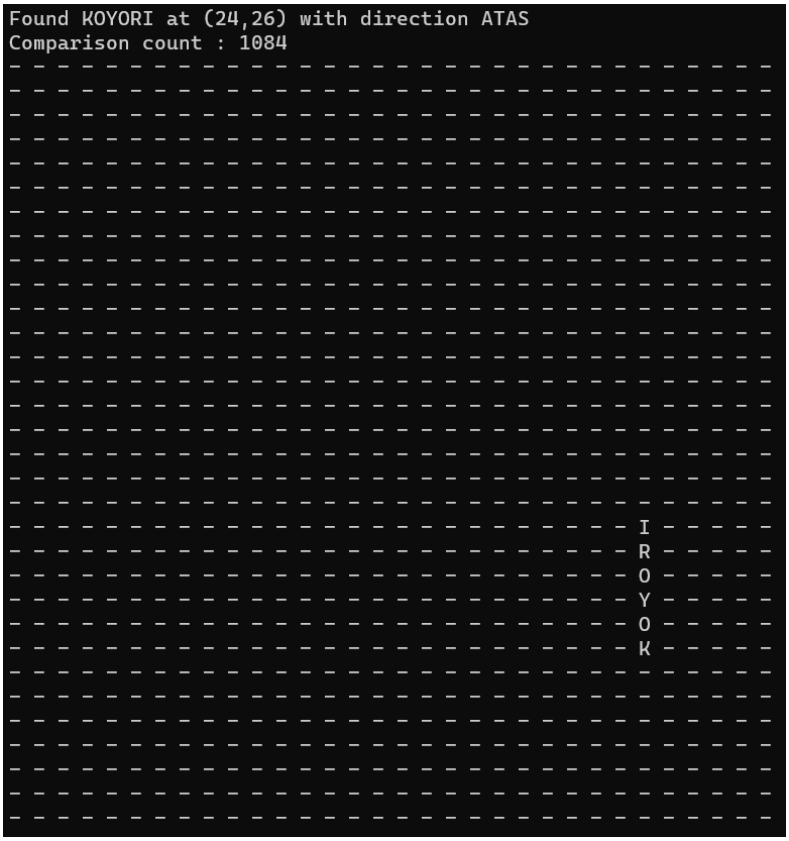

Found IROHA at (4,22) with direction KANAN
Comparison count : 193
I R O H A

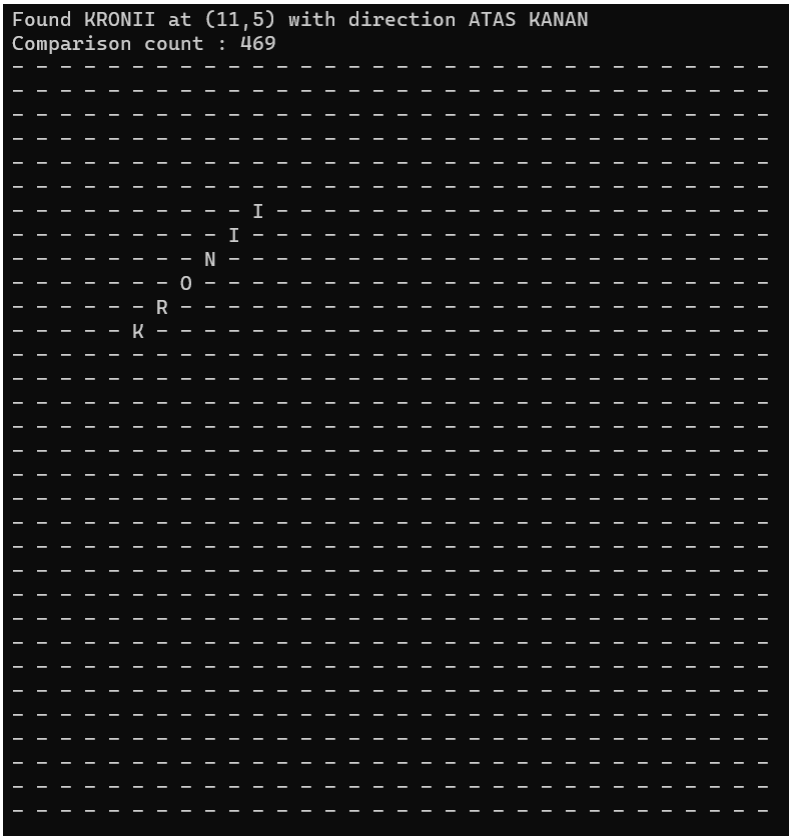

Found IRYS at (11,3) with direction KIRI
Comparison count : 506
S Y R I

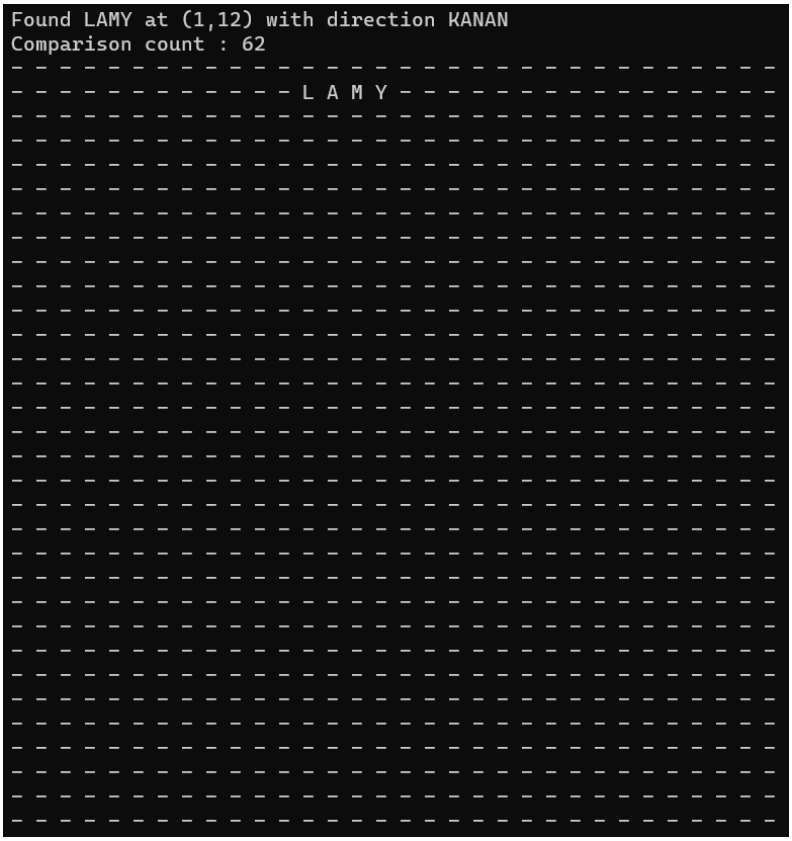

Found KANATA at (21,21) with direction BAWAH KIRI
Comparison count : 953
K
A
N
A
T
A

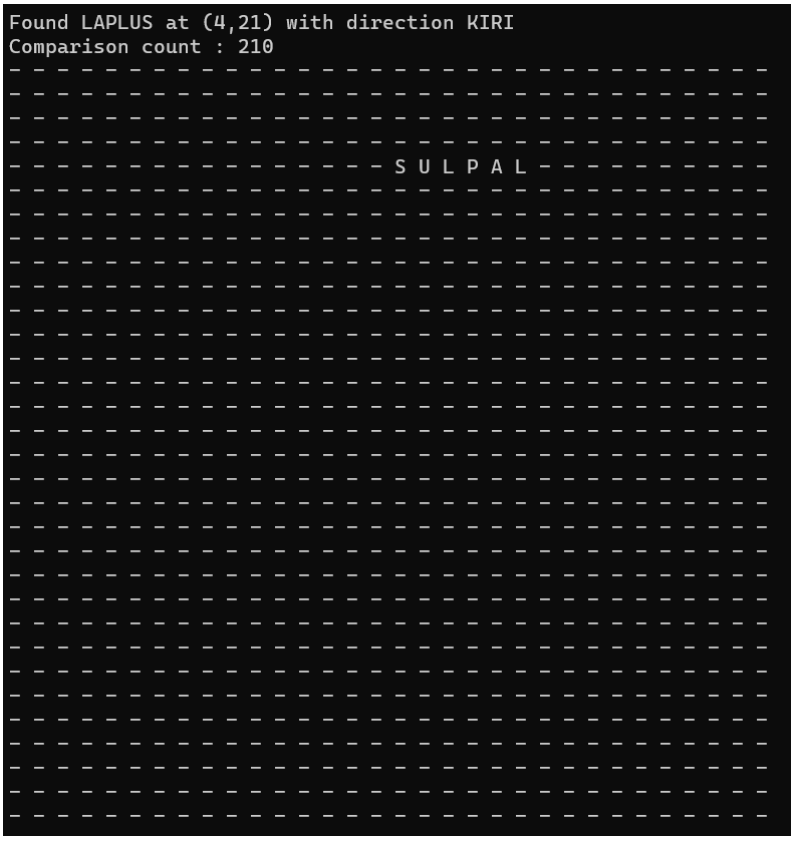

Found KIARA at (21,10) with direction BAWAH KANAN
Comparison count : 931
K
I
A
R
A

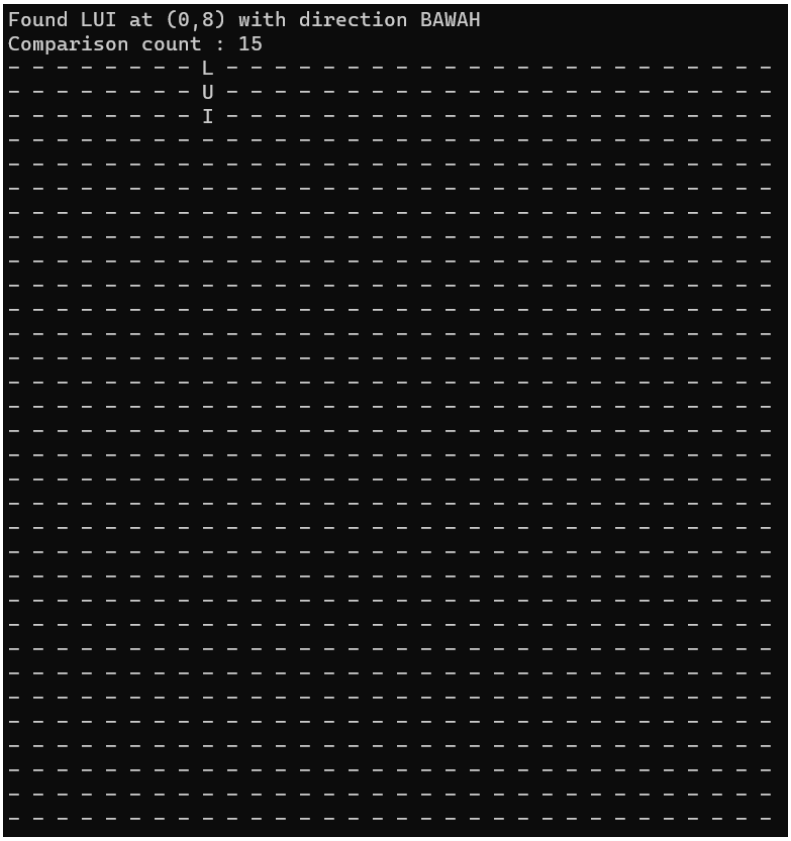

Found KORONE at (0,6) with direction BAWAH KIRI
Comparison count : 16
K
O
R
O
N
E

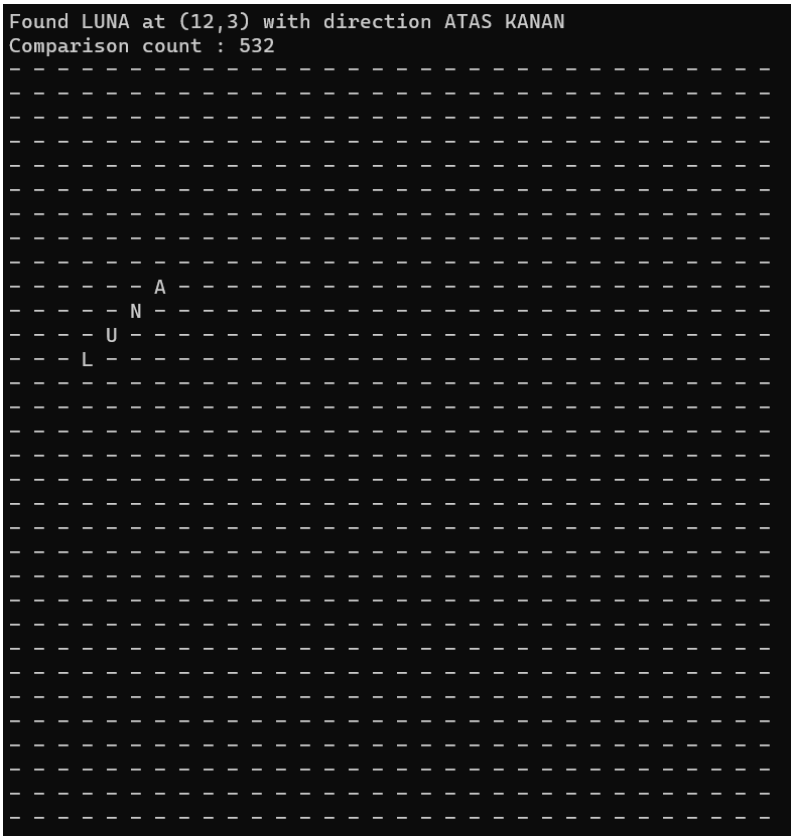

Found KOYORI at (24,26) with direction ATAS
Comparison count : 1084
I
R
O
Y
O
K

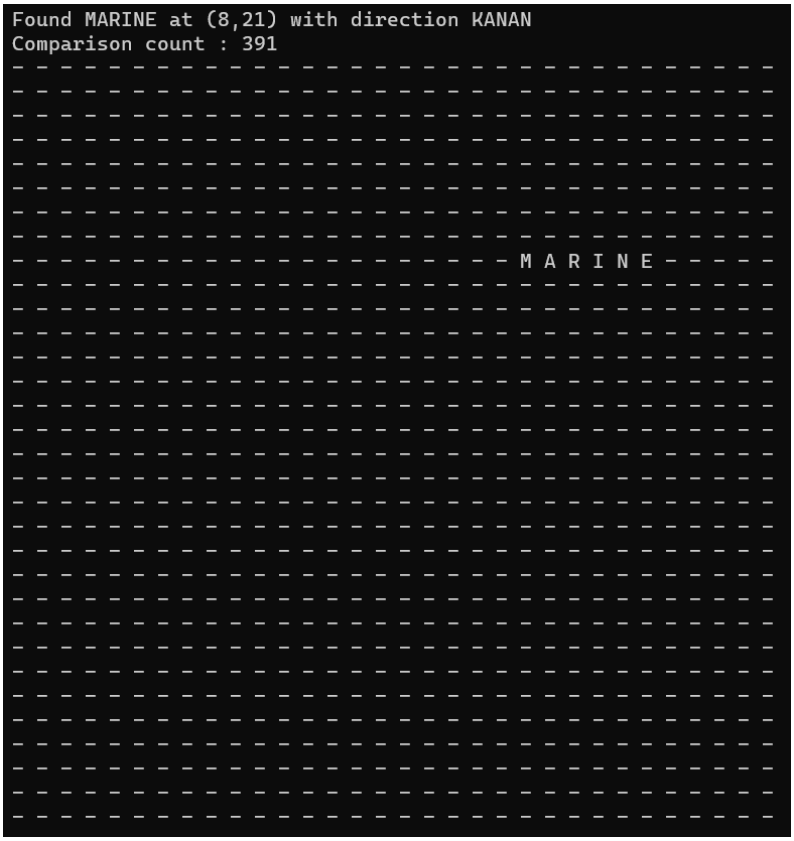

Found KRONII at (11,5) with direction ATAS KANAN
Comparison count : 469
I
I
N
O
R
K

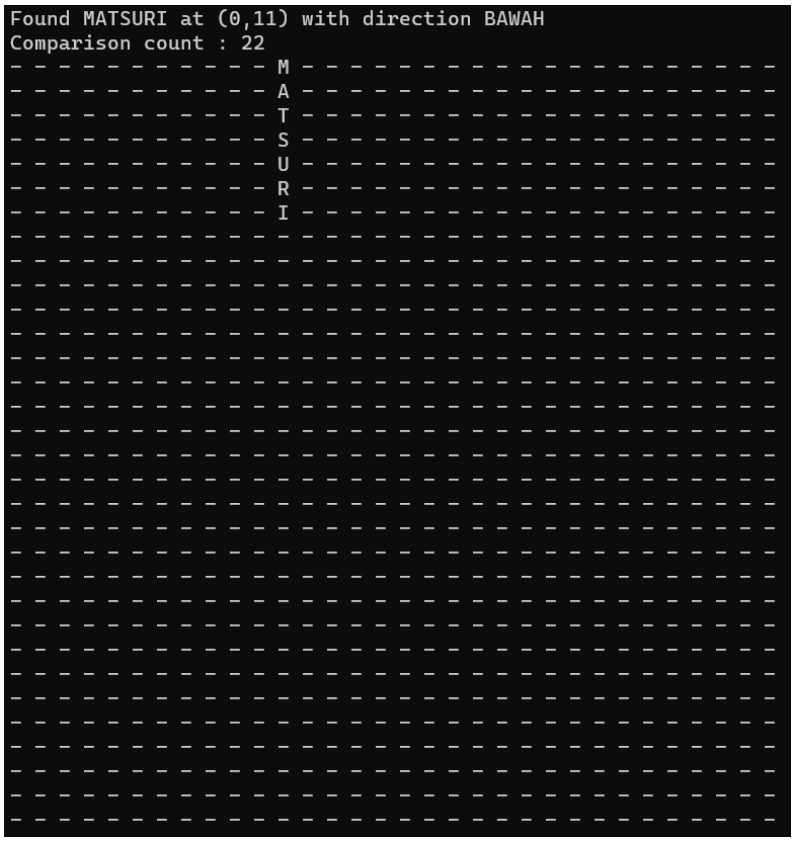

Found LAMY at (1,12) with direction KANAN
Comparison count : 62
L A M Y

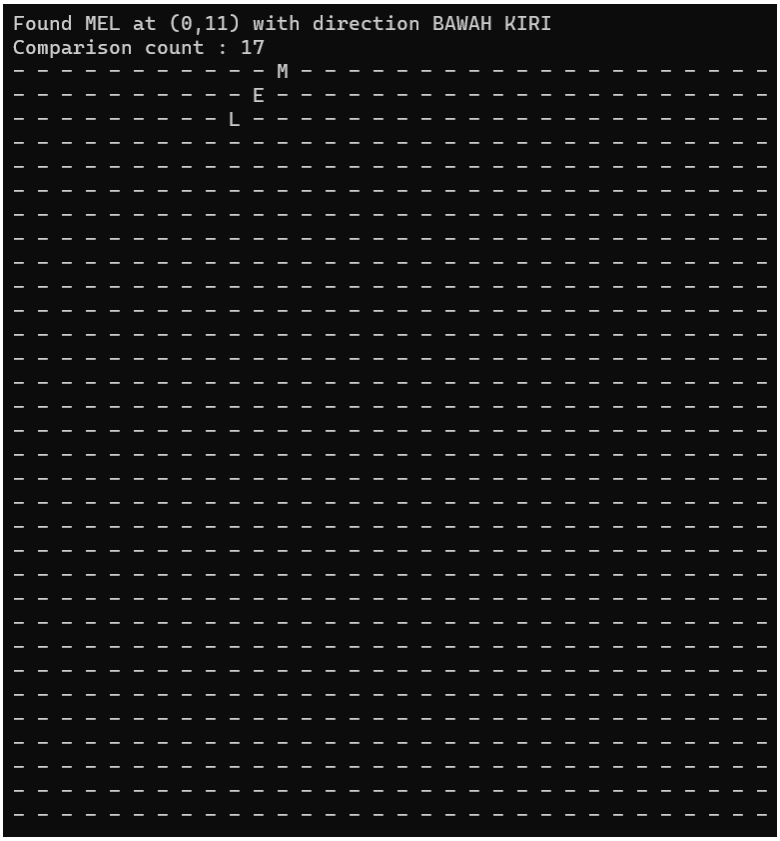

Found LAPLUS at (4,21) with direction KIRI
Comparison count : 210
S U L P A L

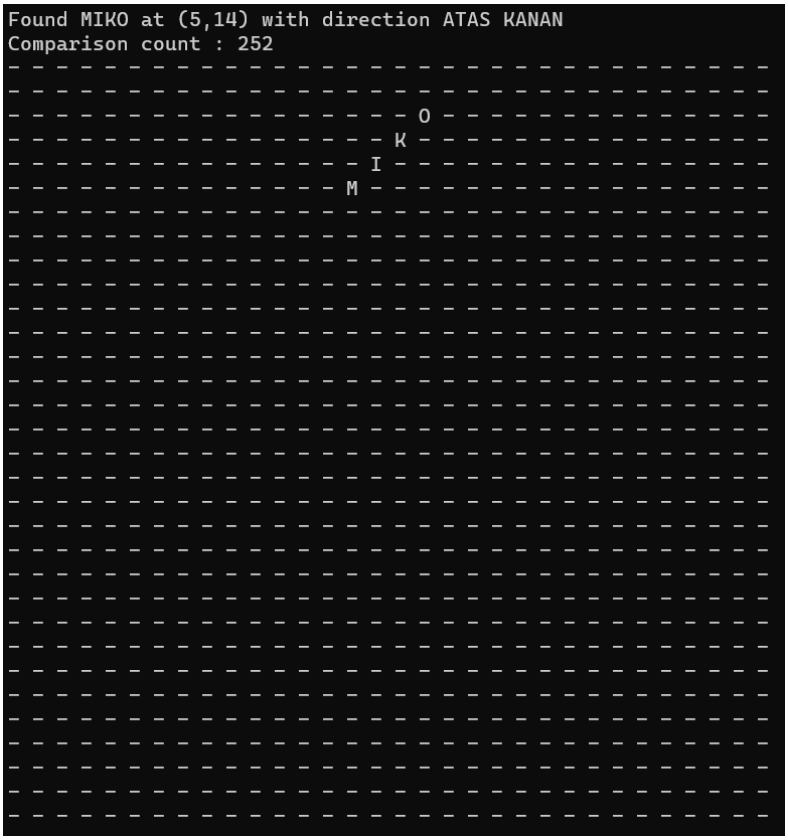

Found LUI at (0,8) with direction BAWAH
Comparison count : 15
L
U
I

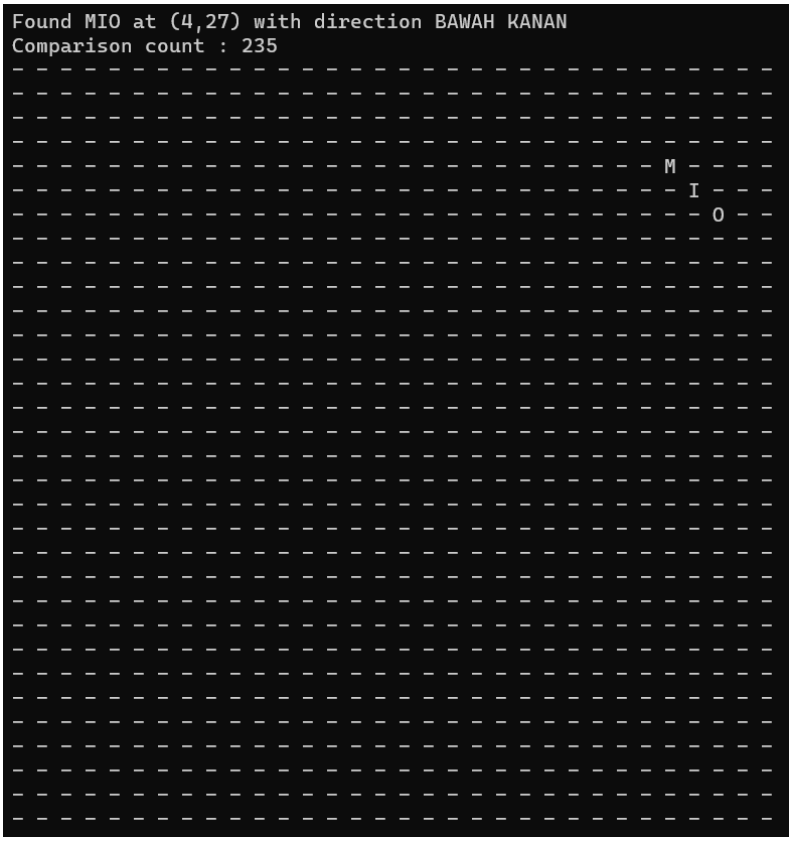

Found LUNA at (12,3) with direction ATAS KANAN
Comparison count : 532
A
N
U
L

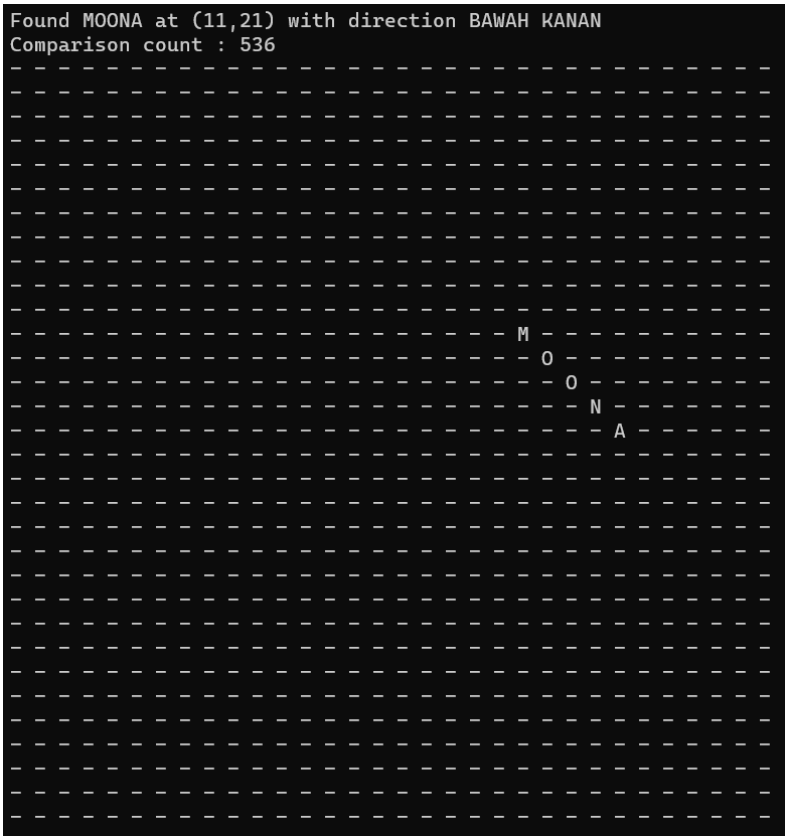

Found MARINE at (8,21) with direction KANAN
Comparison count : 391
M A R I N E

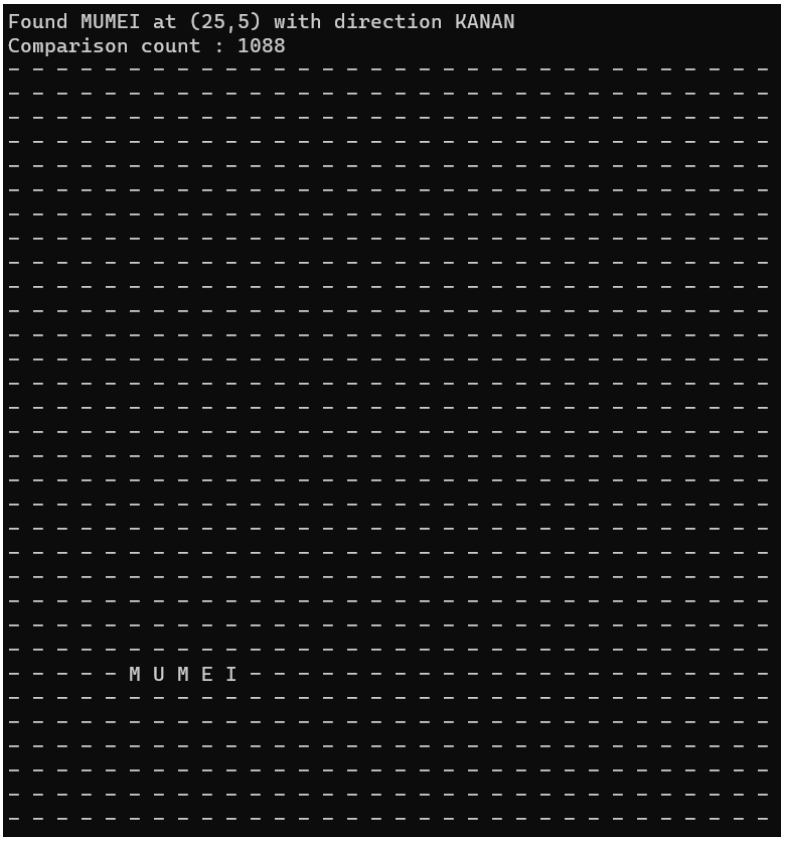

Found MATSURI at (0,11) with direction BAWAH
Comparison count : 22
M
A
T
S
U
R
I

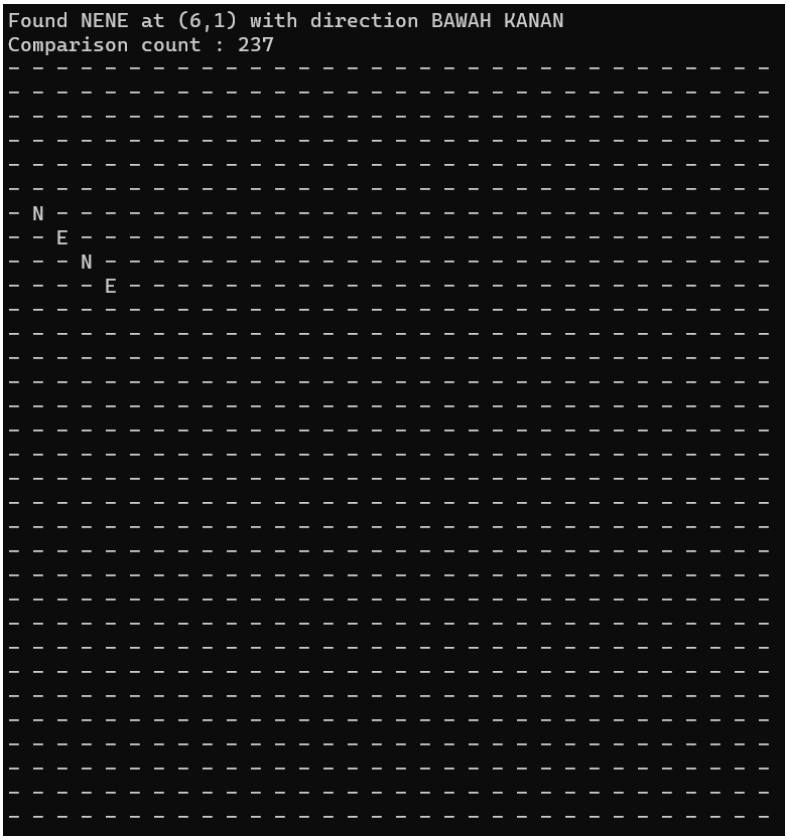

Found MEL at (0,11) with direction BAWAH KIRI
Comparison count : 17
M
E
L

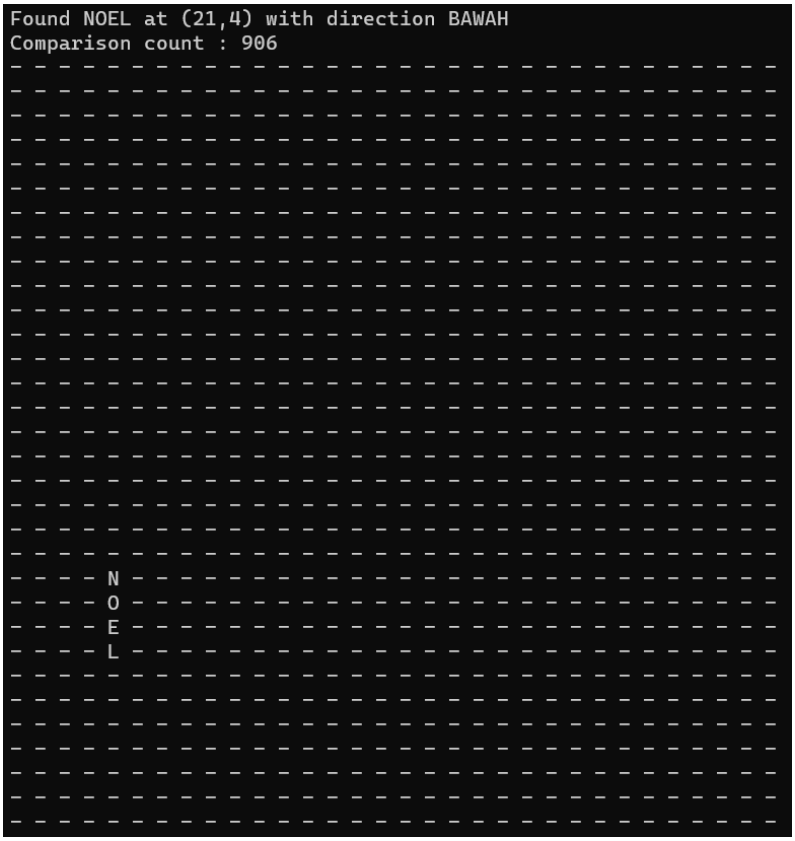

Found MIKO at (5,14) with direction ATAS KANAN
Comparison count : 252
O
K
I
M

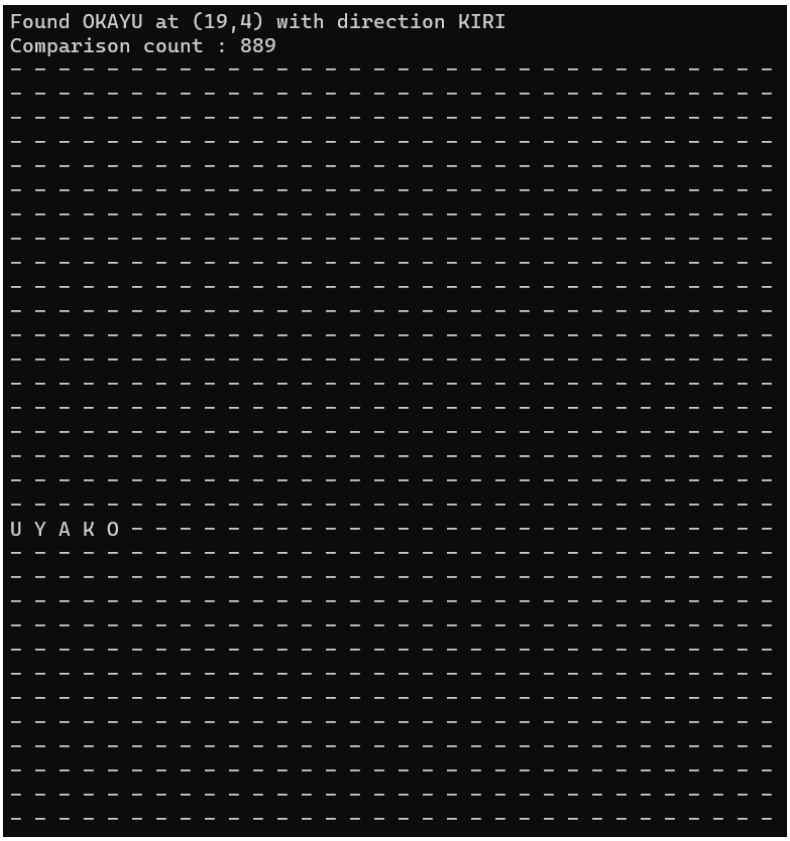

Found MIO at (4,27) with direction BAWAH KANAN
Comparison count : 235
M
I
O

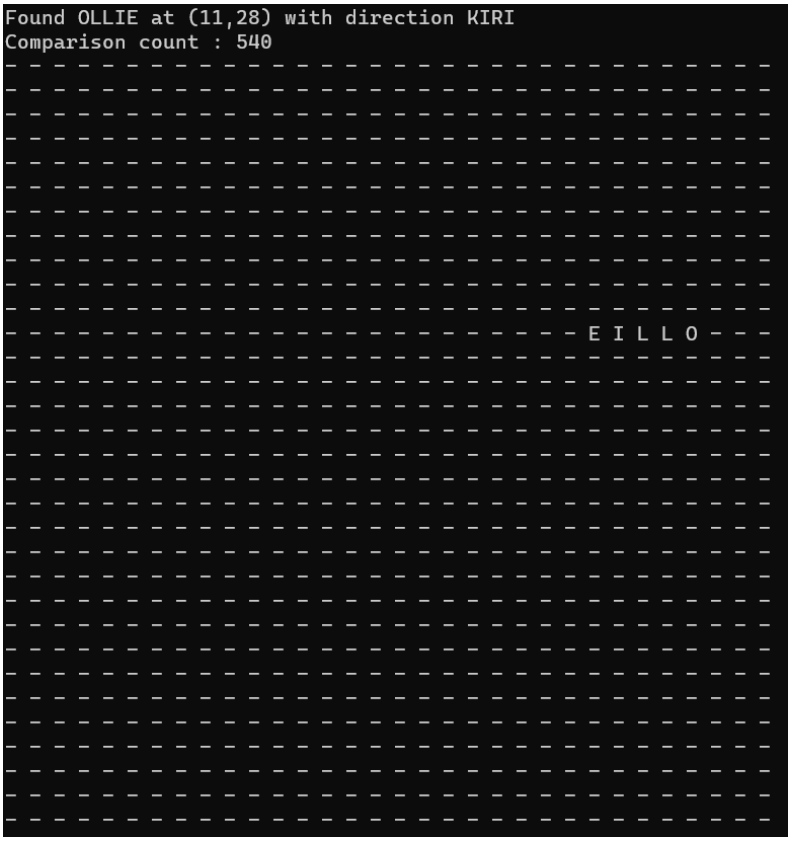

Found MOONA at (11,21) with direction BAWAH KANAN
Comparison count : 536
M
O
O
N
A

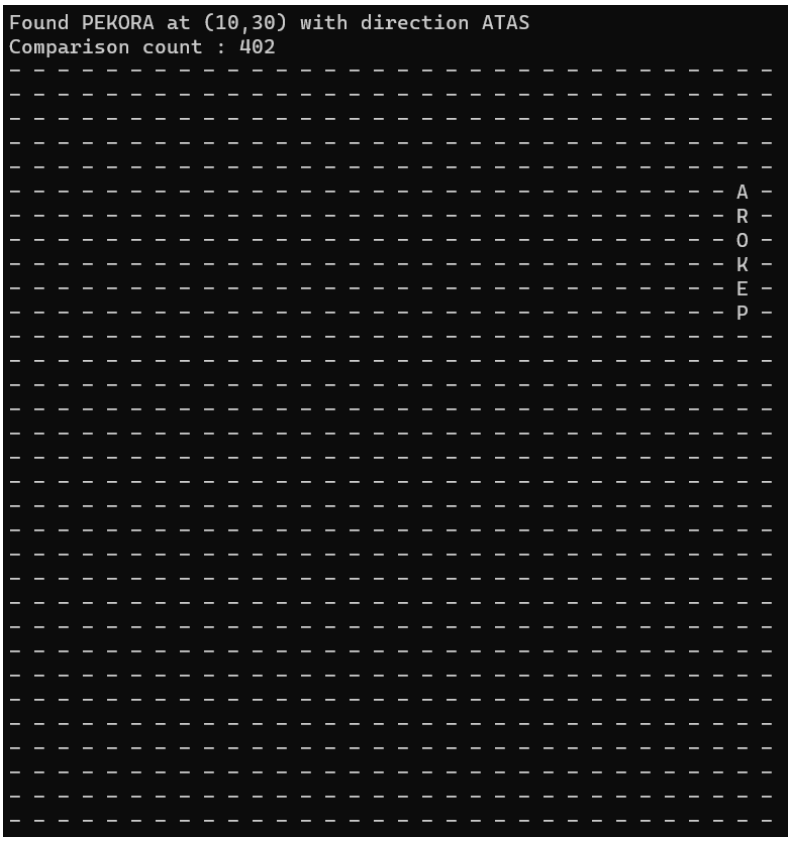

Found MUMEI at (25,5) with direction KANAN
Comparison count : 1088
M U M E I

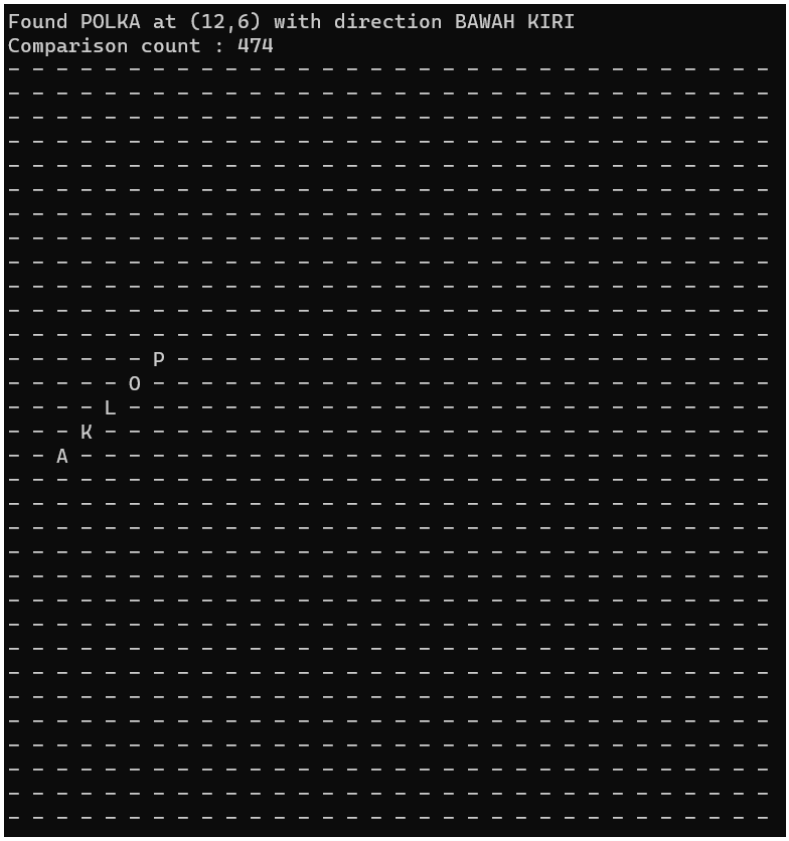

Found NENE at (6,1) with direction BAWAH KANAN
Comparison count : 237
N
E
N
E

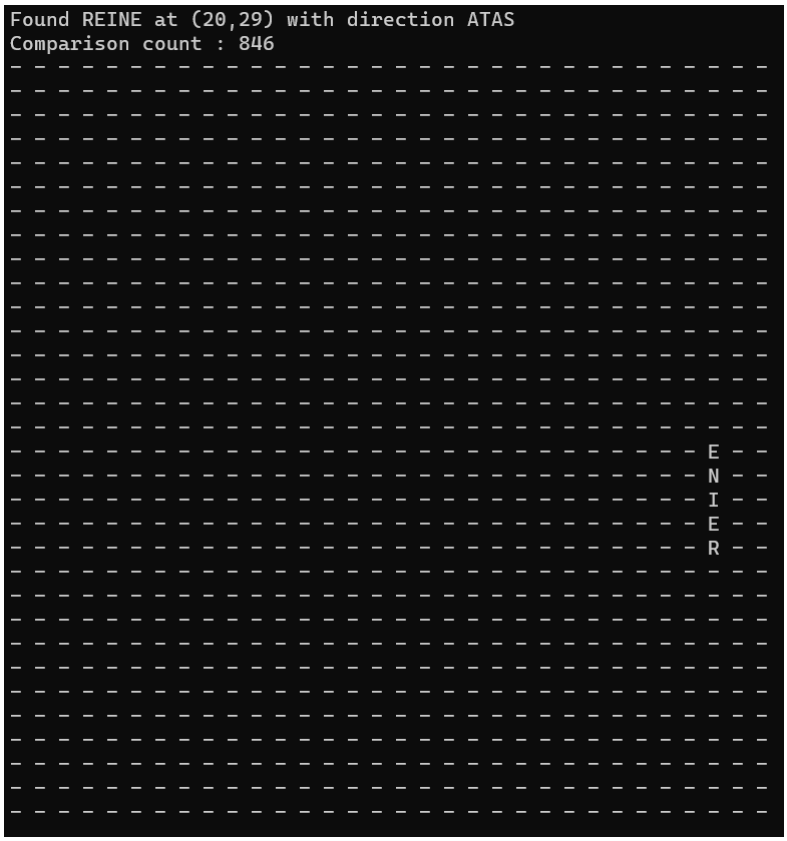

Found NOEL at (21,4) with direction BAWAH
Comparison count : 906
N
O
E
L

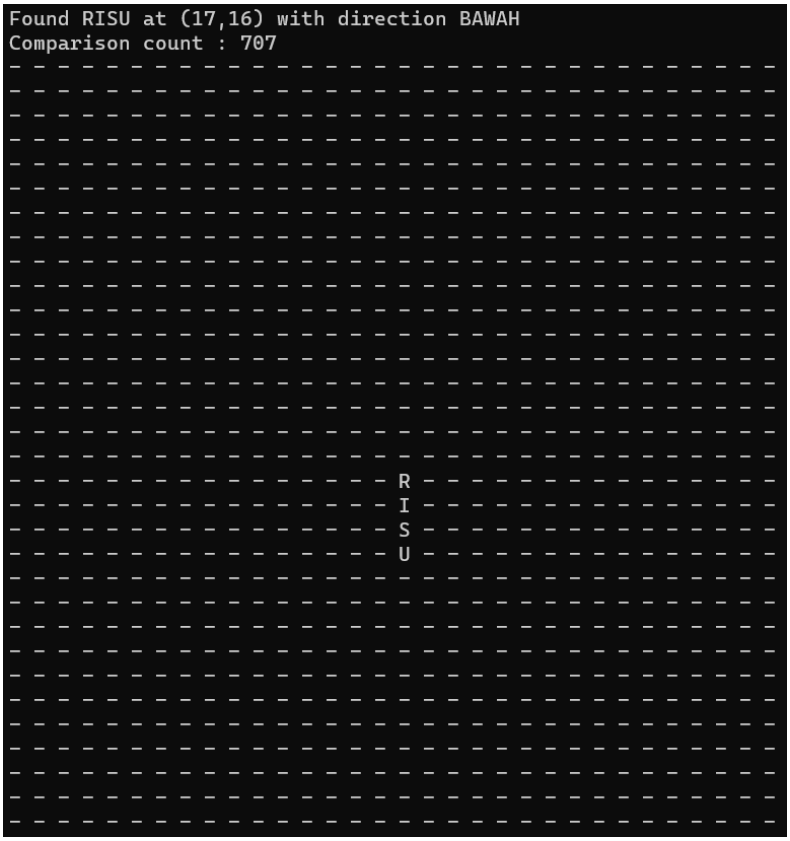

Found OKAYU at (19,4) with direction KIRI
Comparison count : 889
U Y A K O

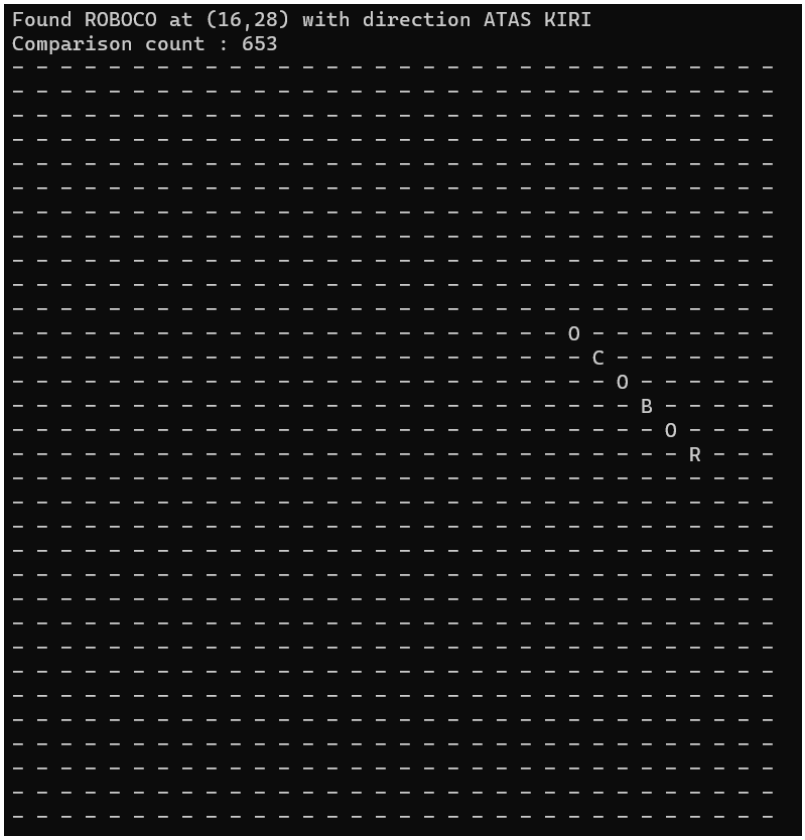

Found OLLIE at (11,28) with direction KIRI
Comparison count : 540
E I L L O

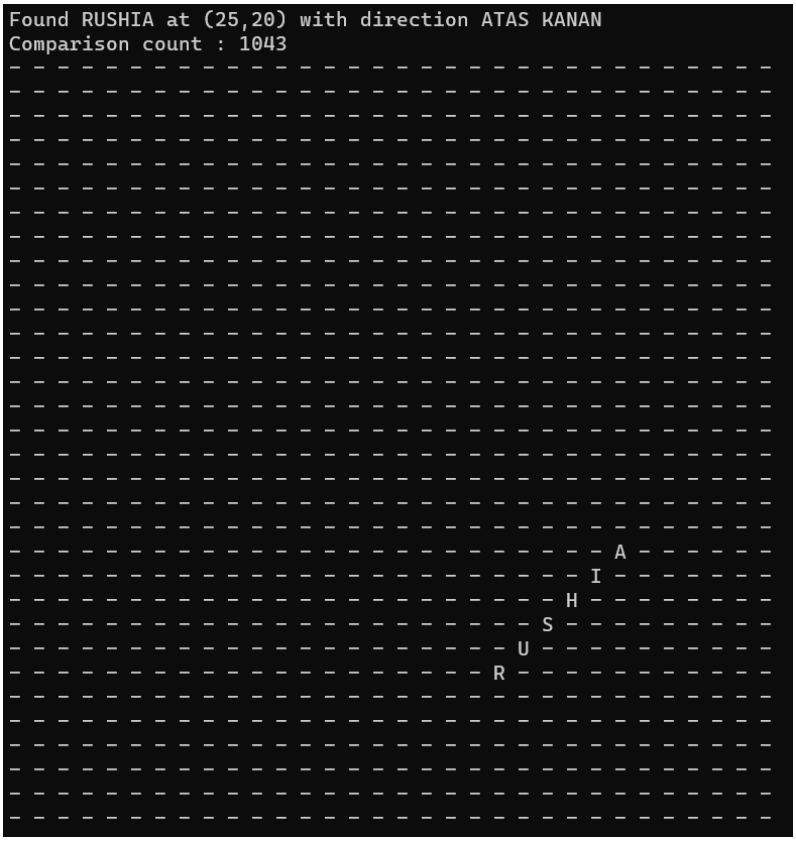

Found PEKORA at (10,30) with direction ATAS
Comparison count : 402
A
R
O
K
E
P

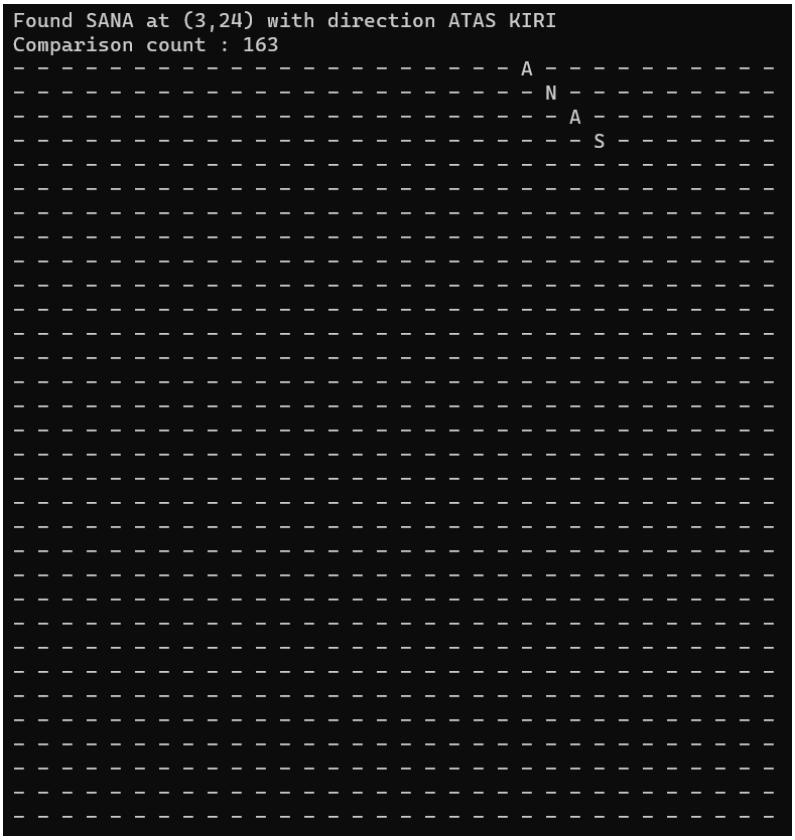

Found POLKA at (12,6) with direction BAWAH KIRI
Comparison count : 474
P
O
L
K
A

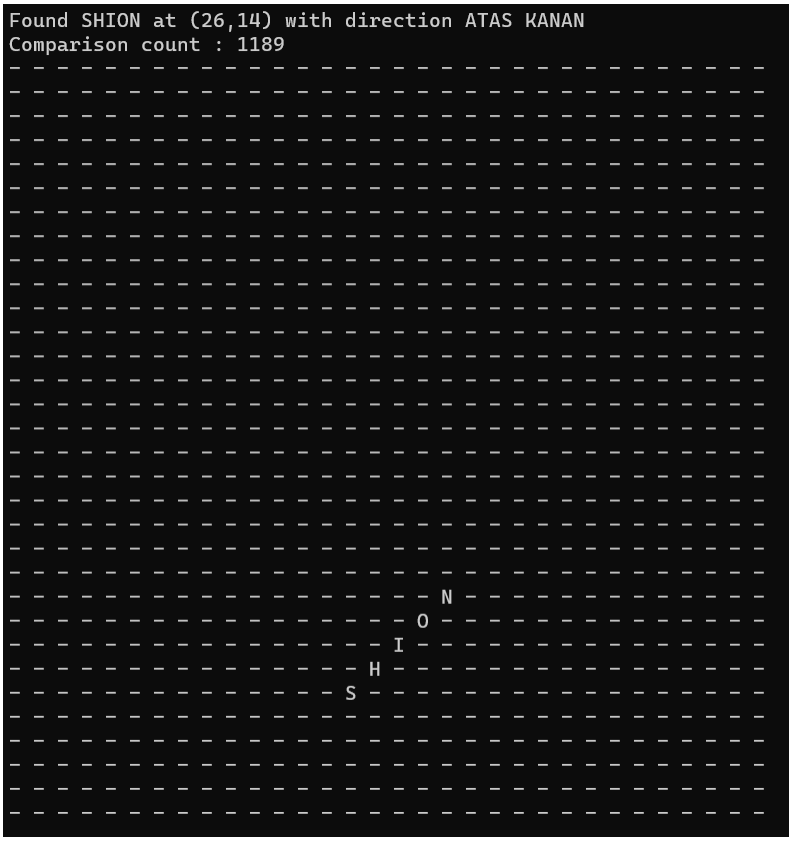

Found REINE at (20,29) with direction ATAS
Comparison count : 846
E
N
I
E
R

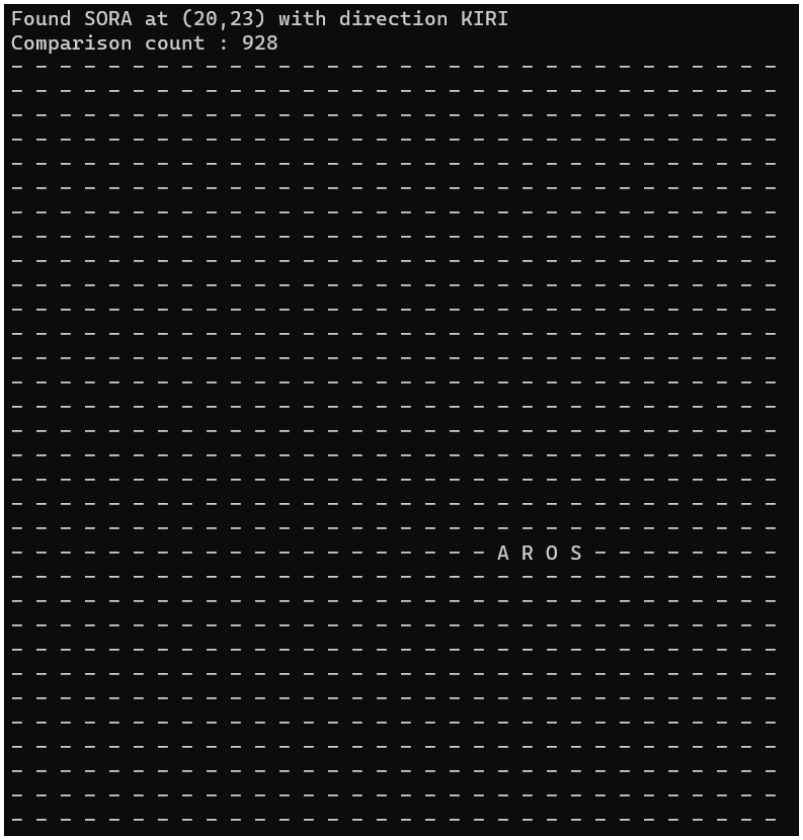

Found RISU at (17,16) with direction BAWAH
Comparison count : 707
R
I
S
U

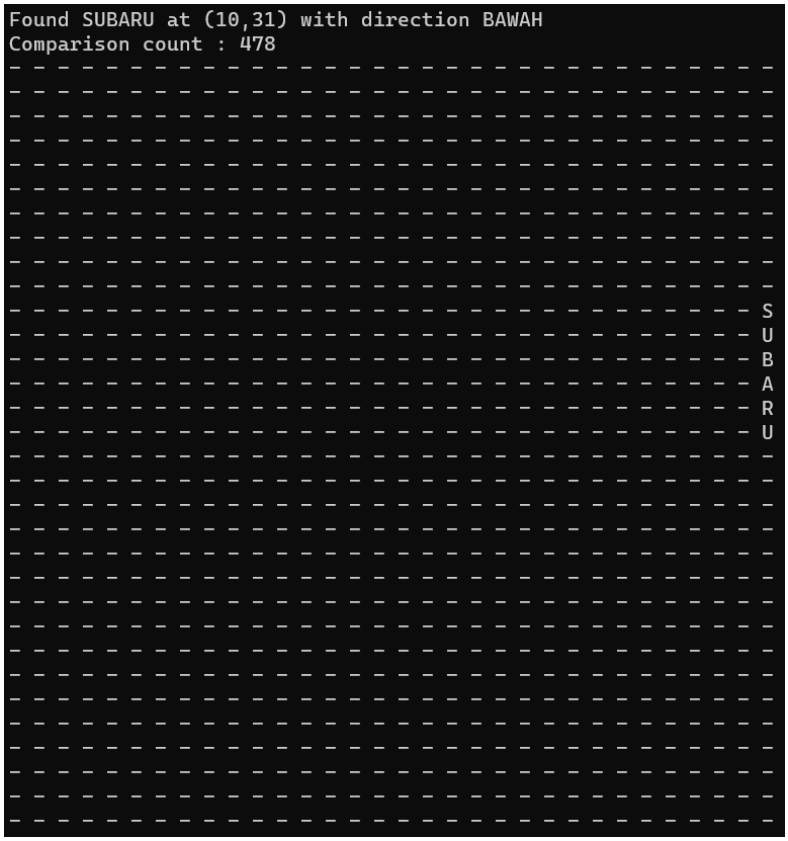

Found ROBOCO at (16,28) with direction ATAS KIRI
Comparison count : 653
O
C
O
B
O
R

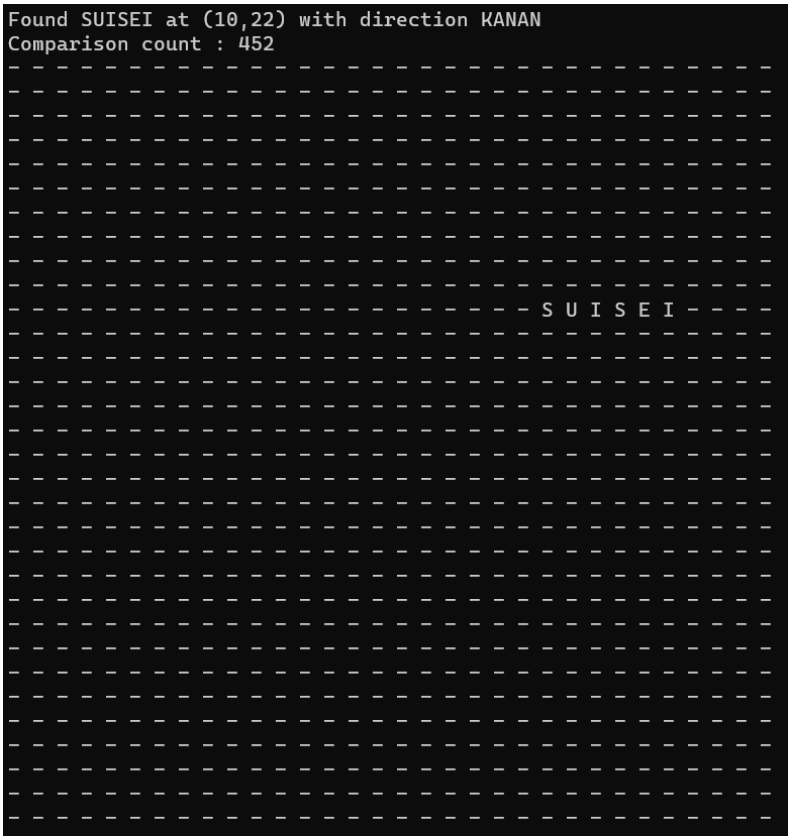

Found RUSHIA at (25,20) with direction ATAS KANAN
Comparison count : 1043
A
I
H
S
U
R

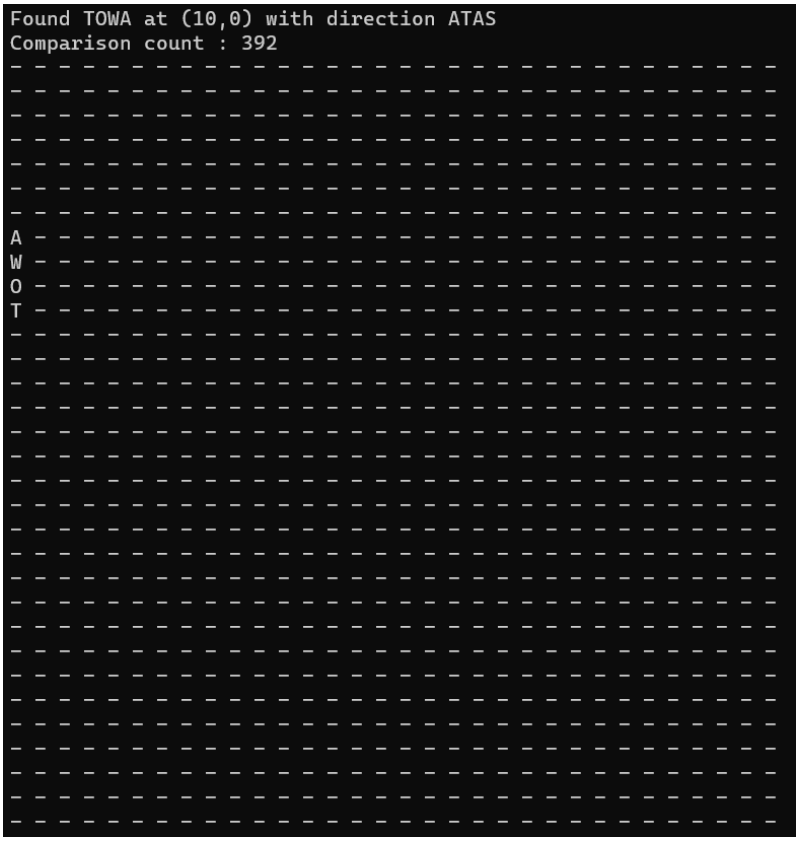

Found SANA at (3,24) with direction ATAS KIRI
Comparison count : 163
A
N
A
S

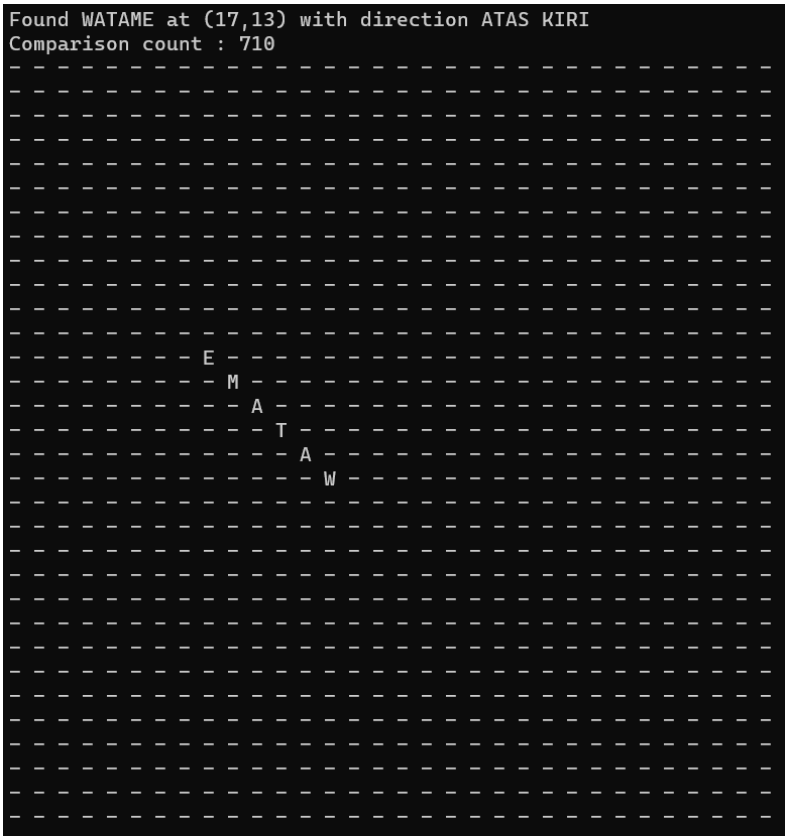

Found SHION at (26,14) with direction ATAS KANAN
Comparison count : 1189
N
O
I
H
S

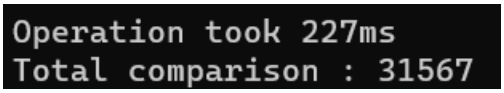

Found SORA at (20,23) with direction KIRI
Comparison count : 928
A R O S


Found SUBARU at (10,31) with direction BAWAH
Comparison count : 478
S
U
B
A
R
U


Found SUISEI at (10,22) with direction KANAN
Comparison count : 452
S U I S E I


Found TOWA at (10,0) with direction ATAS
Comparison count : 392
A
W
O
T


Found WATAME at (17,13) with direction ATAS KIRI
Comparison count : 710
E
M
A
T
A
W



6. Tabel Keberjalanan Program

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 dalam puzzle	√	

7. Kesimpulan

Algoritma *brute force* dapat digunakan untuk menyelesaikan *word search puzzle*. Semakin besar *puzzle* dan semakin banyak kata-kata yang akan dicari membuat *runtime* program semakin lama. Akan tetapi, kompleksitas dari algoritma ini masih cukup besar, sehingga mungkin saja ada algoritma yang lebih efisien daripada algoritma ini.