LAPORAN

TUGAS KECIL 1

IF2121 STRATEGI ALGORITMA

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Oleh:

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PROGRAM STUDI TEKNIK INFORMATIKA

SEKOLAH TEKNIK ELEKTRO DAN INFORMATIKA

INSTITUT TEKNOLOGI BANDUNG

2022

BAB I
ALGORITMA BRUTE FORCE

Pada tugas kecil ini, digunakan algoritma *brute force* dengan deskripsi sebagai berikut:

1. Mulai dengan kata pertama yang hendak dicari dalam puzzle.
2. Menelusuri setiap huruf yang terdapat dalam word puzzle untuk mencari huruf yang sama dengan huruf pertama kata yang dicari.
3. Jika ditemukan huruf yang sesuai, lanjut dengan mencocokkan huruf kedua dan seterusnya dengan mencari ke arah Timur, Tenggara, Selatan, Barat Daya, Barat, Barat Laut, Utara, dan terakhir Timur Laut. Apabila huruf kedua ditemukan pada salah satu arah, akan diteruskan dengan mencocokkan huruf ketiga, keempat, dan seterusnya ke arah yang sama. Jika seluruh huruf pada kata tersebut telah ditemukan, pencarian ke arah mata angin setelahnya (yang belum dilalui) maupun huruf dalam word puzzle lainnya tidak perlu dilakukan. Namun, jika kata tersebut tidak ditemukan pada suatu arah, akan diteruskan pencarian ke arah setelahnya. Bila pada seluruh arah mata angin telah dicari namun tidak ditemukan, akan dilanjutkan ke langkah berikutnya.
4. Bila tidak ditemukan huruf yang sesuai, lanjut dengan mencocokkan huruf pertama dengan huruf pada word puzzle selanjutnya.
5. Jika sebuah kata telah ditemukan pada word puzzle tersebut, pencarian dilanjutkan pada langkah kedua terhadap kata selanjutnya.
6. Bila seluruh kata telah ditemukan posisinya dalam word puzzle, pencarian berakhir.
7. Setiap kali satu kata ditemukan posisinya di dalam word puzzle, ditampilkan matriks yang menunjukkan posisi suatu kata di dalam word puzzle.
8. Pada akhir program, ditampilkan waktu eksekusi program dan jumlah perbandingan huruf yang diperlukan.

BAB II
KODE SUMBER

Kode ditulis dalam Bahasa C. Berikut merupakan kode sumber yang terdapat di dalam file main.c. Kode sumber juga dapat diakses melalui Github https://github.com/rannnayy/Tucil1_13520019 atau Google Drive .

```
#include <stdio.h>
#include <stdlib.h>
#include <sys/time.h>
#include <dirent.h>
#include <string.h>

#define NEWLINE '\n'
#define NULLCHAR '\0'
#define BLANK ' '
#define MARK_EOF EOF

#define boolean unsigned char
#define true 1
#define false 0

typedef struct {
    char* contents;
    int length;
} Word;

void printAns(int row, int col, char posRowCol[row][col])
{
    for (int i = 0; i < row; i++){
        for (int j = 0; j < col; j++){
            if (j == col-1)
                printf("%c", posRowCol[i][j]);
            else
                printf("%c ", posRowCol[i][j]);
        }
        printf("\n");
    }
}

int incIndexRow(int row, int dir)
{
    switch (dir)
    {
        case 1: // Timur
            return row; break;
        case 2: // Tenggara
            return (row+1); break;
        case 3: // Selatan
            return (row+1); break;
        case 4: // Barat Daya
            return (row+1); break;
        case 5: // Barat
            return row; break;
        case 6: // Barat Laut
            return (row-1); break;
        case 7: // Utara
            return (row-1); break;
        case 8: // Timur Laut
            return (row-1); break;
    }
}

int incIndexCol(int col, int dir)
{
    switch (dir)
```

```
    {
        case 1: // Timur
            return (col+1); break;
        case 2: // Tenggara
            return (col+1); break;
        case 3: // Selatan
            return col; break;
        case 4: // Barat Daya
            return (col-1); break;
        case 5: // Barat
            return (col-1); break;
        case 6: // Barat Laut
            return (col-1); break;
        case 7: // Utara
            return col; break;
        case 8: // Timur Laut
            return (col+1); break;
    };
}

void sequentialMatching(int j, int row, int col, char wordPuzzle[], Word words, boolean *found, char
posRowCol[row][col], int dir, int *numCompare)
{
    int idxRow = j/col; // wordPuzzle index
    int idxCol = j%col;
    int idxWord = 1; // word content index

    while(incIndexCol(idxCol, dir) >= 0 && incIndexCol(idxCol, dir) < col && incIndexRow(idxRow, dir)
>= 0 && incIndexRow(idxRow, dir) < row
          &&      wordPuzzle[(incIndexRow(idxRow,      dir)*col)+incIndexCol(idxCol,      dir)]      ==
words.contents[idxWord] && words.length > idxWord && (!(*found))){

        posRowCol[idxRow][idxCol] = words.contents[idxWord-1];
        idxRow = incIndexRow(idxRow, dir);
        idxCol = incIndexCol(idxCol, dir);
        idxWord++;
    }
    (*numCompare)++;
    if (idxWord == words.length){
        *found = true;
        posRowCol[idxRow][idxCol] = words.contents[idxWord-1];
    }
    else{
        for (int a = 0; a < row; a++){
            for (int b = 0; b < col; b++){
                posRowCol[a][b] = '-';
            }
        }
    }
}

void displayFile()
{
    DIR *dir;
    char *p1, *p2;
    int ret;
    struct dirent *dirs;
    dir = opendir("./test");

    int cnt = 0;

    if(dir){
        while((dirs = readdir(dir)) != NULL){
            p1 = strtok(dirs->d_name, ".");
            p2 = strtok(NULL, ".");

            if(p2 != NULL){
                ret = strcmp(p2, "txt");
                if(ret == 0){
                    cnt++;
                    printf("%d. %s\n", cnt, strcat(strcat(p1, "."), "txt"));
                }
            }
        }
```

```
        closedir(dir);
    }
}

void welcomeMsg()
{
    printf(" __           __           _    _____                      _       _____               _
\n");
    printf(" \\ \\        / /          | |  / ____|                    | |     |  __ \\             | |
\n");
    printf("  \\ \\  /\\  / /__  _ __ __| | | (___   ___  __ _ _ __ ___| |__   | |__) |   _ _______| |
___  \n");
    printf("   \\ \\/  \\/ / _ \\| '__/ _` |  \\___ \\ / _ \\/ _` | '__/ __| '_ \\  |  ___/ | | |_  /_
/ |/ _ \\ \n");
    printf("    \\  /\\  / (_) | | | (_| |  ____) |  __/ (_| | | | (__| | | | | |   | |_| |/ / / /| |
__/  \n");
    printf("          \\/    \\/  \\___/|_|    \\__,_|  |_____/  \\___|\\__,_|_|    \\___|_|  |_|  |_|
\\__,_/___/___|_|\\___| \n");
    printf("\n");
    printf("Maharani Ayu Putri Irawan - 13520019\n");
    printf("Tucil1_13520019\n\n");
}

int main()
{
    char filename[50];

    welcomeMsg();
    printf("File yang tersedia:\n");
    displayFile();
    printf("\nMasukkan nama file (contoh: ./test/cobainput.txt) : ");
    scanf("%[^\n]s", filename);
    FILE *fp = fopen(filename, "r");

    if (fp == NULL){
        printf("File tidak tersedia!");
    }
    else{
        char* wordPuzzle;
        char currChar;
        int charCtr = 0;
        int row = 0;
        int col = -1;
        boolean beforeNL = false;
        boolean emptyLine = false;
        boolean memory = false; // true if reallocation unsuccessfull

        int numWord = 0;
        int lenWord = 0;

        wordPuzzle = (char*)malloc(charCtr * sizeof(char));
        if (wordPuzzle != NULL){
            // Read wordPuzzle matrix
            currChar = getc(fp);
            while ((!emptyLine) && (!memory)){
                if (currChar != BLANK && currChar != NEWLINE){
                    if(beforeNL){
                        beforeNL = false;
                    }

                    charCtr++;
                    wordPuzzle = realloc(wordPuzzle, charCtr * sizeof(char));
                    if(wordPuzzle != NULL){
                        wordPuzzle[charCtr-1] = currChar;
                    }
                    else{
                        printf("Memory dynamic reallocation unsuccessfull!");
                        memory = true;
                    }
                    wordPuzzle[charCtr] = currChar;
                }
                else if (currChar == NEWLINE && col == -1){
                    col = charCtr;
                    row = 1;
```

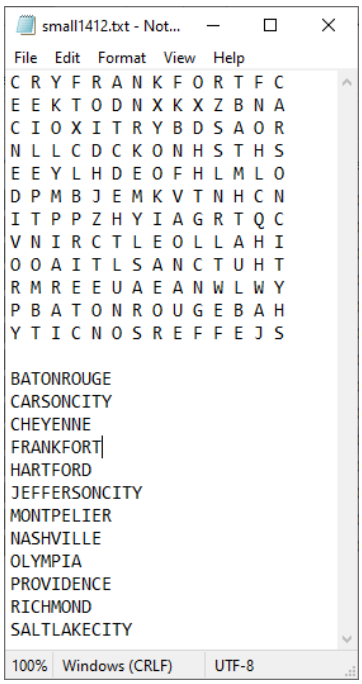
```
                    beforeNL = true;
                }
                else if (currChar == NEWLINE){
                    if (beforeNL){
                        emptyLine = true;
                    }
                    else{
                        row++;
                        beforeNL = true;
                    }
                }
                currChar = getc(fp);
            }

            // Read words to be searched within wordPuzzle
            if (row > col){
                lenWord = row;
            }
            else{
                lenWord = col;
            }

            memory = false;
            Word* words = malloc(numWord * sizeof(Word));
            if (words != NULL){
                while (currChar != MARK_EOF && (!memory)){
                    numWord++;
                    words = realloc(words, numWord * sizeof(Word));
                    if (words != NULL){
                        words[numWord-1].contents = (char*)malloc(lenWord * sizeof(char*));

                        int ctr = 0;
                        while(currChar != MARK_EOF && currChar != NEWLINE && currChar != BLANK &&
currChar != NULLCHAR){
                            words[numWord-1].contents[ctr] = currChar;
                            ctr++;
                            currChar = getc(fp);
                        }
                        words[numWord-1].length = ctr;
                        currChar = getc(fp);
                    }
                    else{
                        printf("Memory dynamic reallocation unsuccessfull!");
                        memory = true;
                    }
                }
            }
            else{
                printf("Memory allocation unsuccessfull!");
            }

            // Brute Force Algorithm for Word Puzzle Problem
            // Algorithm :
            // 1. Start with a word. Iterate through wordPuzzle to find the first letter of the word.
            // 2. If the word's first letter is found, check for all directions for the second letter.
            //    If second letter is found, continue to search letter per letter on that direction.
            //     Otherwise, move to another direction. Repeat until found or all directions have
searched.
            //    If not found, continue iteration through wordPuzzle. Repeat step 1.
            // 3. If found, continue step 1 to another word. Repeat until all words have been found.

            // Beginning of brute force algorithm. Start measuring execution time
            struct timeval start, end;
            clock_t startS, endS;
            int ms_elapsed = 0;
            double s_elapsed = 0.0;

            int numCompare = 0;
            for (int i = 0; i < numWord; i++){
                int j = 0;
                boolean found = false;
                char posRowCol[row][col];

                for (int a = 0; a < row; a++){
```

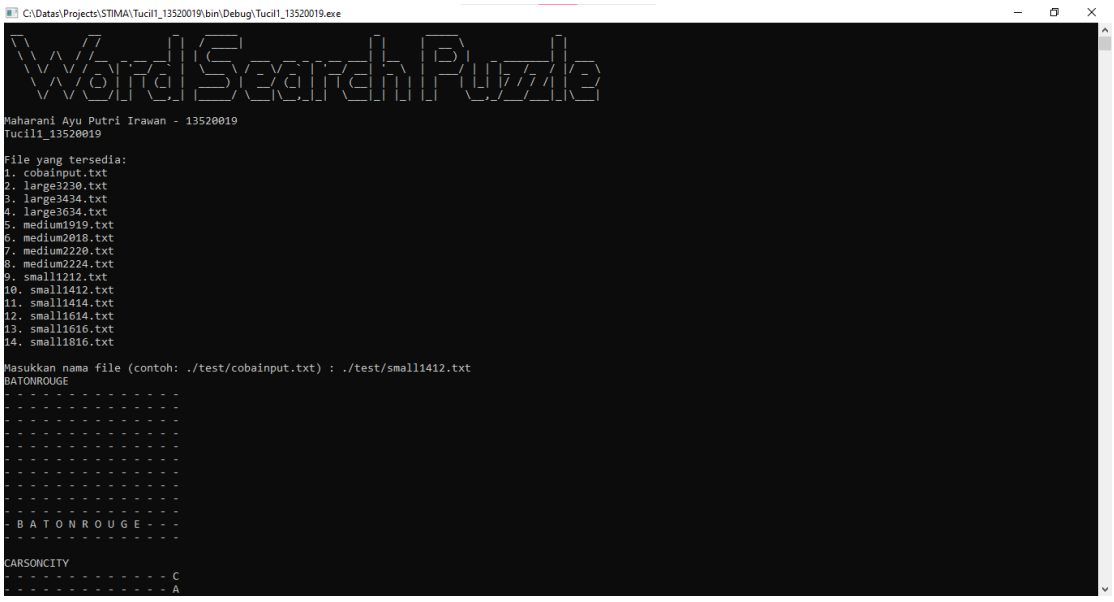
```
                    for (int b = 0; b < col; b++){
                        posRowCol[a][b] = '-';
                    }
                }
                for(int j=0; j < words[i].length; j++){
                    printf("%c", words[i].contents[j]);
                }
                printf("\n");

                while (j < charCtr && (!found)){
                    gettimeofday(&start, NULL);
                    startS = clock();
                    if(wordPuzzle[j] == words[i].contents[0]){
                        // First letter found
                        if (words[i].length == 1){ // One letter retrieved
                            found = true;
                        }
                        else {
                            // Continue to search the rest to all directions
                            int dir = 1;
                            while (!found && dir <= 8){
                                sequentialMatching(j, row, col, wordPuzzle, words[i], &found, posRowCol,
dir, &numCompare);
                                dir++;
                            }
                        }
                    }
                    gettimeofday(&end, NULL);
                    endS = clock();
                    ms_elapsed  +=  ((end.tv_sec  -  start.tv_sec)  *  1000000)  +  (end.tv_usec  -
start.tv_usec);
                    s_elapsed += (double)(endS - startS) / (double)(CLOCKS_PER_SEC);;
                    numCompare++;
                    j++;
                }
                // Finished searching a word
                printAns(row, col, posRowCol);
                printf("\n");
            }
            // Print Result
            printf("\n%d microseconds ~ %lf\n", ms_elapsed, s_elapsed);
            printf("\nNumber of comparations made: %d\n", numCompare);

            free(wordPuzzle);
            free(words);
        }
        else{
            printf("Memory allocation unsuccessfull!");
        }
    }
    fclose(fp);
    return 0;
}
```

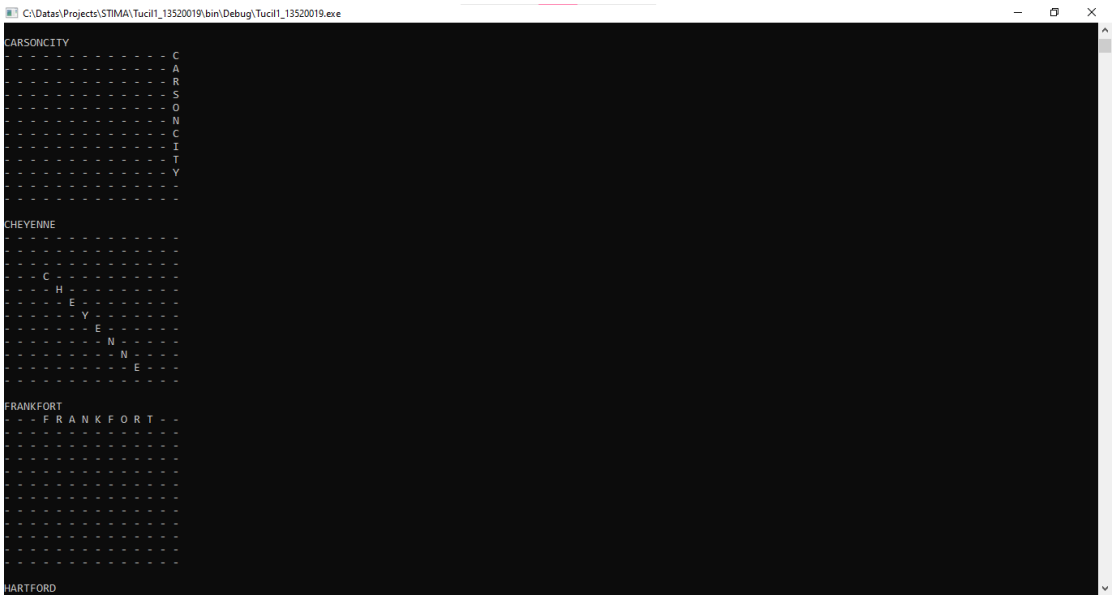
BAB III

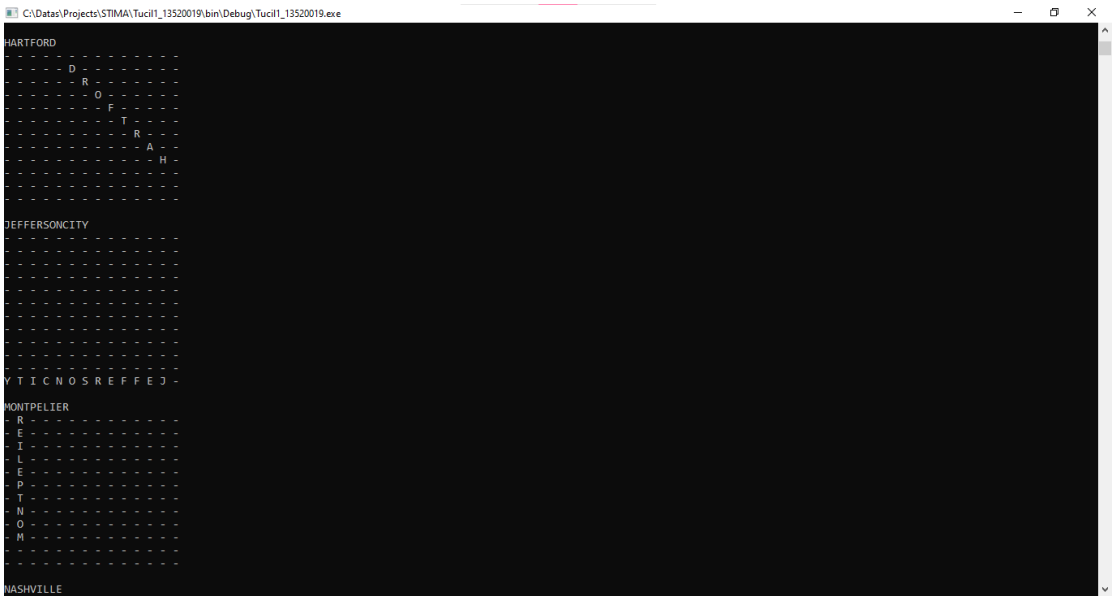
EKSPERIMEN

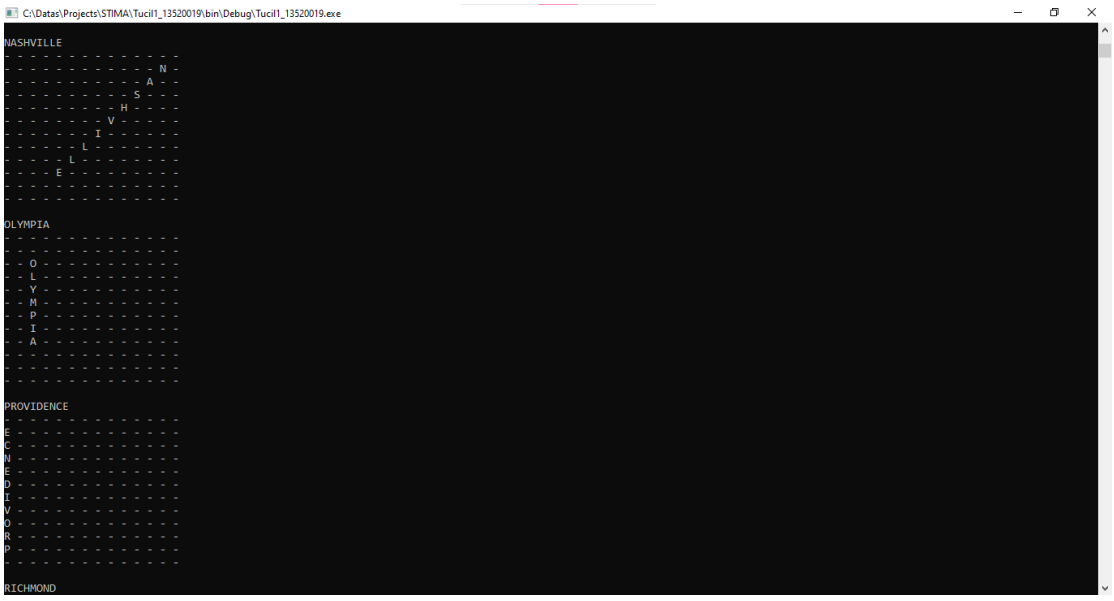
A. Eksperimen 1 (Word puzzle berukuran 14 x 12)

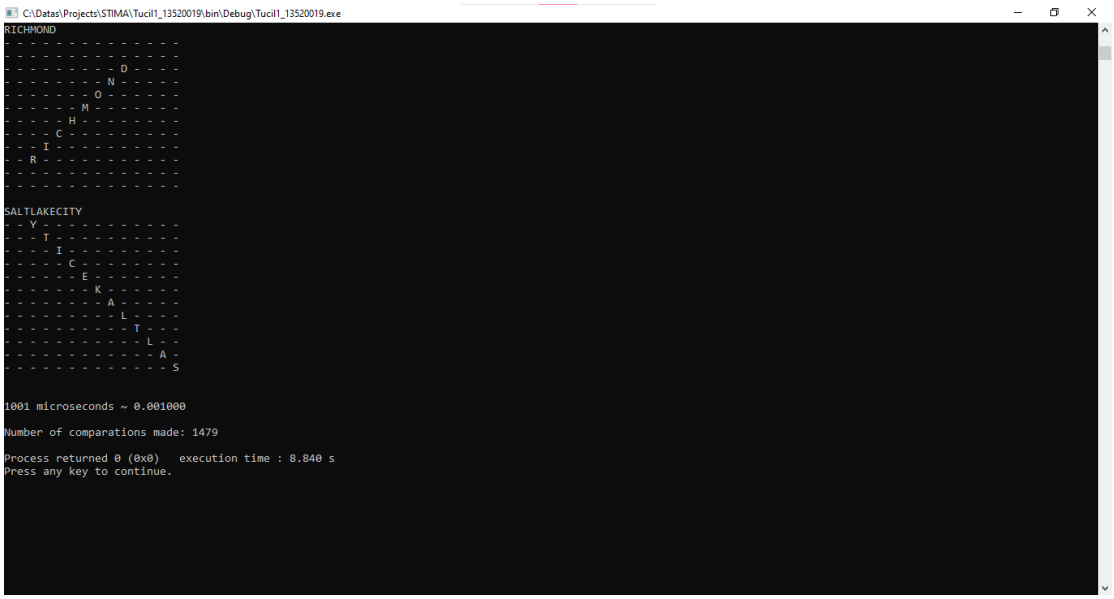





C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
CARSONCITY
CHEYENNE
FRANKFORT
HARTFORD


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
HARTFORD
JEFFERSONCITY
Y T I C N O S R E F F E J -
MONTPELIER
NASHVILLE


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
NASHVILLE
OLYMPIA
PROVIDENCE
RICHMOND


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
RICHMOND
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - D - - - -
- - - - - - - - - N - - - - -
- - - - - - - O - - - - - - -
- - - - - - M - - - - - - - -
- - - - H - - - - - - - - - -
- - - C - - - - - - - - - - -
- - - I - - - - - - - - - - -
- - R - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

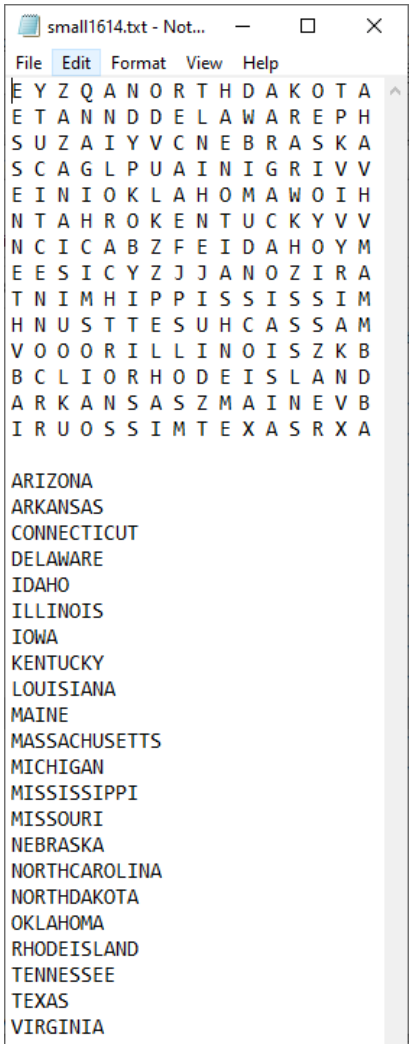
SALTLAKECITY
- - Y - - - - - - - - - - - -
- - - T - - - - - - - - - - -
- - - - I - - - - - - - - - -
- - - - - C - - - - - - - - -
- - - - - - E - - - - - - - -
- - - - - - - K - - - - - - -
- - - - - - - - - A - - - - -
- - - - - - - - - - L - - - -
- - - - - - - - - - - - T - -
- - - - - - - - - - - - - L -
- - - - - - - - - - - - - - A
- - - - - - - - - - - - - - S

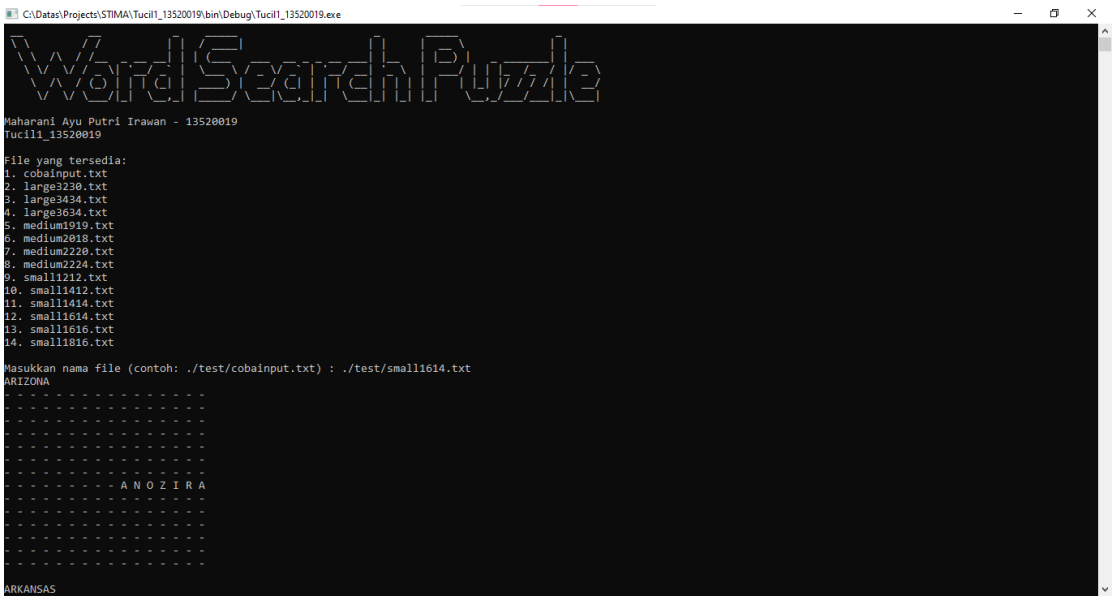
1001 microseconds ~ 0.001000

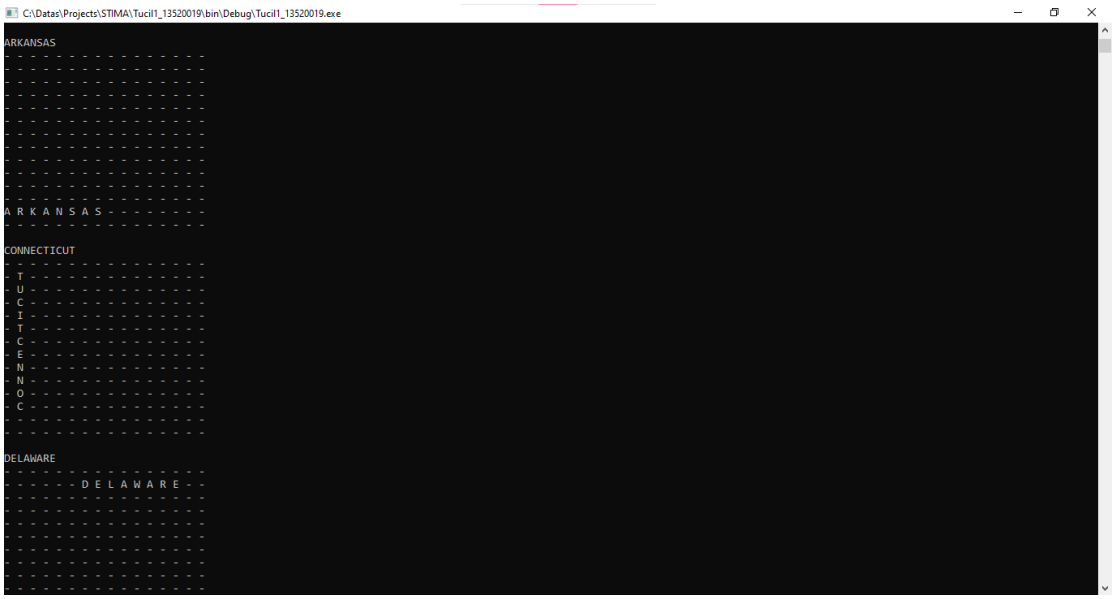
Number of comparations made: 1479

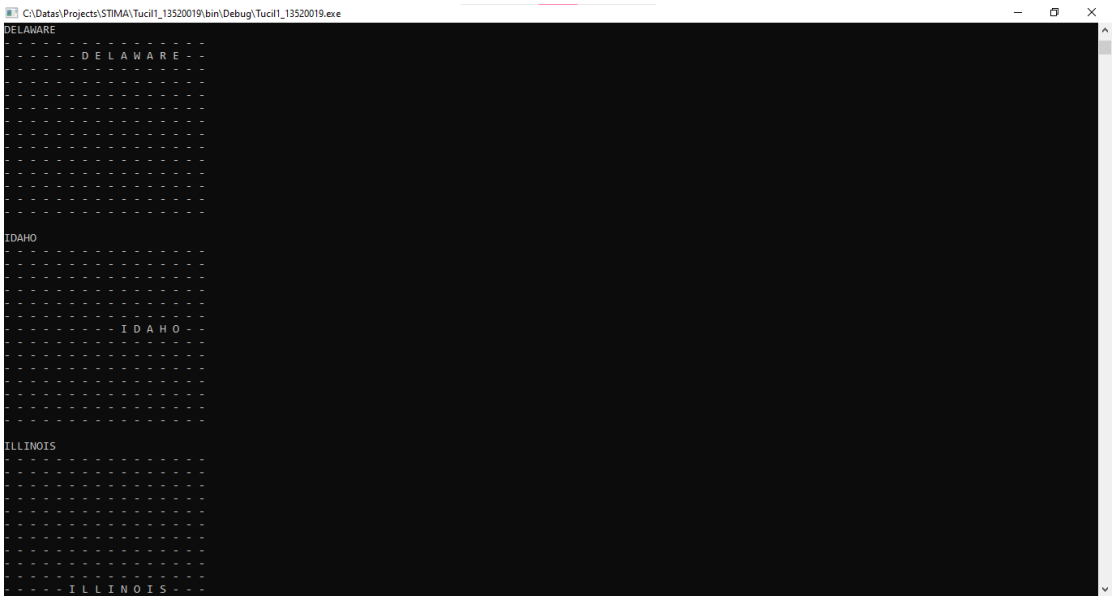
Process returned 0 (0x0)   execution time : 8.840 s
Press any key to continue.

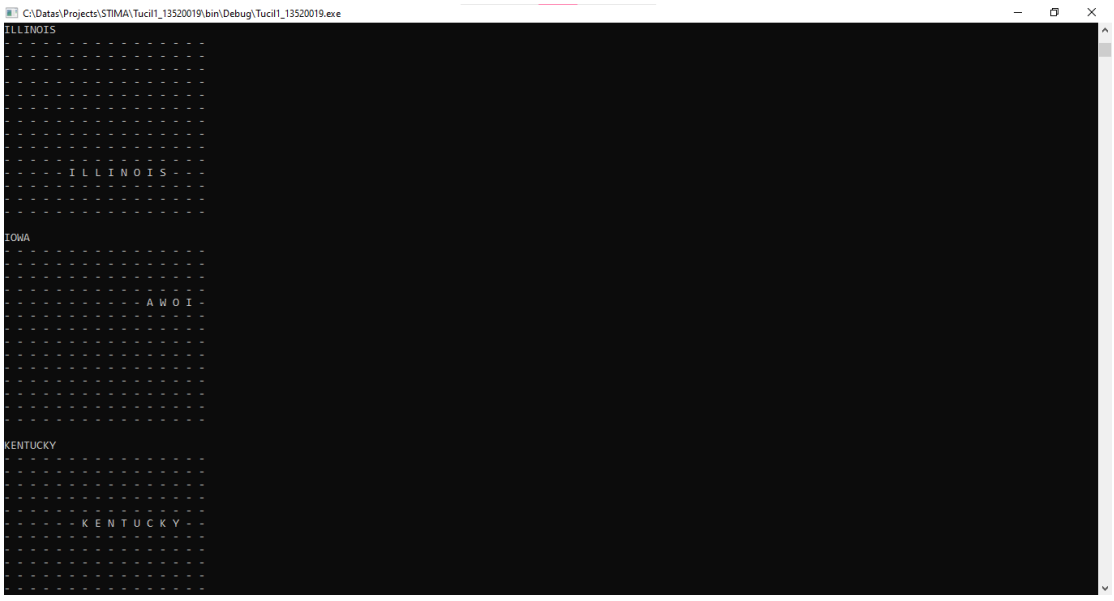
B. Eksperimen 2 (Word puzzle berukuran 16 x 14)

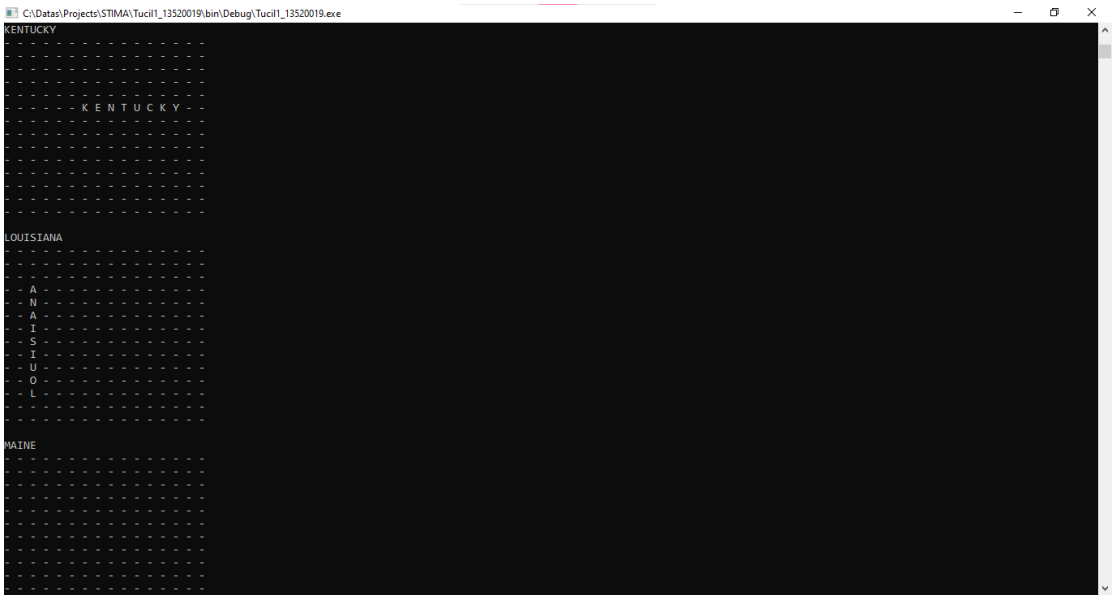


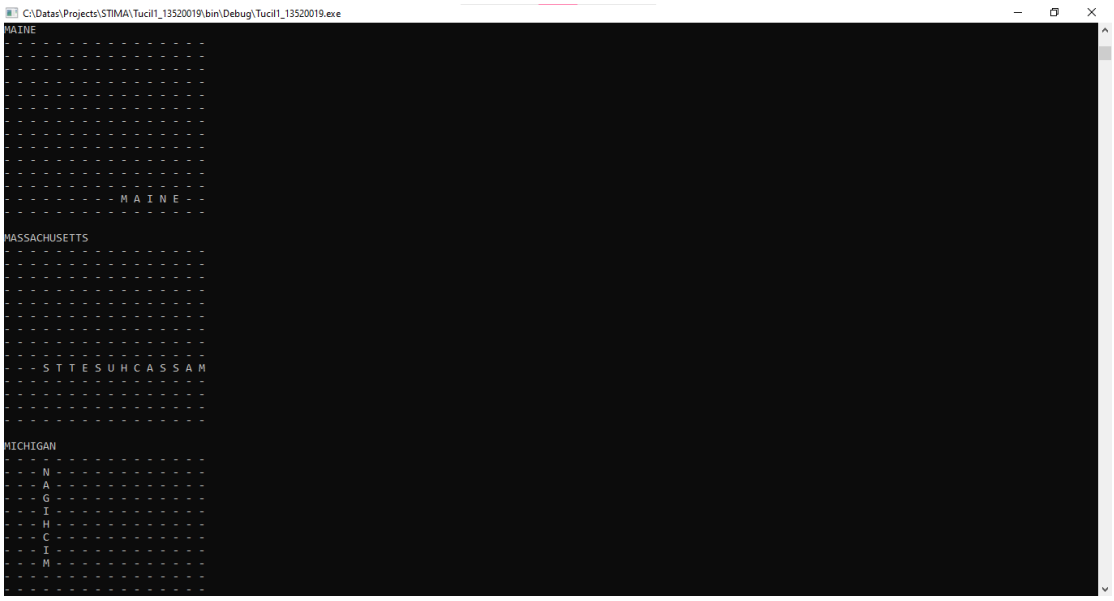


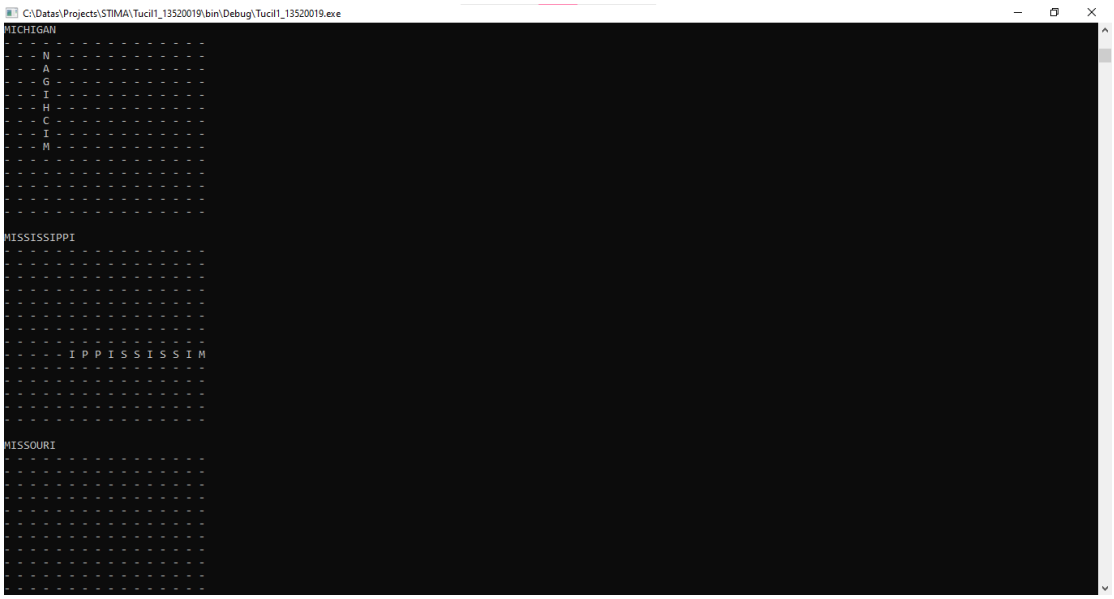

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
ARKANSAS
A R K A N S A S
CONNECTICUT
DELAWARE
D E L A W A R E

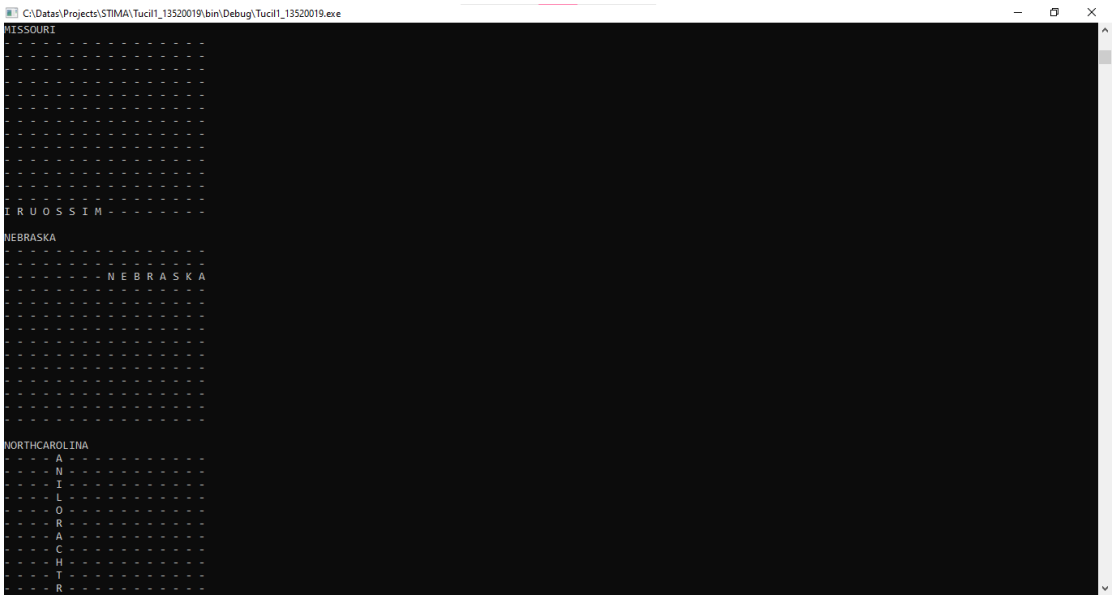

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
DELAWARE
D E L A W A R E
IDAHO
I D A H O
ILLINOIS
I L L I N O I S

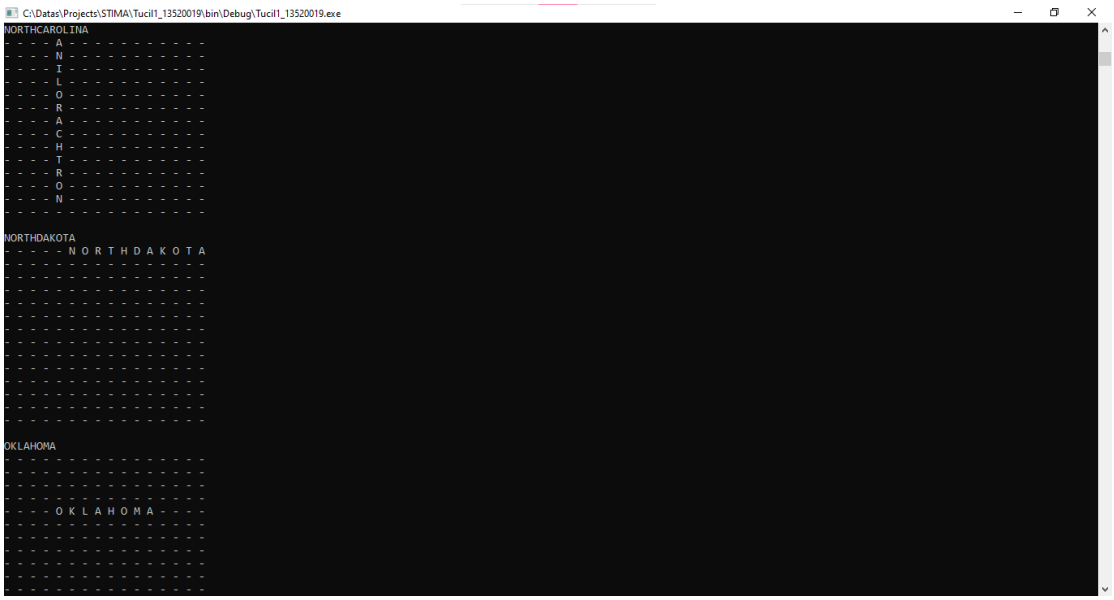

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
ILLINOIS
I L L I N O I S
IOWA
A W O I
KENTUCKY
K E N T U C K Y


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
KENTUCKY
- - - - - - K E N T U C K Y - -
LOUISIANA
- A - - - - - - - - - - - - - -
- N - - - - - - - - - - - - - -
- A - - - - - - - - - - - - - -
- I - - - - - - - - - - - - - -
- S - - - - - - - - - - - - - -
- I - - - - - - - - - - - - - -
- U - - - - - - - - - - - - - -
- O - - - - - - - - - - - - - -
- L - - - - - - - - - - - - - -
MAINE


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
MAINE
- - - - - - - - - M A I N E - -
MASSACHUSETTS
- - - S T T E S U H C A S S A M
MICHIGAN
- - - N - - - - - - - - - - - -
- - - A - - - - - - - - - - - -
- - - G - - - - - - - - - - - -
- - - I - - - - - - - - - - - -
- - - H - - - - - - - - - - - -
- - - C - - - - - - - - - - - -
- - - I - - - - - - - - - - - -
- - - M - - - - - - - - - - - -


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
MICHIGAN
- - - N - - - - - - - - - - - -
- - - A - - - - - - - - - - - -
- - - G - - - - - - - - - - - -
- - - I - - - - - - - - - - - -
- - - H - - - - - - - - - - - -
- - - C - - - - - - - - - - - -
- - - I - - - - - - - - - - - -
- - - M - - - - - - - - - - - -
MISSISSIPPI
- - - - - I P P I S S I S S I M
MISSOURI


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
MISSOURI
I R U O S S I M
NEBRASKA
N E B R A S K A
NORTHCAROLINA
N O R T H C A R O L I N A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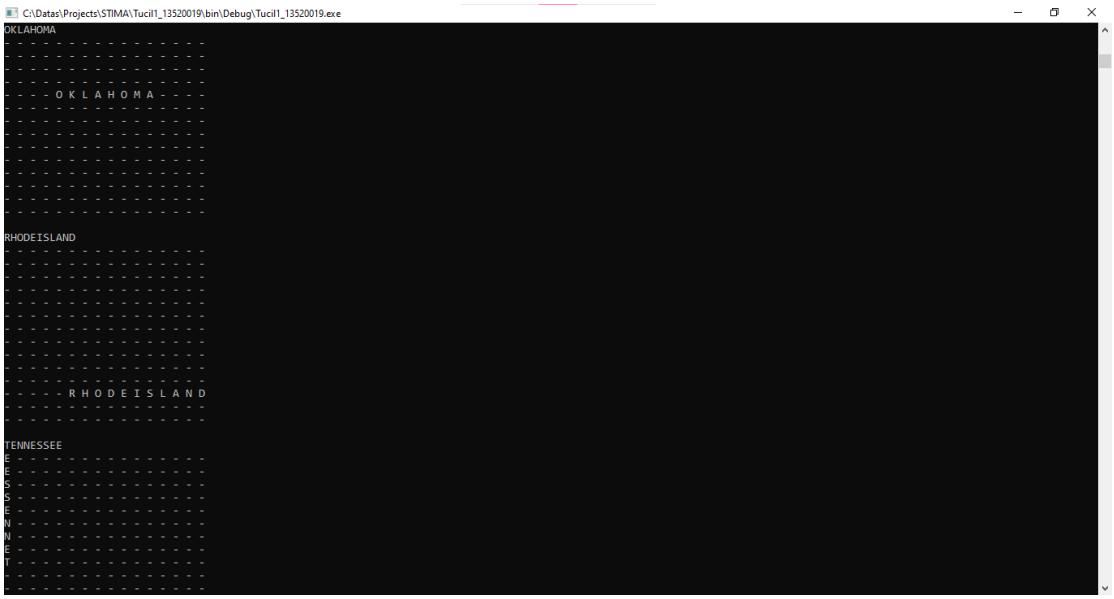
NORTHDAKOTA
N O R T H D A K O T A
OKLAHOMA
O K L A H O M A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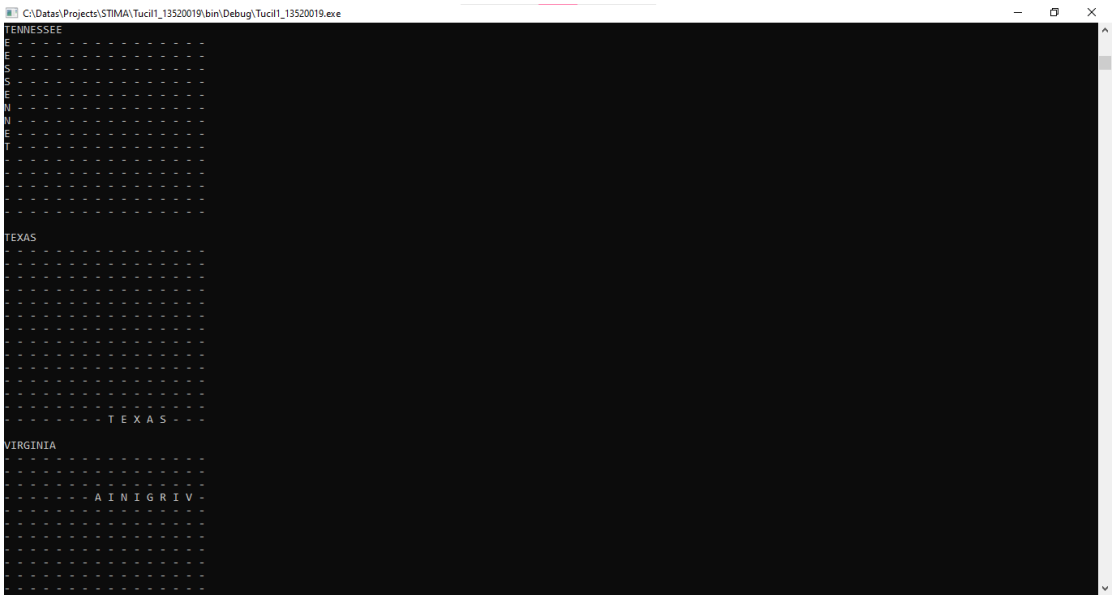
TENNESSEE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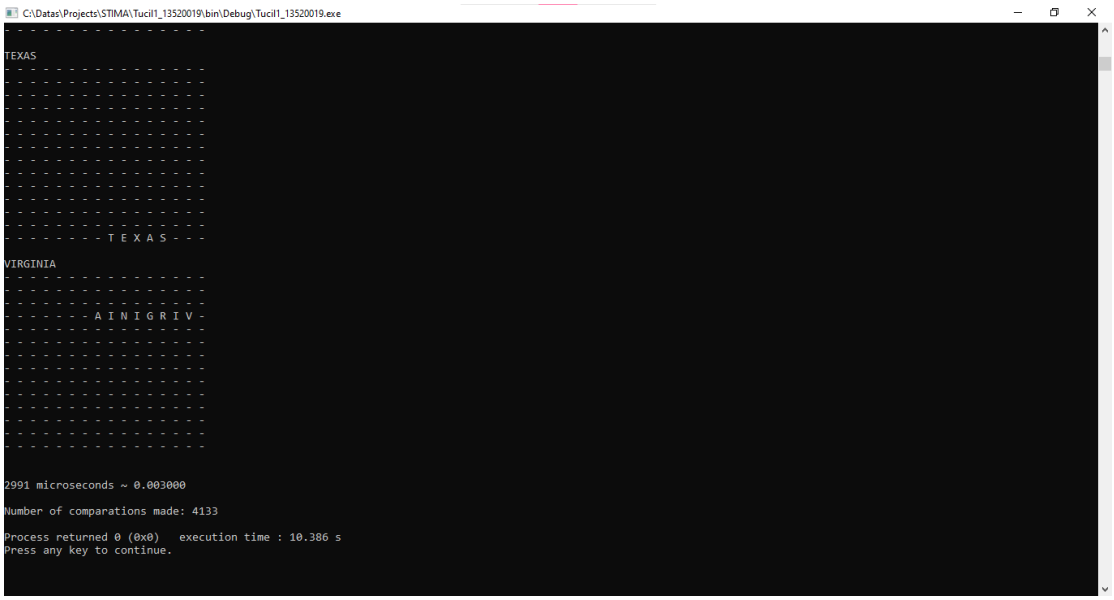
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2991 microseconds ~ 0.003000
Number of comparations made: 4133
Process returned 0 (0x0)   execution time : 10.386 s
Press any key to continue.

C. Eksperimen 3 (Word puzzle berukuran 16 x 16)

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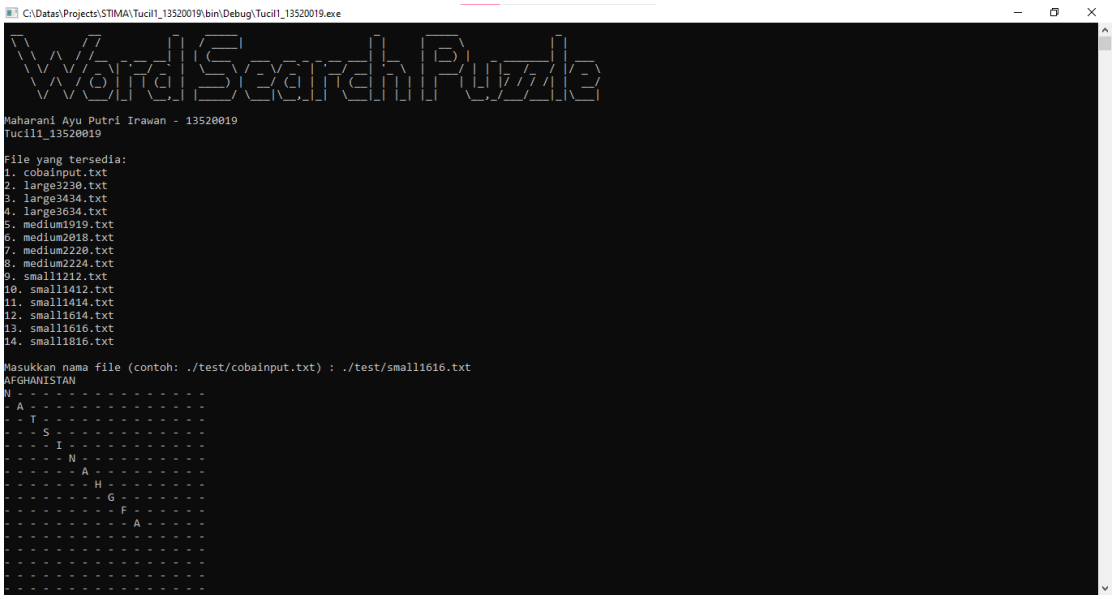
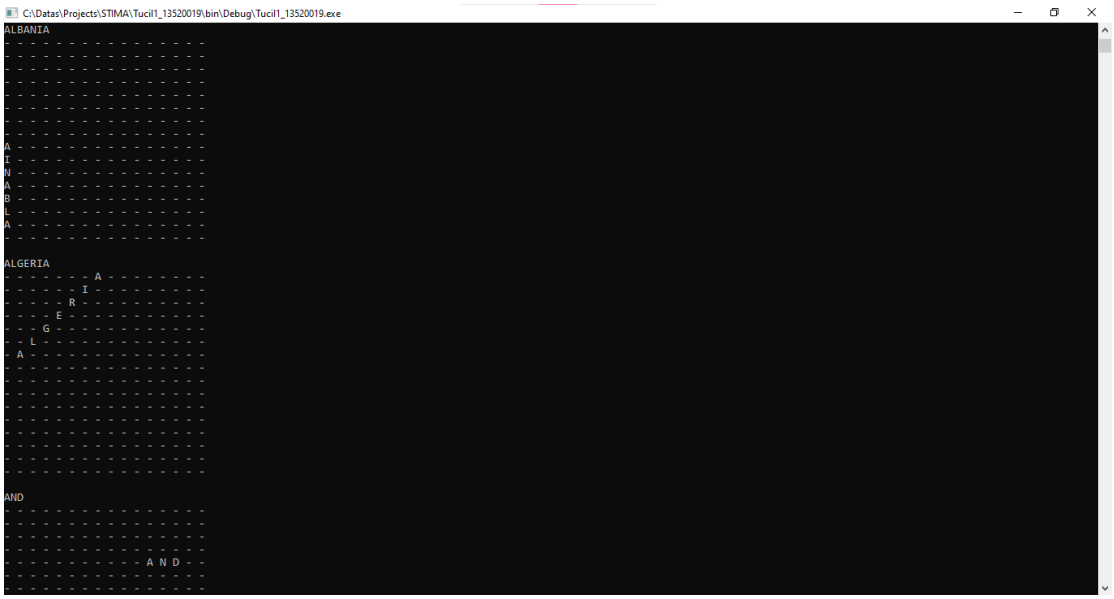
I A U S T R I A L F M I C T A L
N A I D O B M A C E A G D R A D
A C A M E R O O N Z B U T R G W
B N A J I A B R E Z A A T K O R
L A C I N I M O D L E S T O N I
A R O D A U C E K R U M U I G L
F M S N B A N G L A D E S H K E

AFGHANISTAN
ALBANIA
ALGERIA
AND
ANGOLA
ANTIGUA
ARGENTINA
ARMENIA
AUSTRIA
AZERBAIJAN
BAHRAIN
BANGLADESH
BARBUDA
BELARUS
BELIZE
BENIN
BHUTAN
BOLIVIA
CAMBODIA
CAMEROON
CANADA
DOMINICA
ECUADOR
EGYPT
ERITREA
ETHIOPIA


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
Maharani Ayu Putri Irawan - 13520019
Tucil1_13520019
File yang tersedia:
1. cobainput.txt
2. large3230.txt
3. large3434.txt
4. large3634.txt
5. medium1919.txt
6. medium2018.txt
7. medium2220.txt
8. medium2224.txt
9. small1212.txt
10. small1412.txt
11. small1414.txt
12. small1614.txt
13. small1616.txt
14. small1816.txt
Masukkan nama file (contoh: ./test/cobainput.txt) : ./test/small1616.txt
AFGHANISTAN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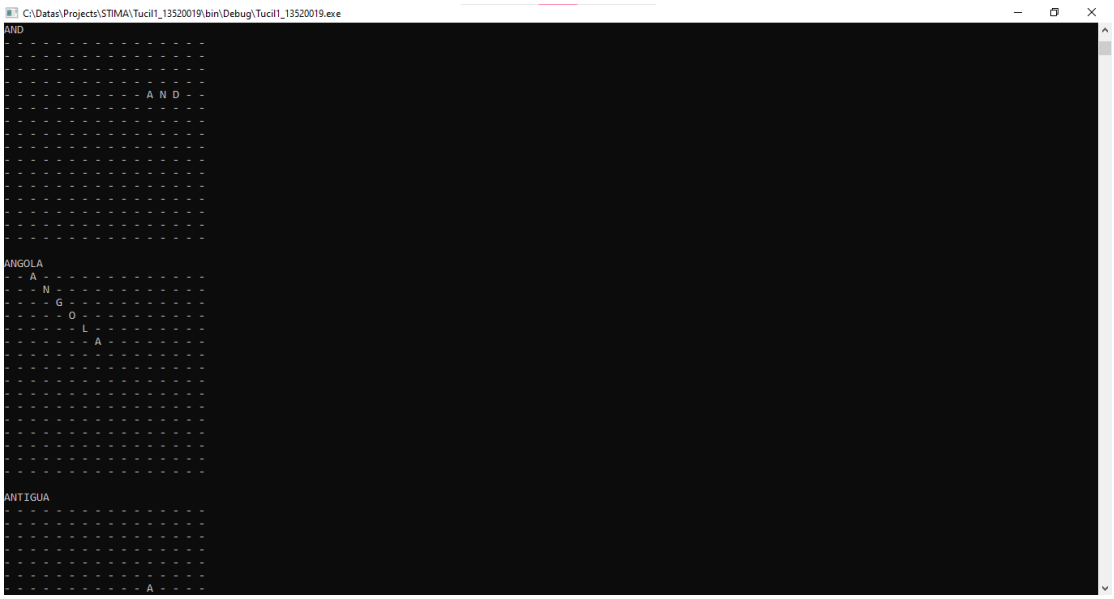
ALBANIA
ALGERIA
AND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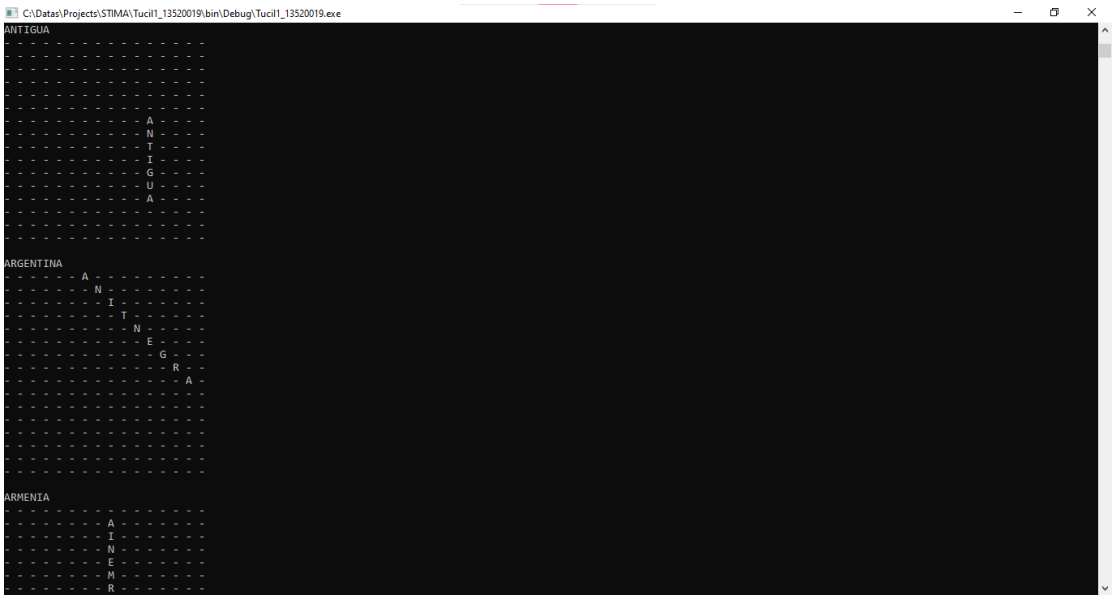
AND
ANGOLA
ANTIGUA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ANTIGUA
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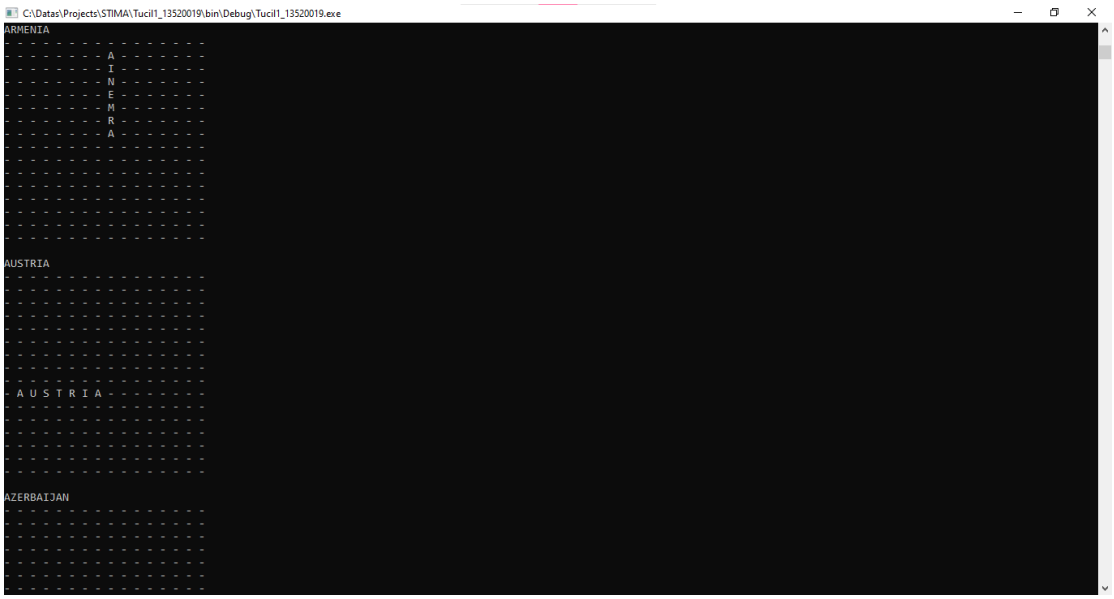
ARMENIA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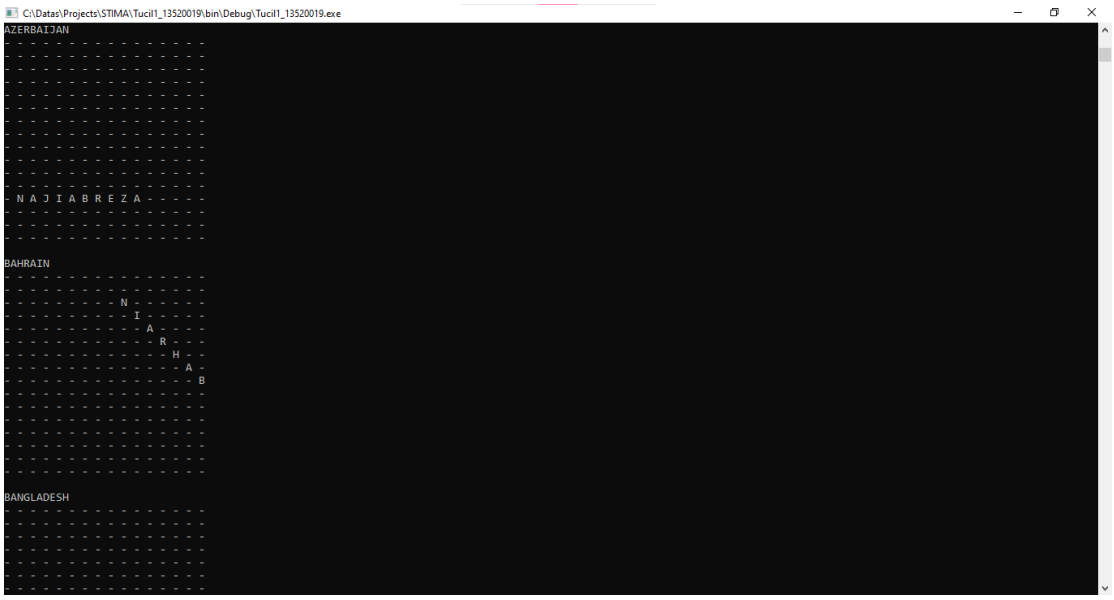
ARMENIA
AUSTRIA
AZERBAIJAN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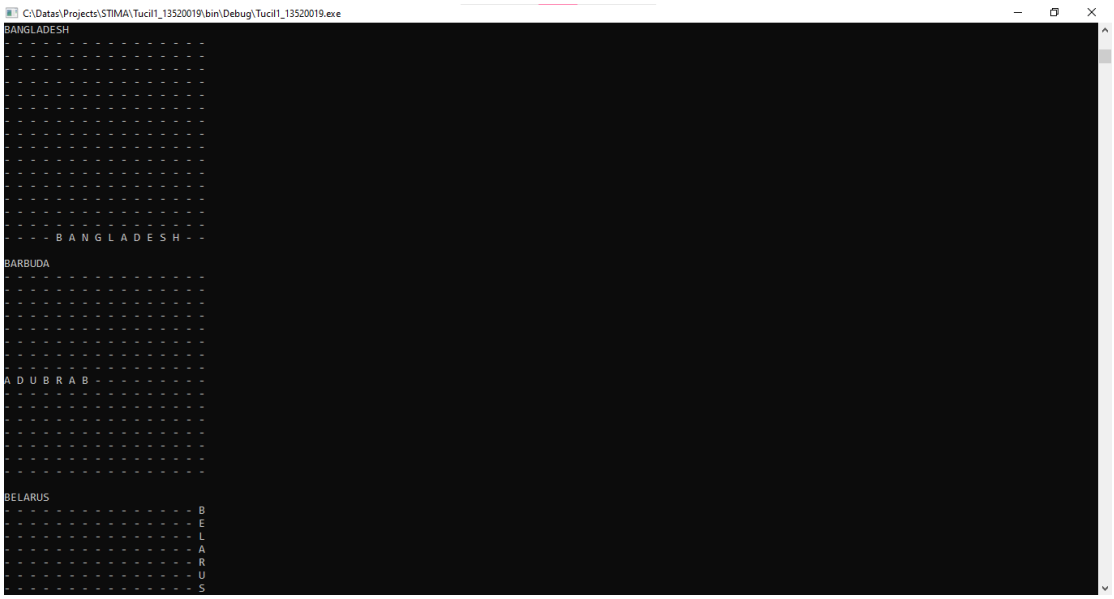
AZERBAIJAN
BAHRAIN
BANGLADESH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BANGLADESH
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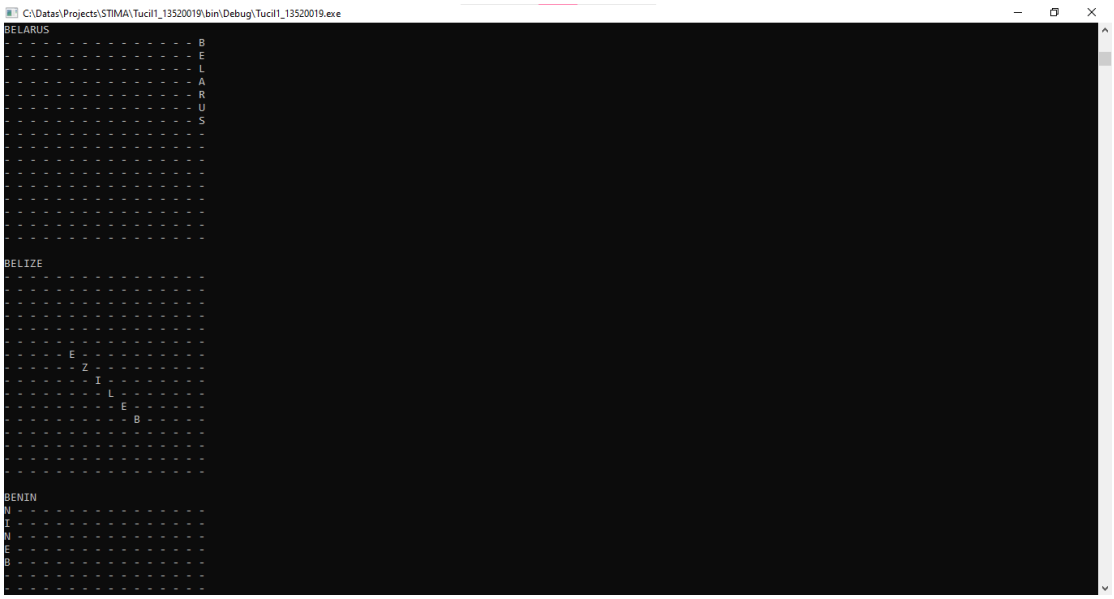
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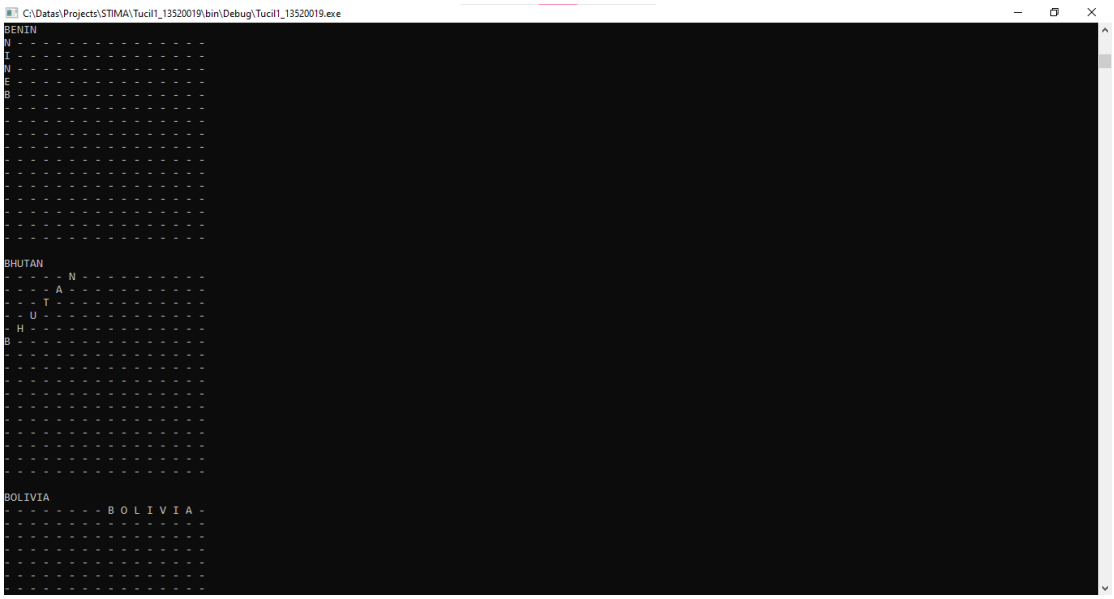
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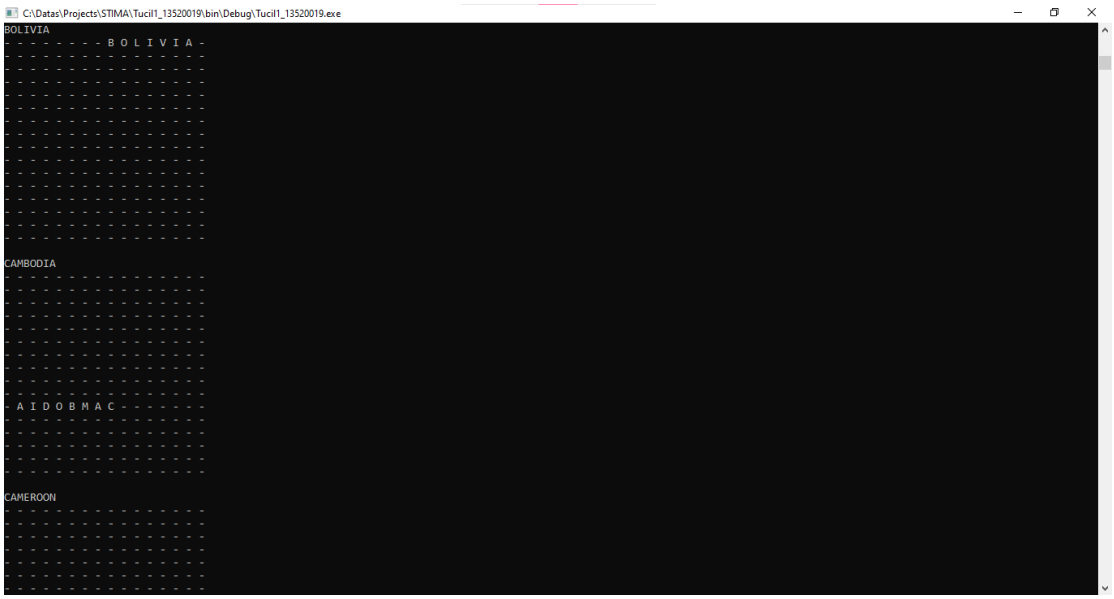
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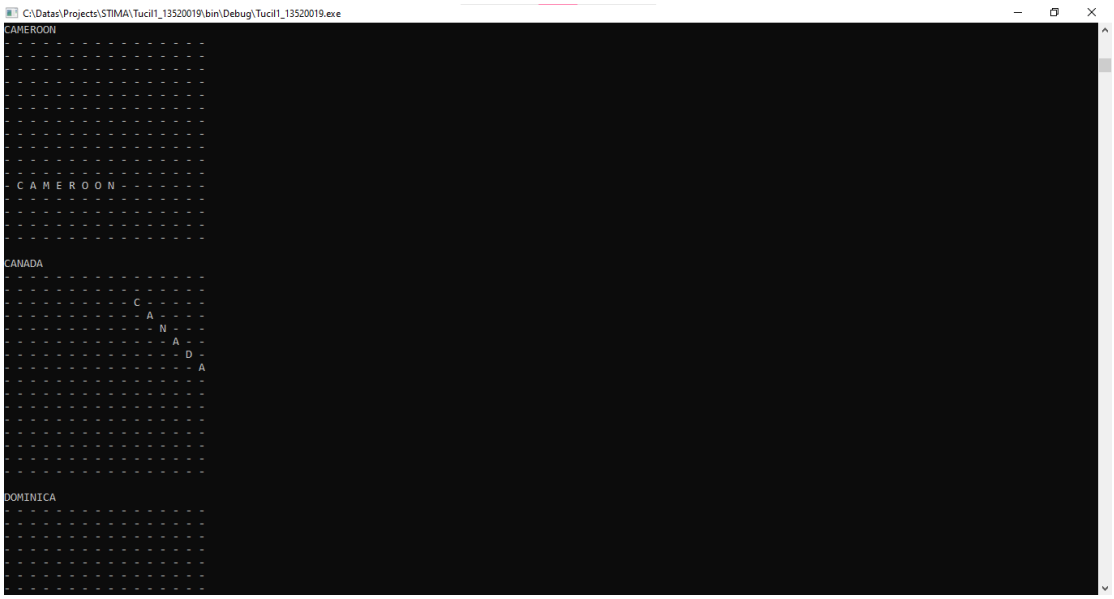
C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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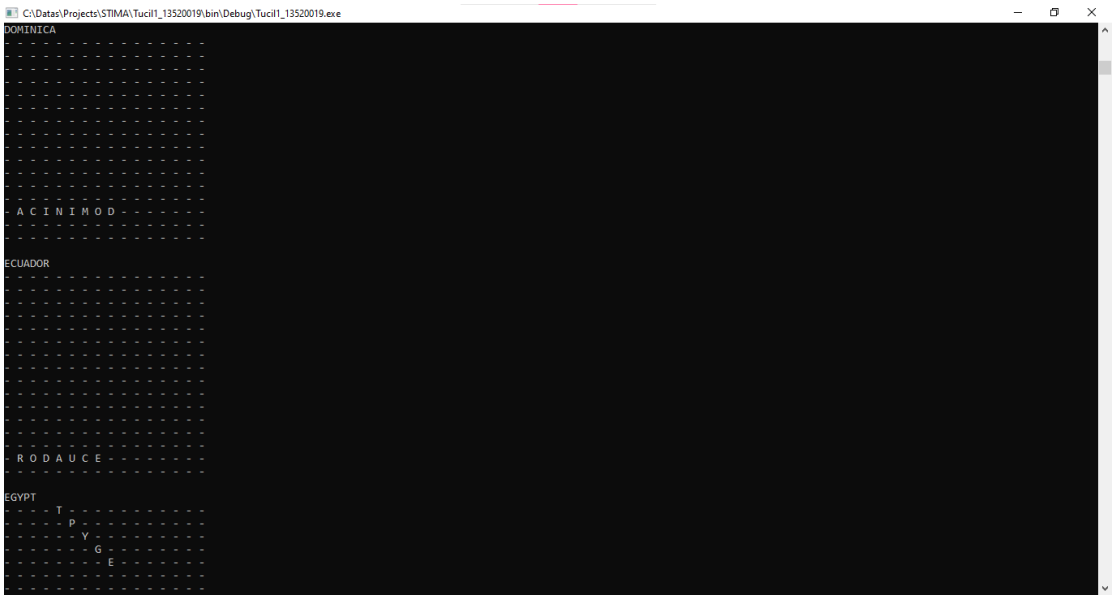
C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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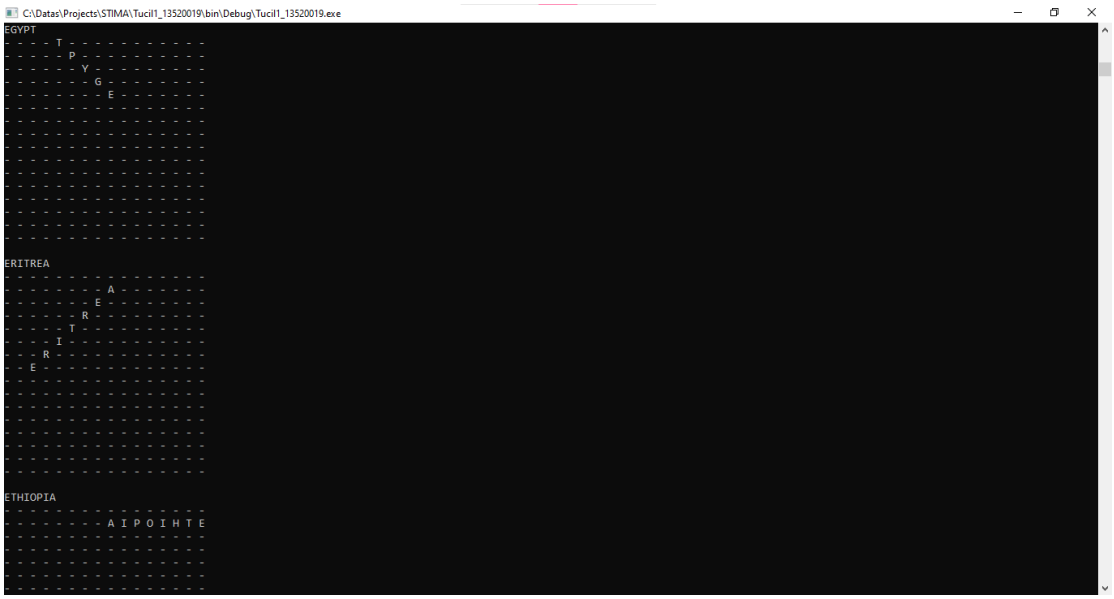
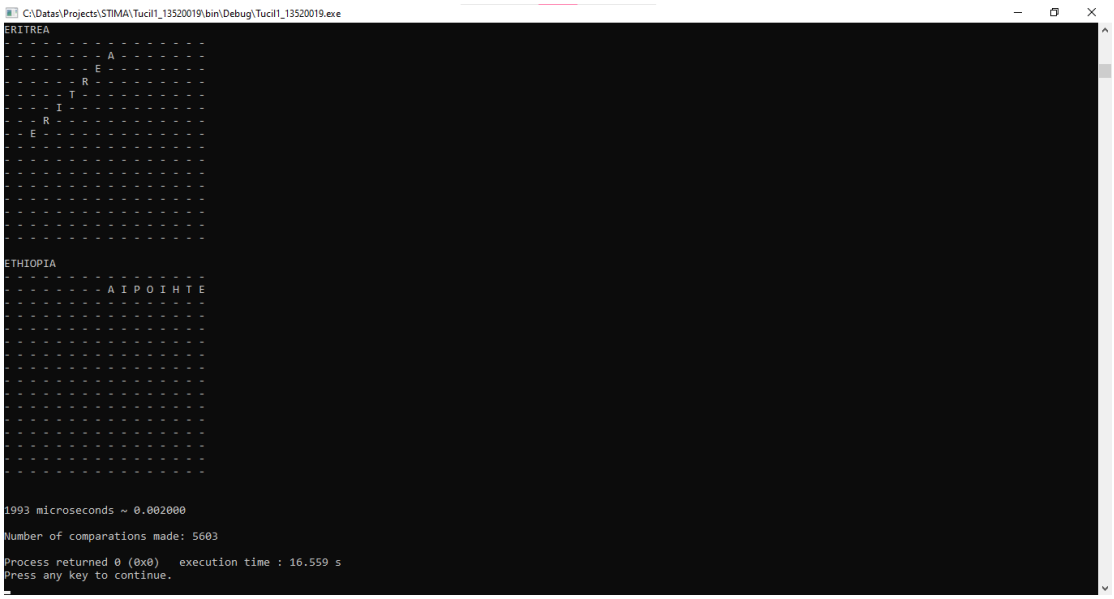
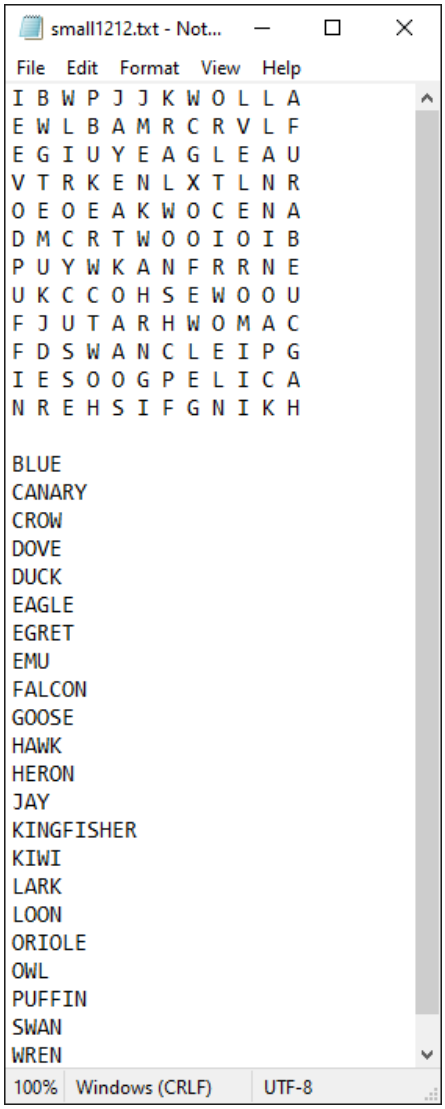
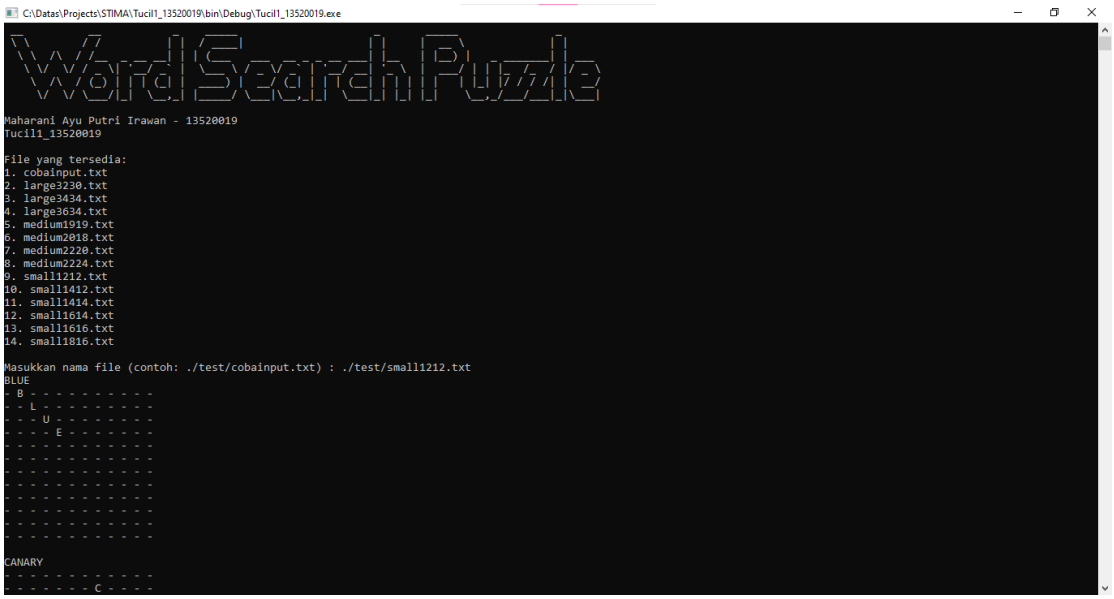
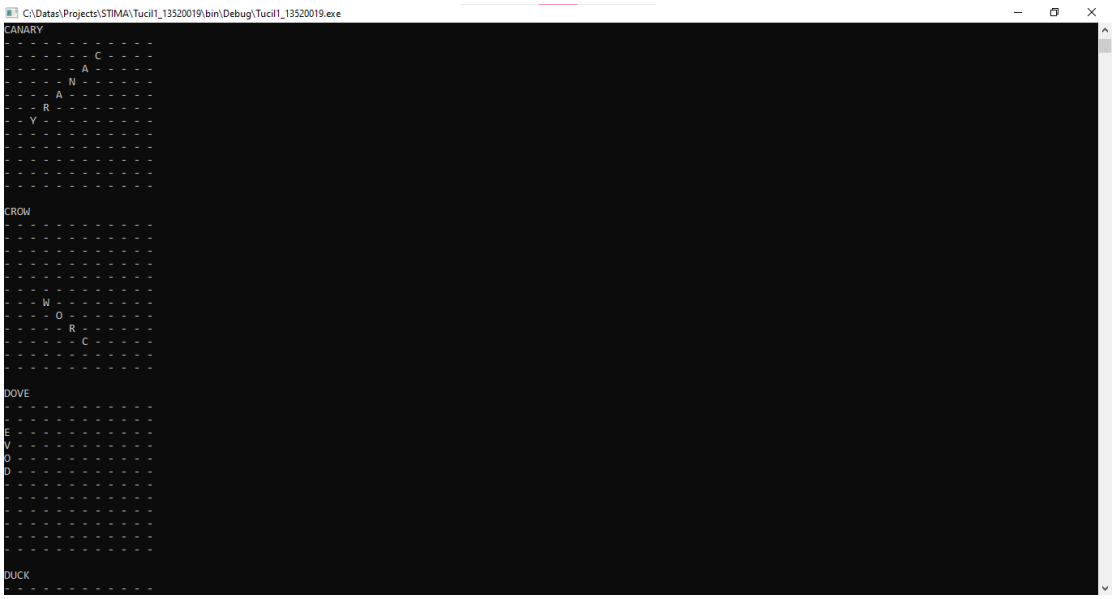

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
EGYPT
ERITREA
ETHIOPIA
A I P O I H T E

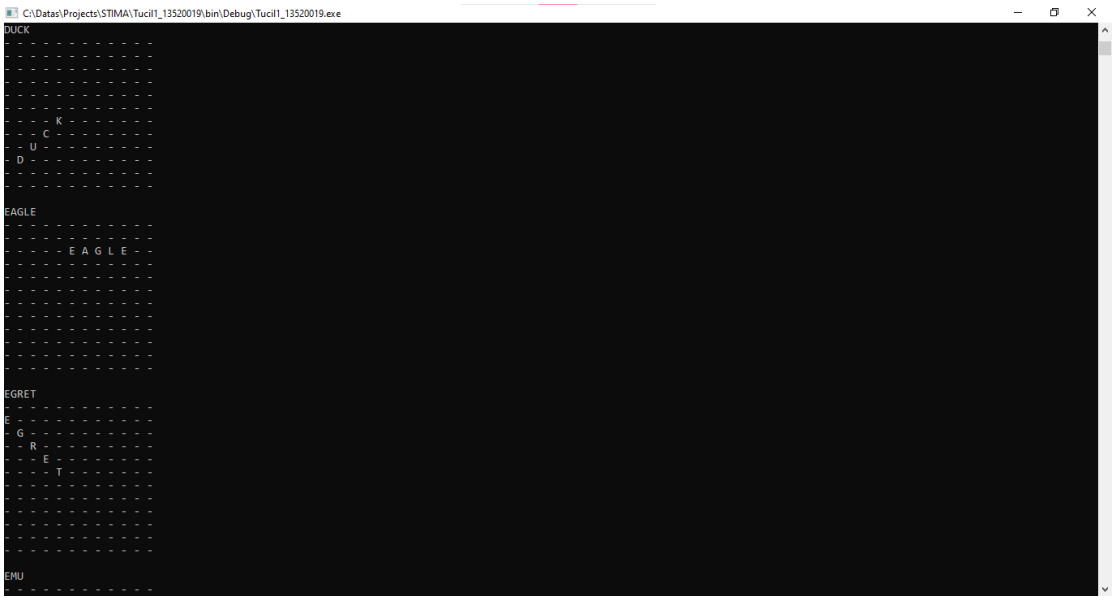

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
ERITREA
ETHIOPIA
A I P O I H T E
1993 microseconds ~ 0.002000
Number of comparations made: 5603
Process returned 0 (0x0)   execution time : 16.559 s
Press any key to continue.

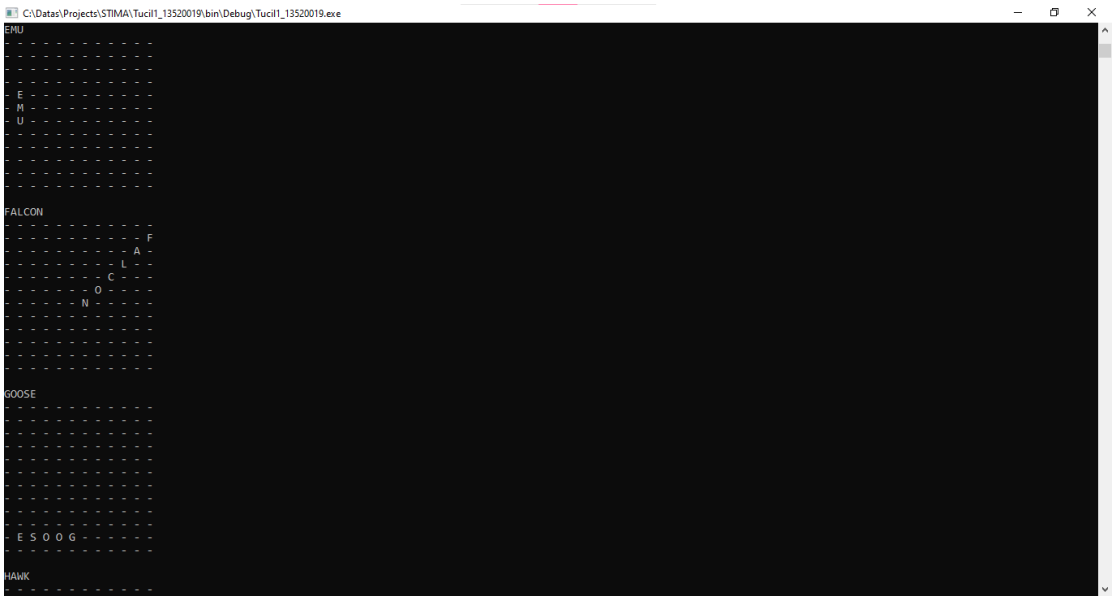
D. Eksperimen 4 (Word puzzle berukuran 12 x 12)

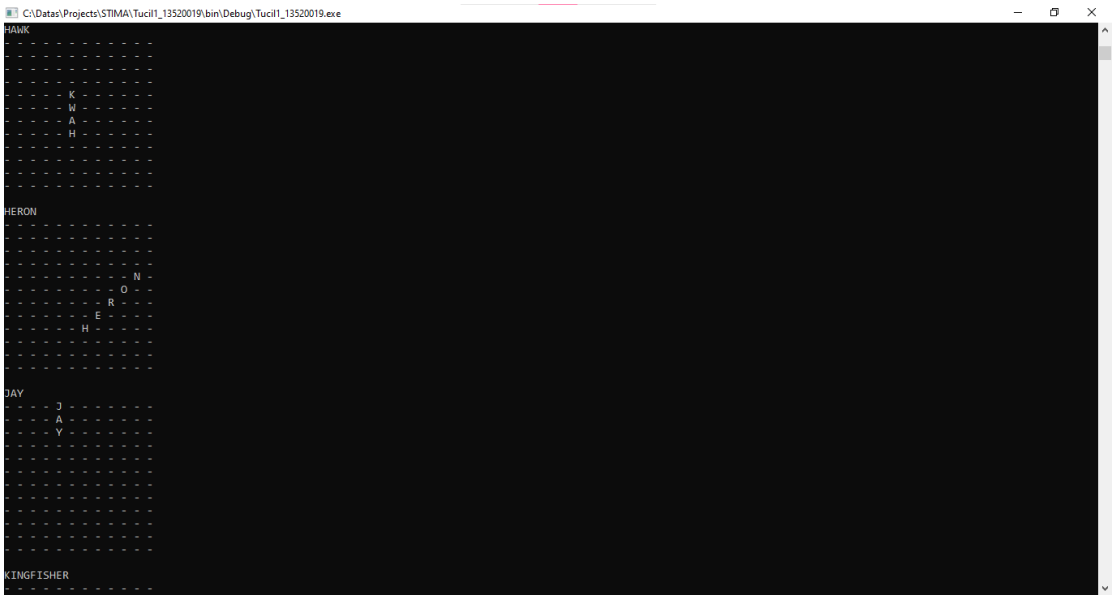


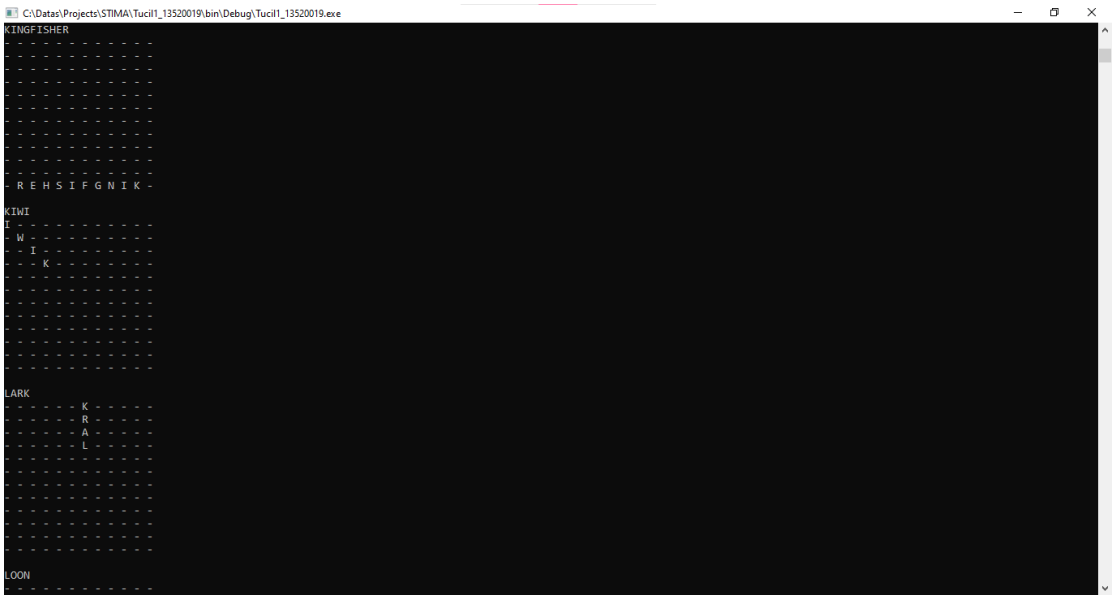


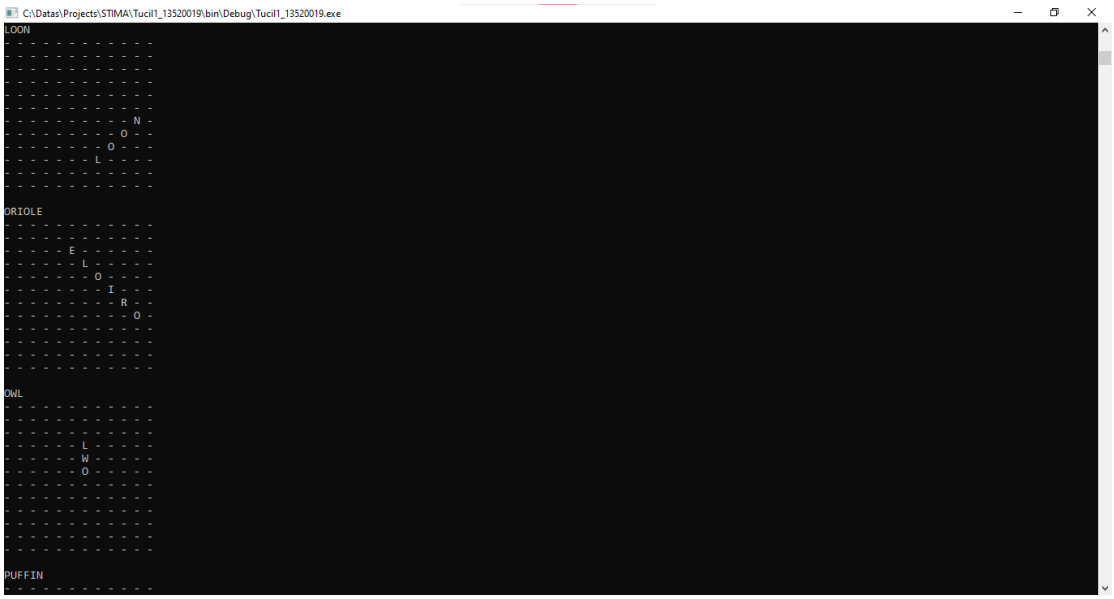

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
CANARY
CROW
DOVE
DUCK

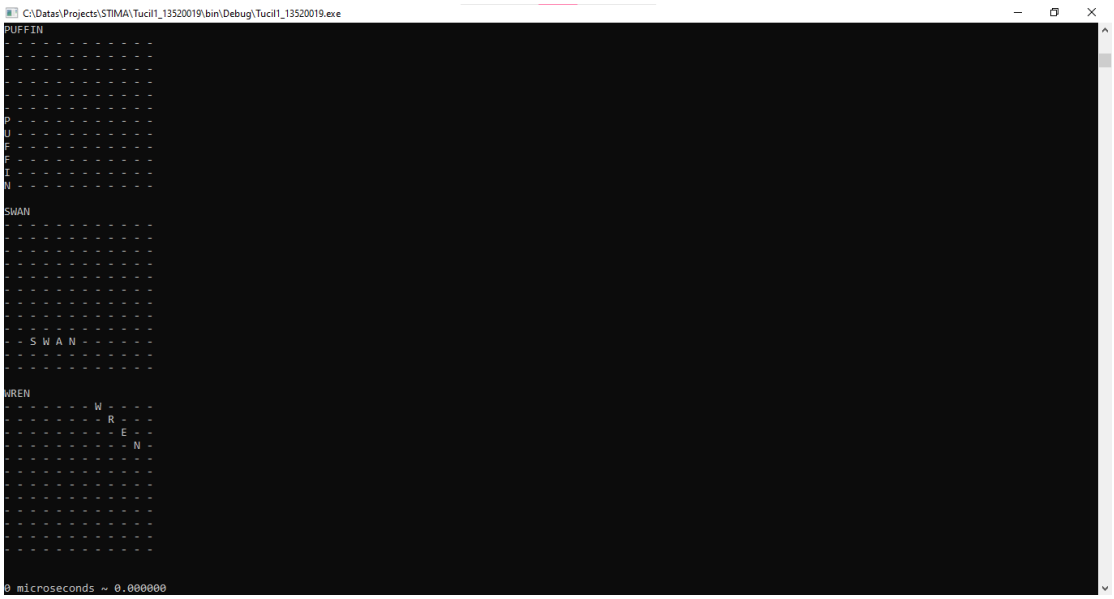

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
DUCK
EAGLE
EGRET
EMU

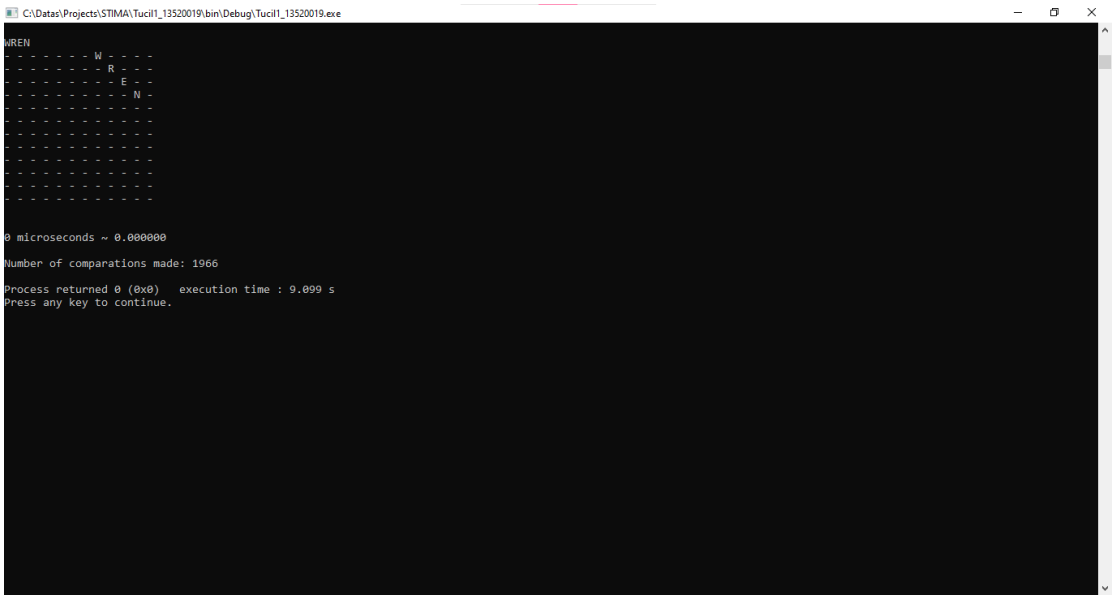

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
EMU
FALCON
GOOSE
HAWK


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
HAWK
HERON
JAY
KINGFISHER


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
KINGFISHER
KIWI
LARK
LOON


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
LOON
ORIOLE
OWL
PUFFIN


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
PUFFIN
SWAN
S W A N
WREN
0 microseconds ~ 0.000000


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
WREN
0 microseconds ~ 0.000000
Number of comparations made: 1966
Process returned 0 (0x0)   execution time : 9.099 s
Press any key to continue.

E. Eksperimen 5 (Word puzzle berukuran 18 x 16)

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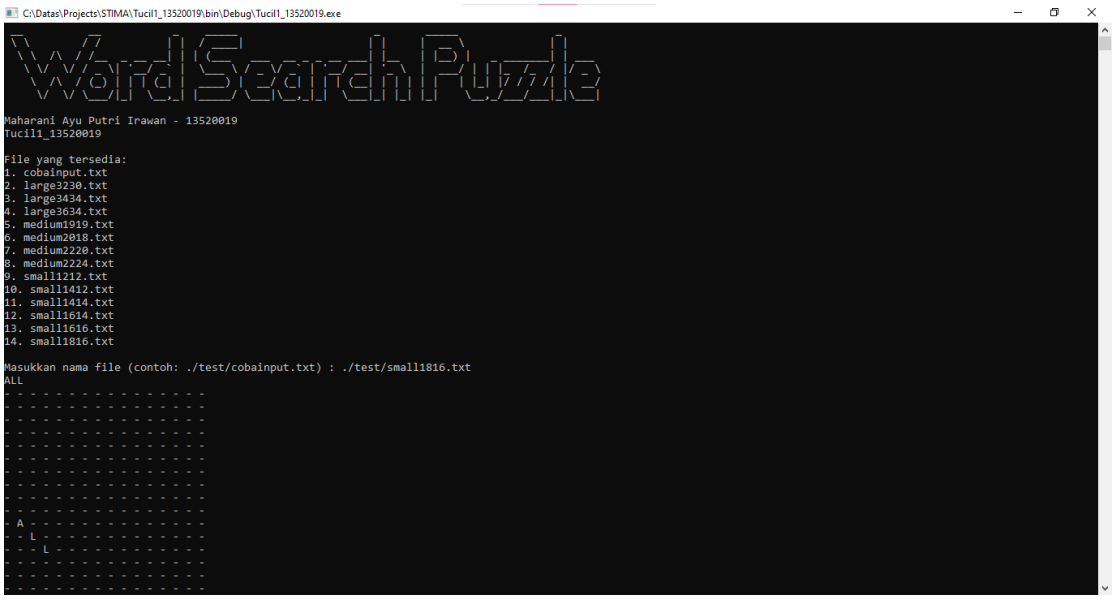
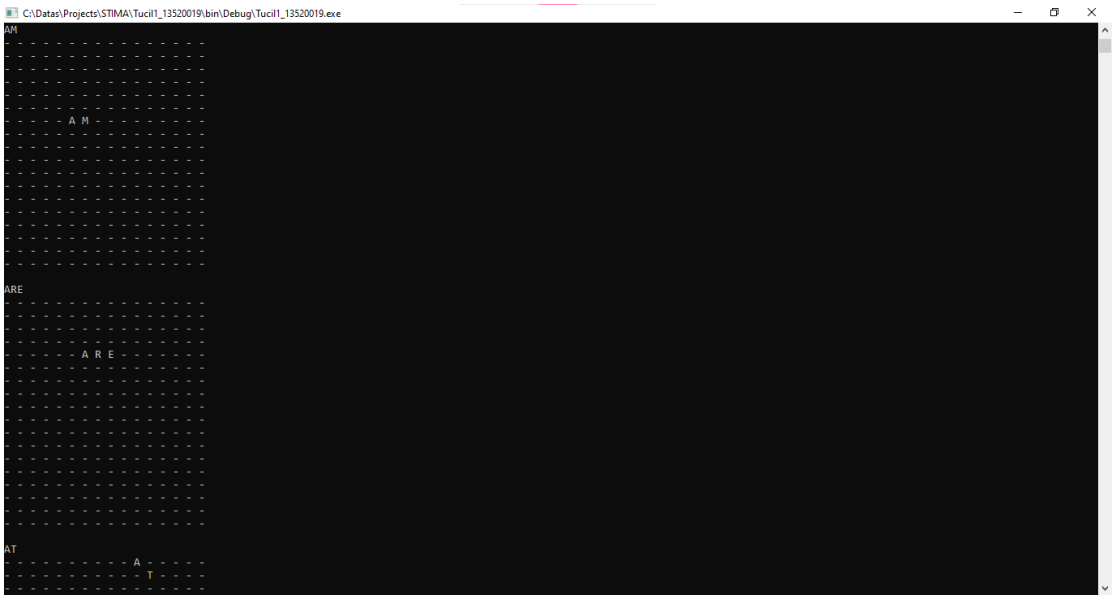
YES




C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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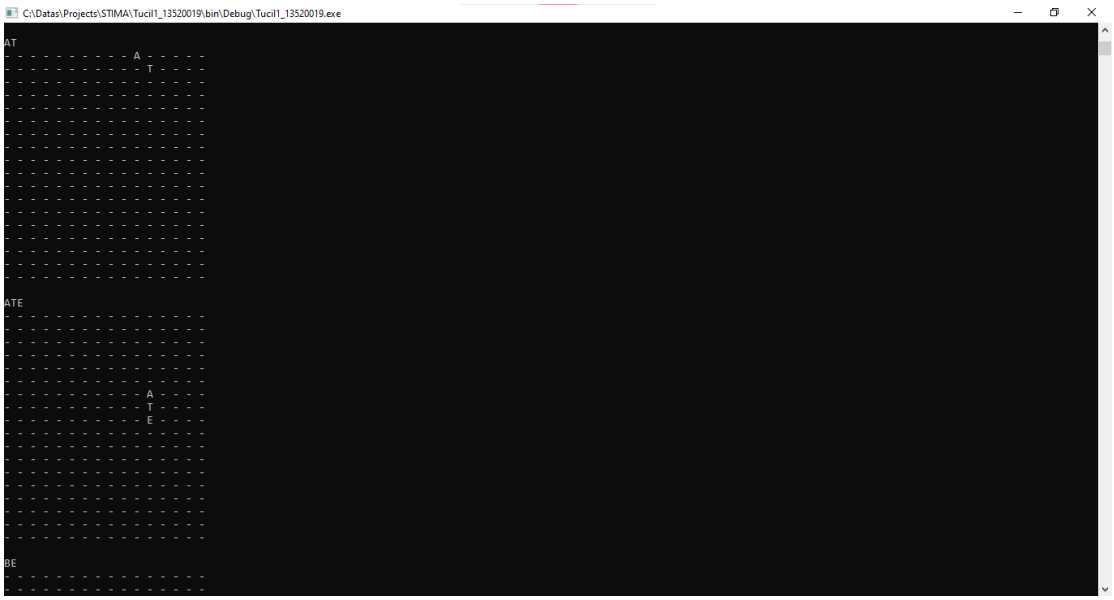
C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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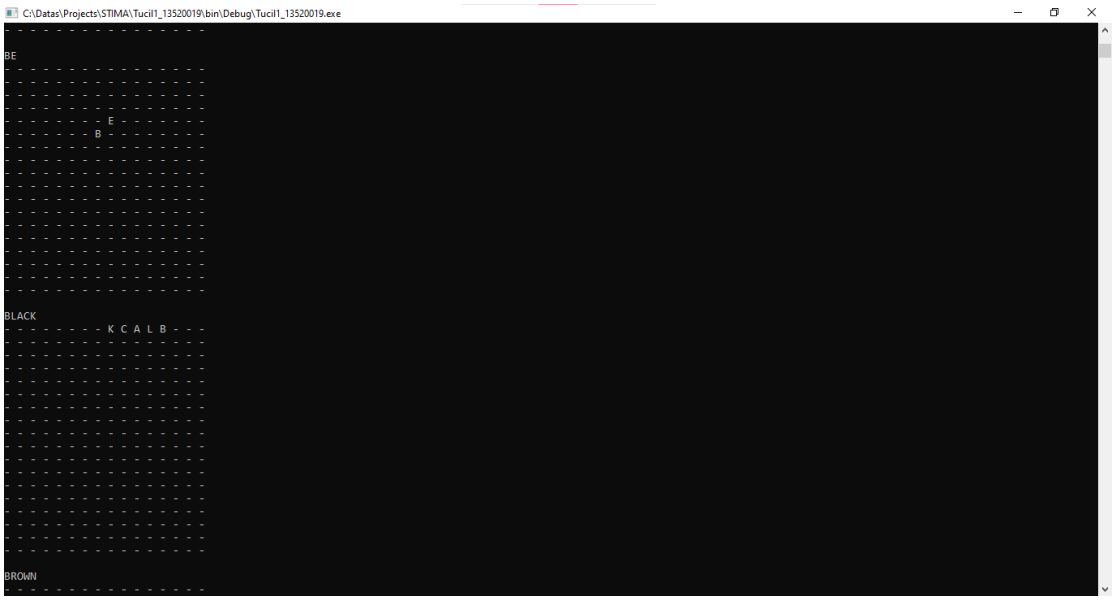
C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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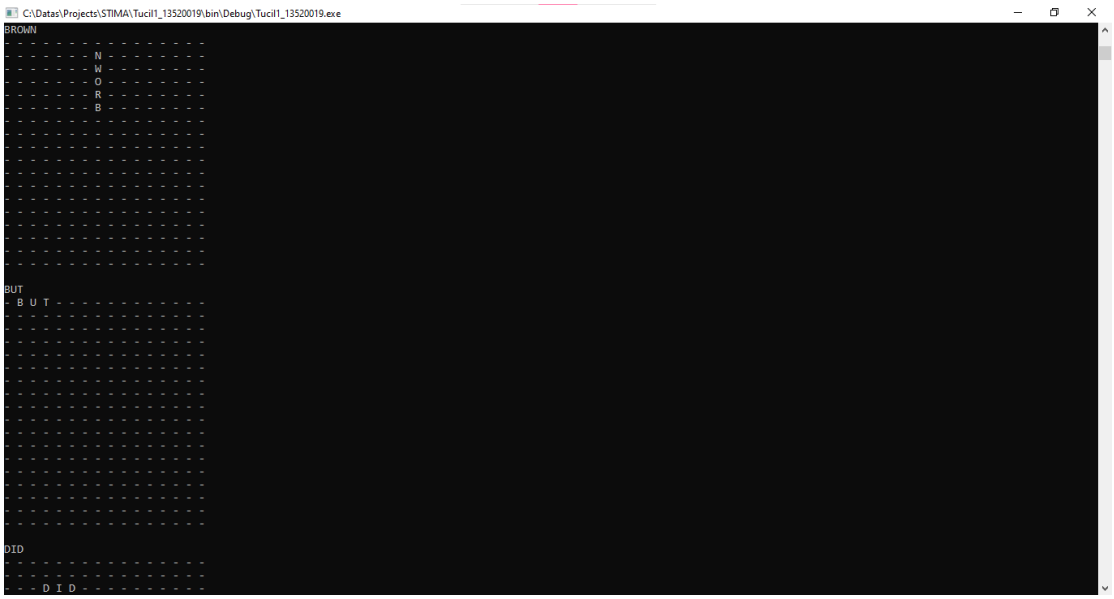
C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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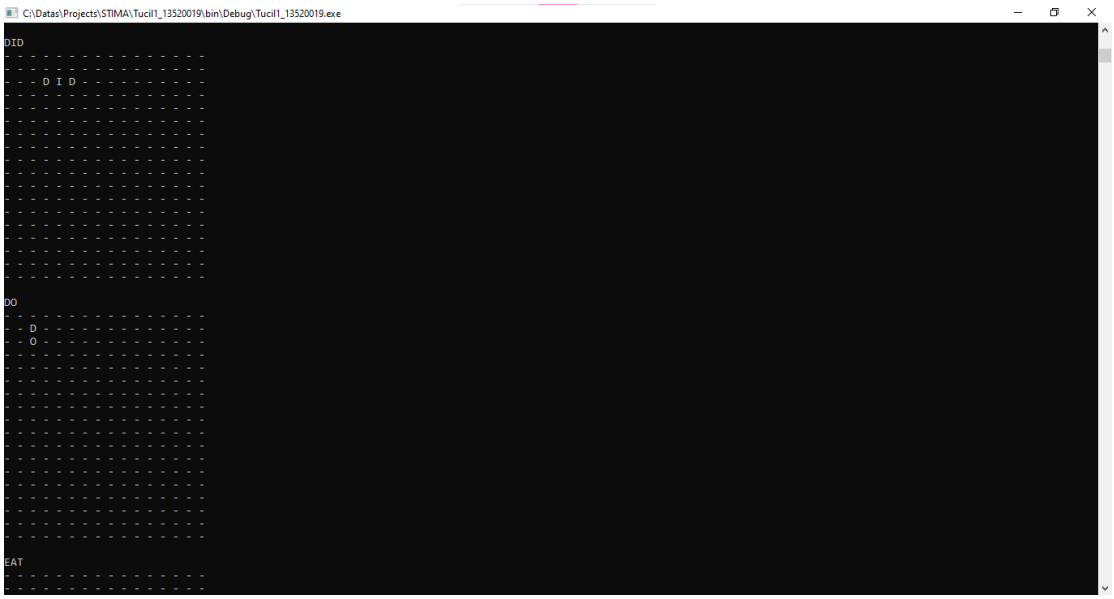
C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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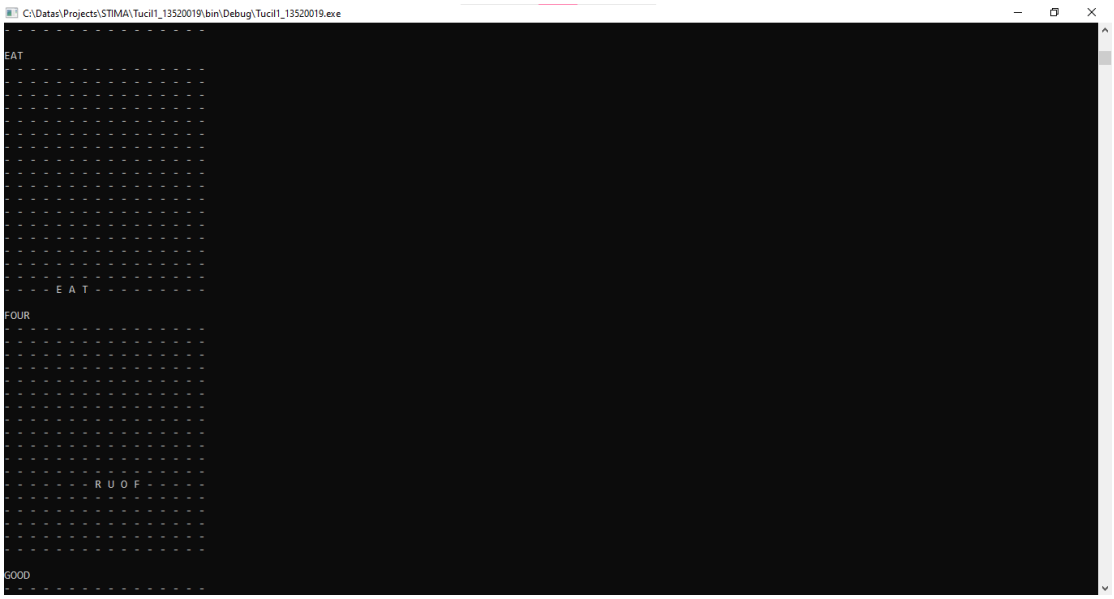
C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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GOOD
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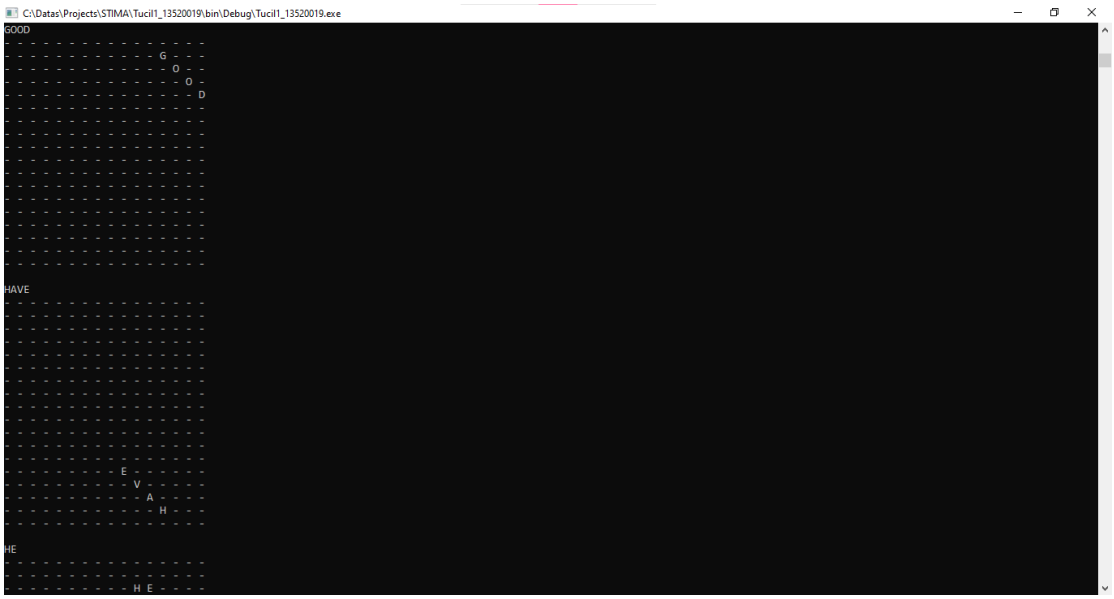
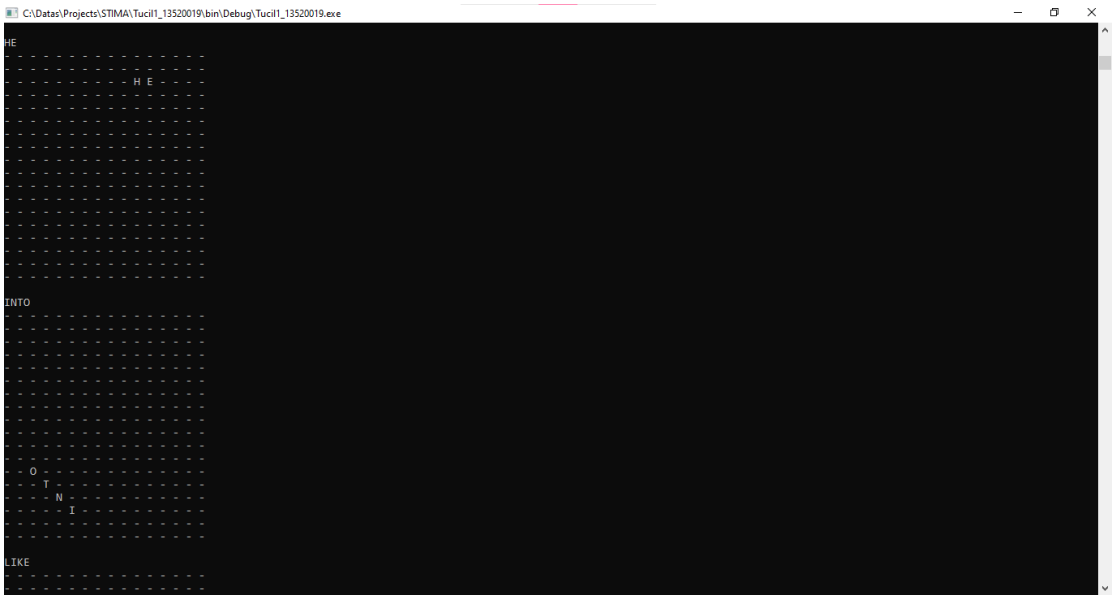
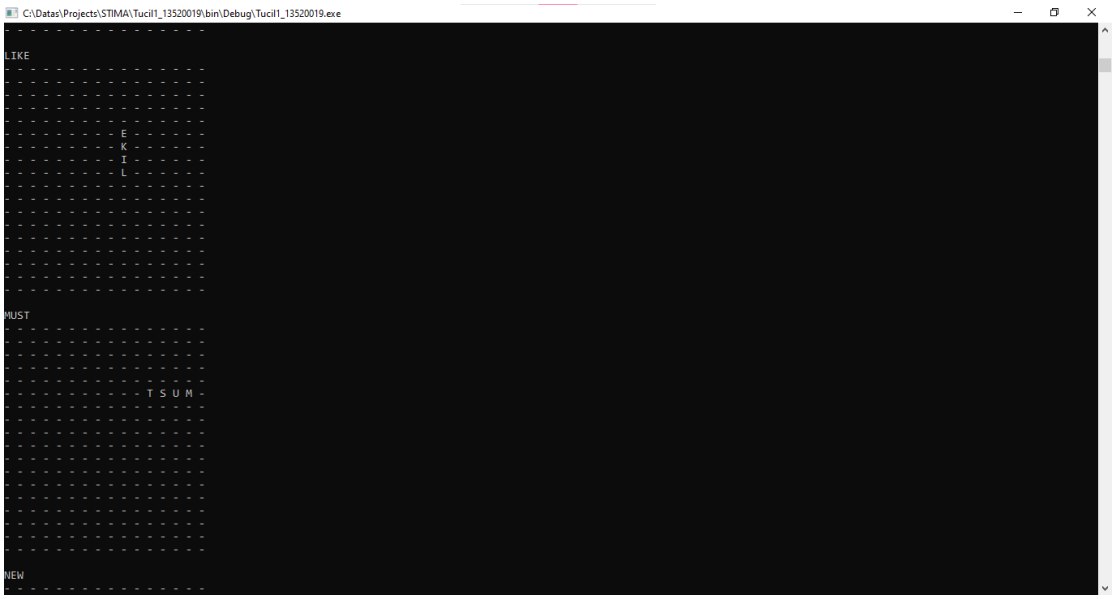
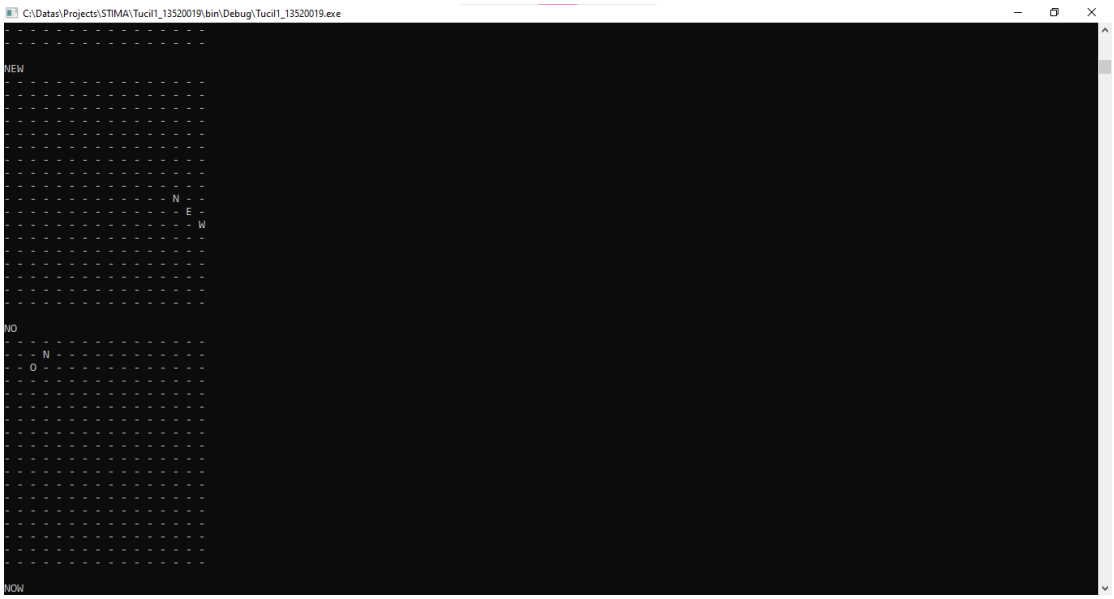
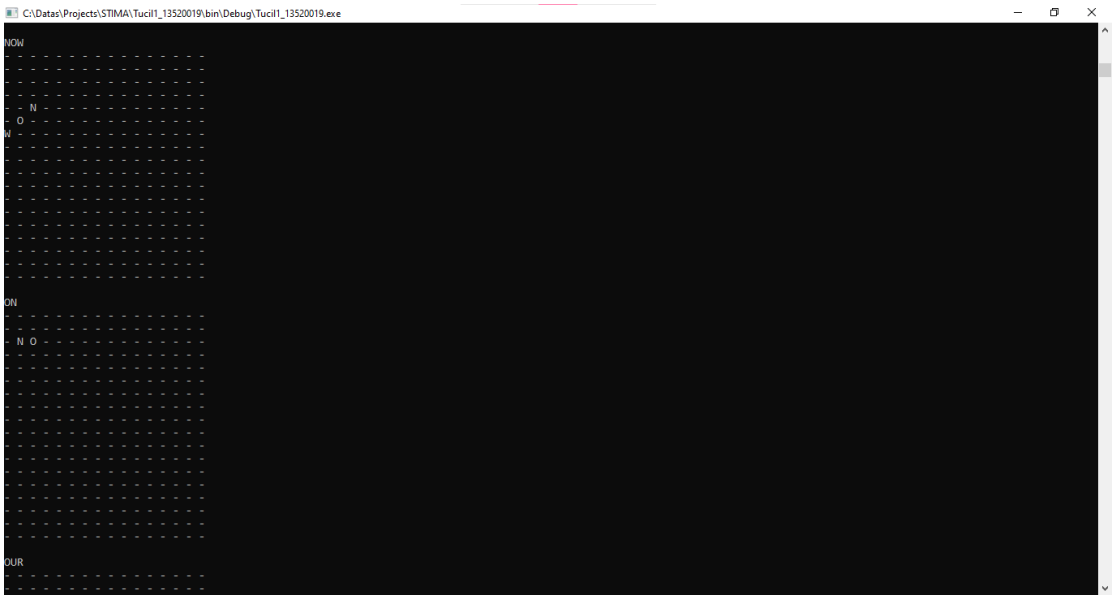

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
GOOD
HAVE
HE


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
HE
INTO
LIKE


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
LIKE
MUST
NEW


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
NEW
NO
NOW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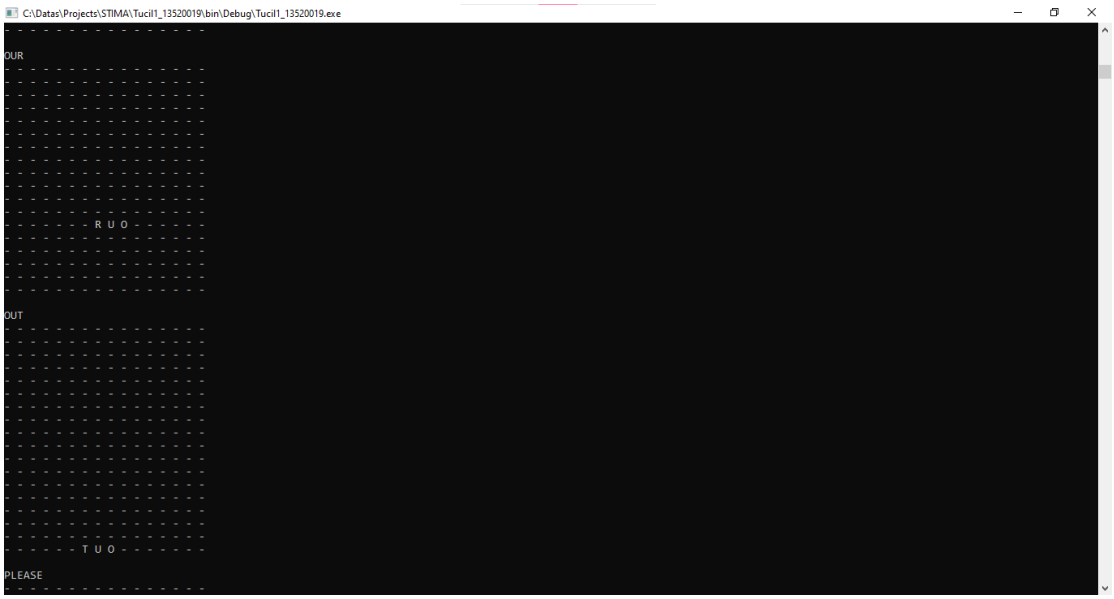
NOW
ON
OUR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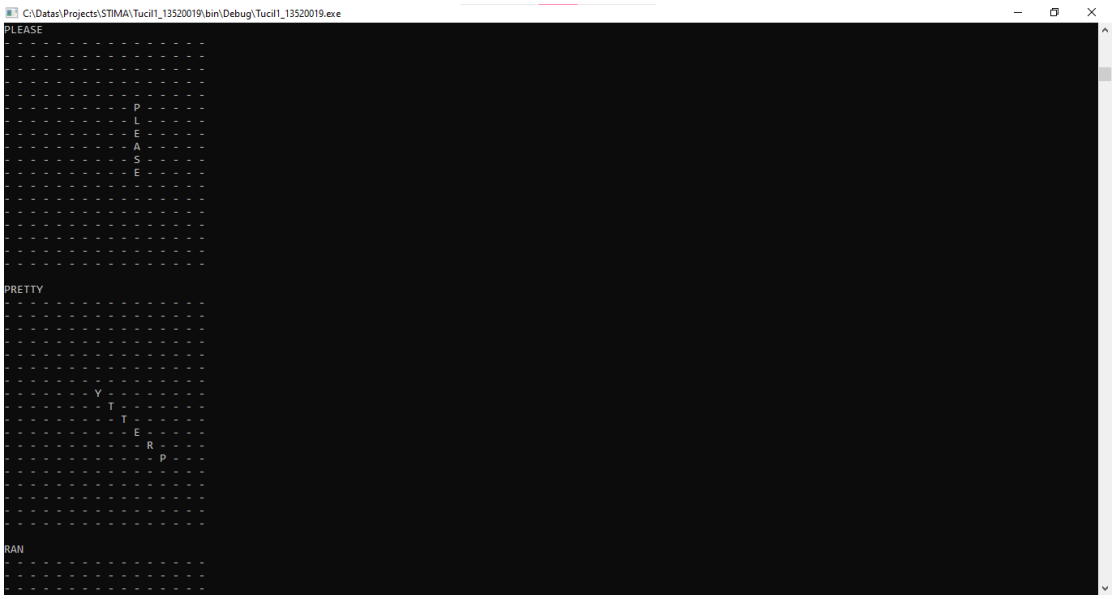
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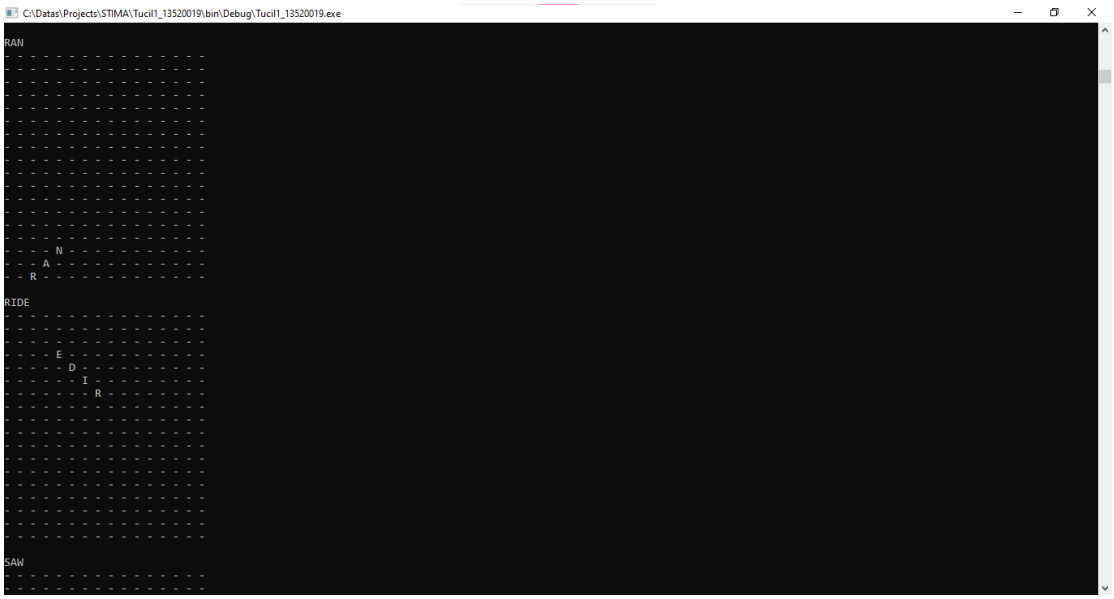
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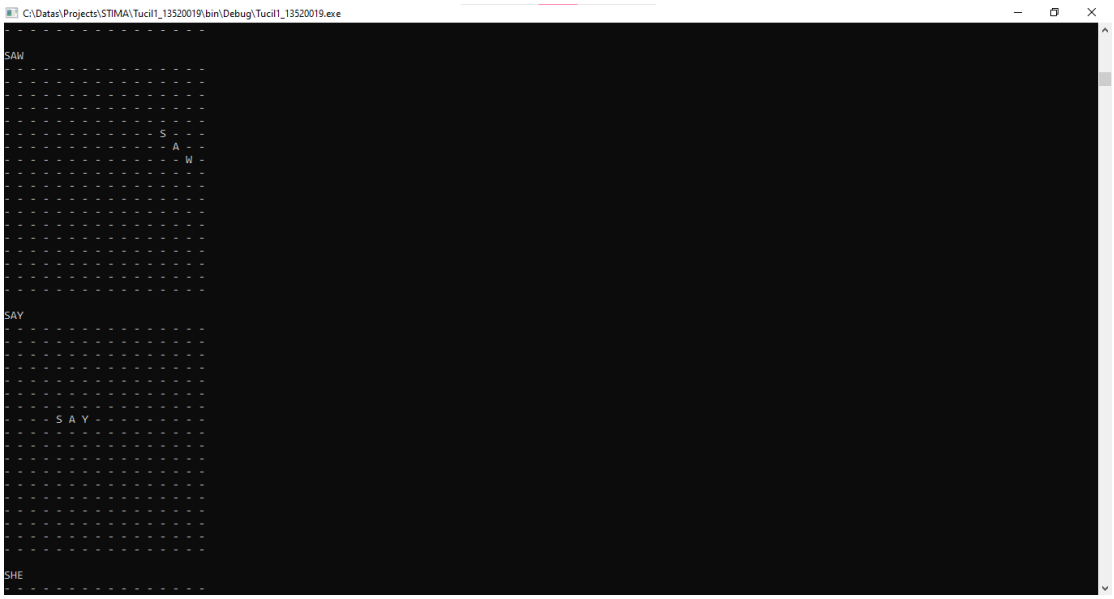
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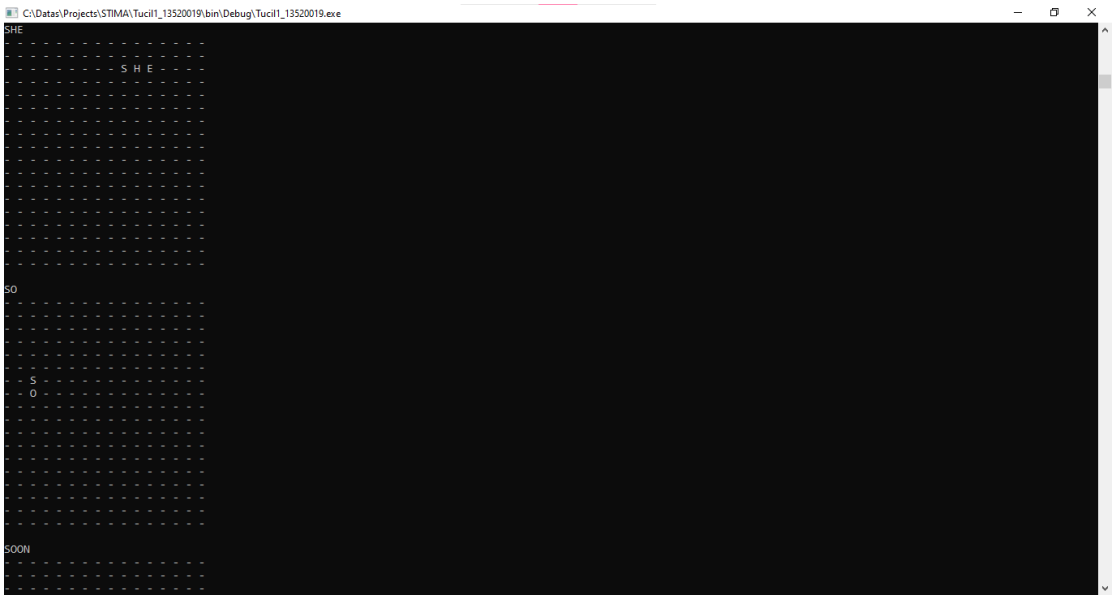
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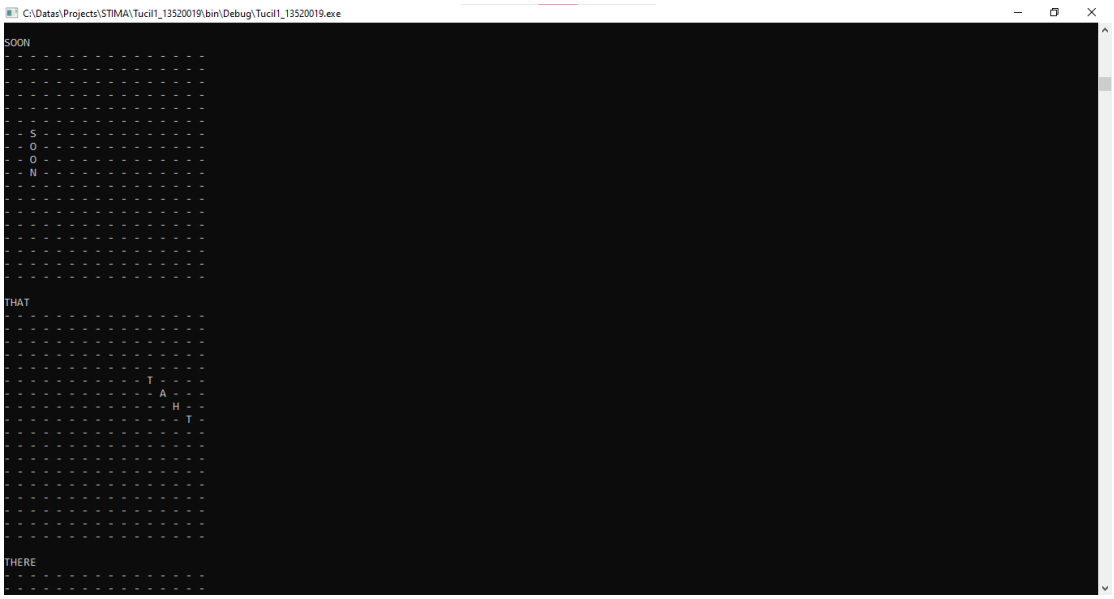
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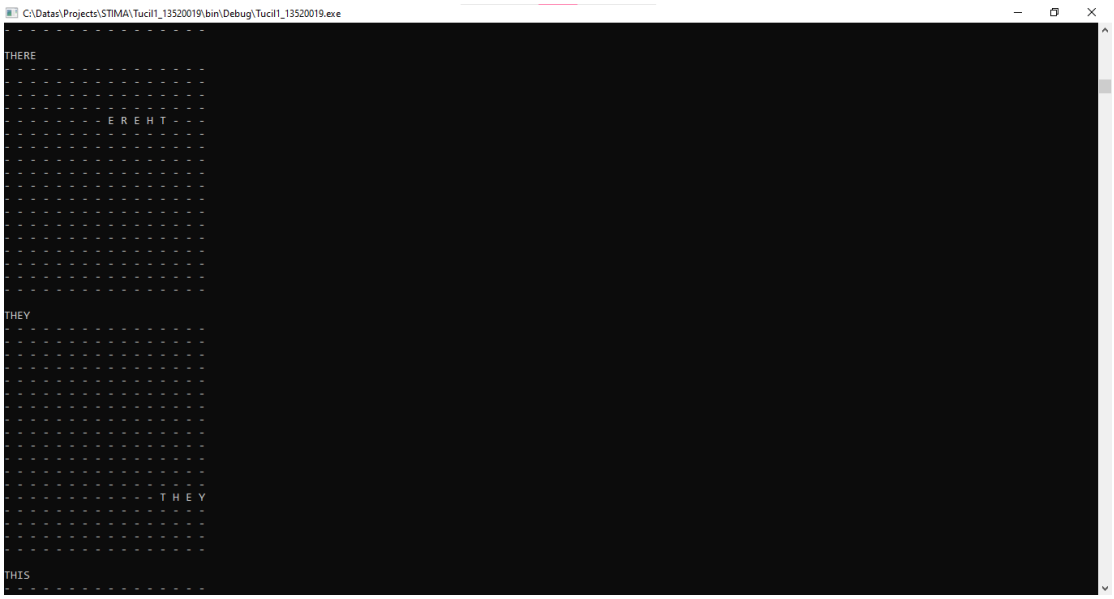
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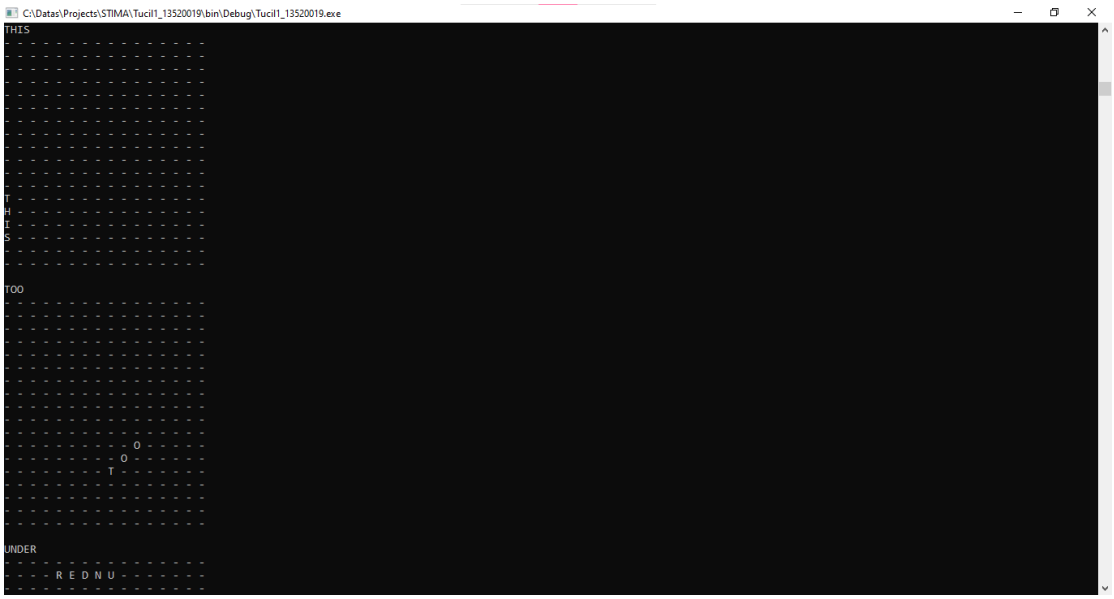
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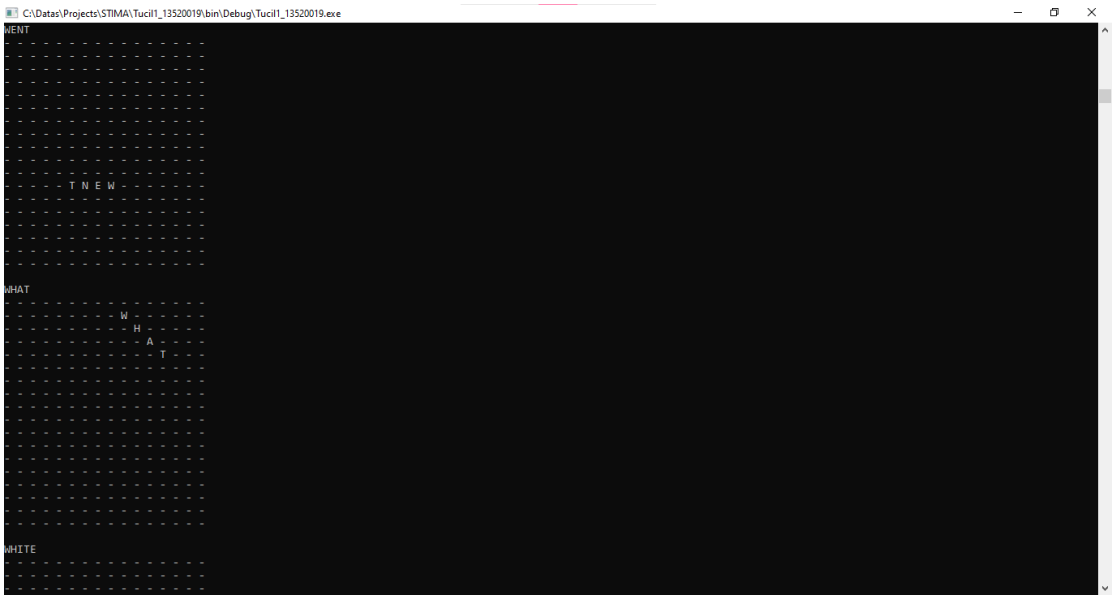
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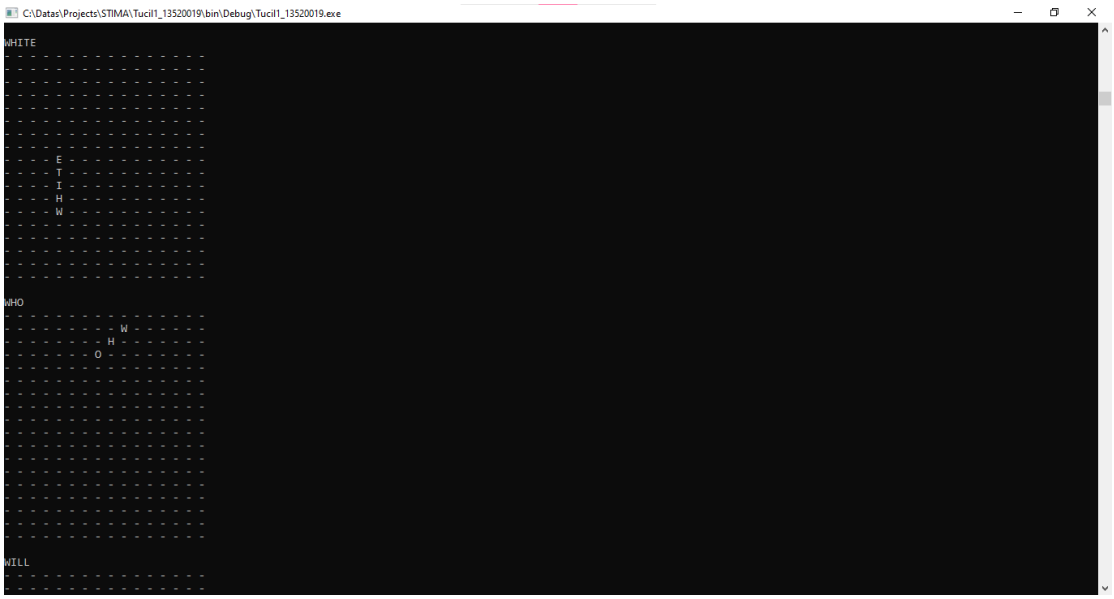
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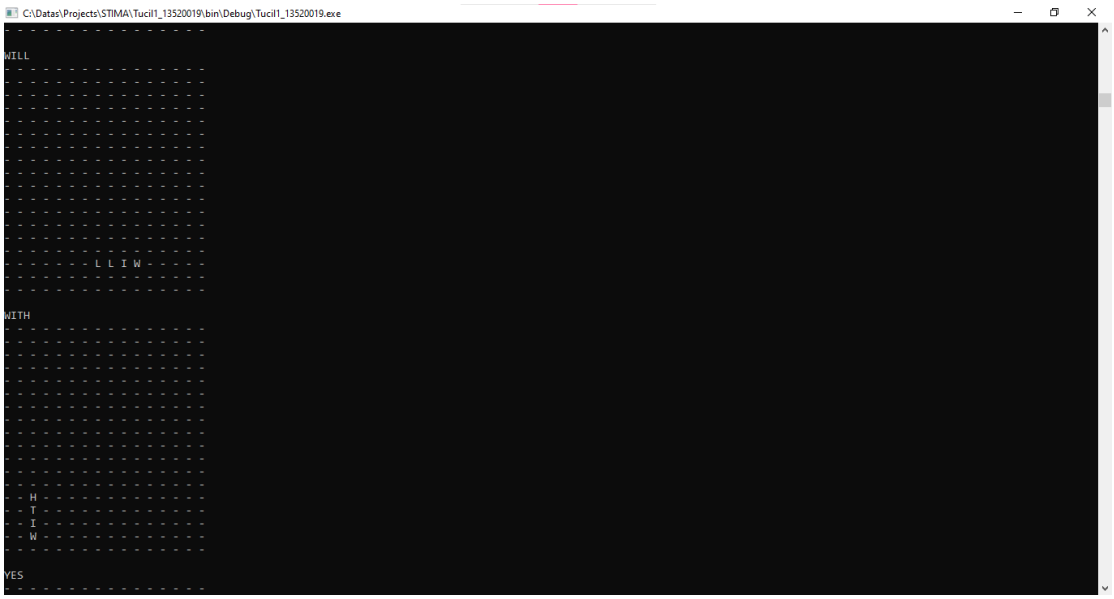
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WILL
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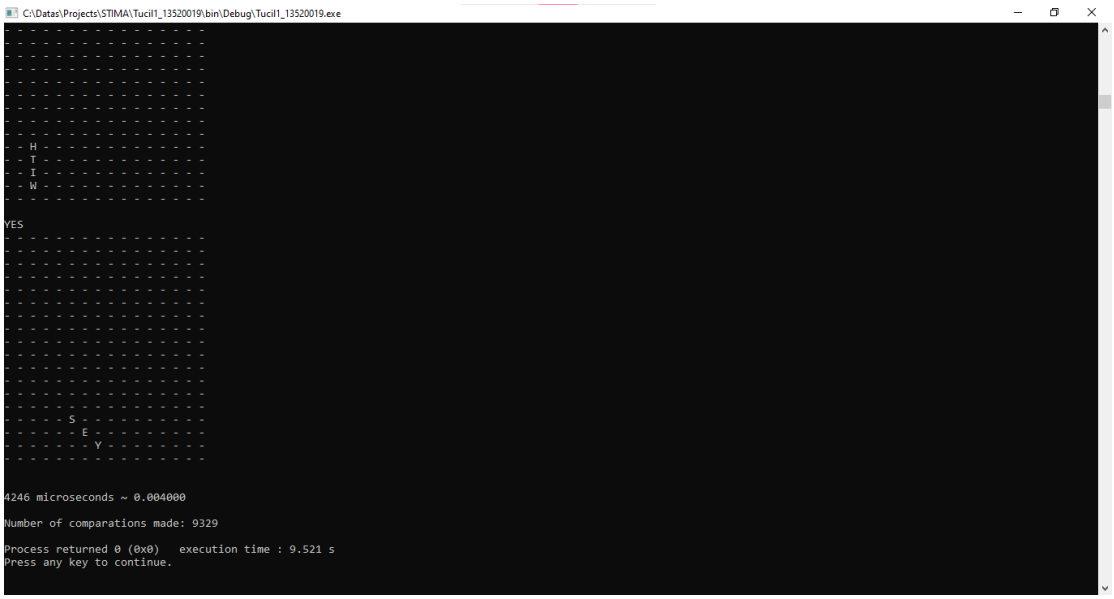
C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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4246 microseconds ~ 0.004000
Number of comparations made: 9329
Process returned 0 (0x0)   execution time : 9.521 s
Press any key to continue.

F. Eksperimen 6 (Word puzzle berukuran 19 x 19)

K P E G R E T P F G N O C L A F Q O L
I Y K M K K E E U L B S W A N C Q R A
W T R C T N F S O R E C O N I H R I R
I C U A G R E I P G A M Q L T E C O K
I D Q U N W C W F B O L H U A E M L D
L X I I S A A L A P M I W A E K N E D
E N Z N J C C R E H X P G O T T C E J
O E B N A H A R T E B E E S T E Z A G
P L A M Y W M Q X H Z R O O Q P E A J
A G B X G T I A R P O N V H U N G H L
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D E O R I N A O B D G R F P H G P O L
U R N S N Q R U T F R I G E M A O L L
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AARDVARK
GIRAFFE
MACAW
BABOON
GULL
MAGPIE
BAT
HARTEBEEST
MANDRILL
BLUE
HAWK
ORIOLE
BONOBO
HEDGEHOG
OWL
CANARY
HERON
PENGUIN
CHEETAH
HYRAX
PUFFIN
CHIMPANZEE
IBIS
QUETZAL
CRANE
IMPALA
RHINOCEROS
CROW
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SWAN
DUCK
JAY
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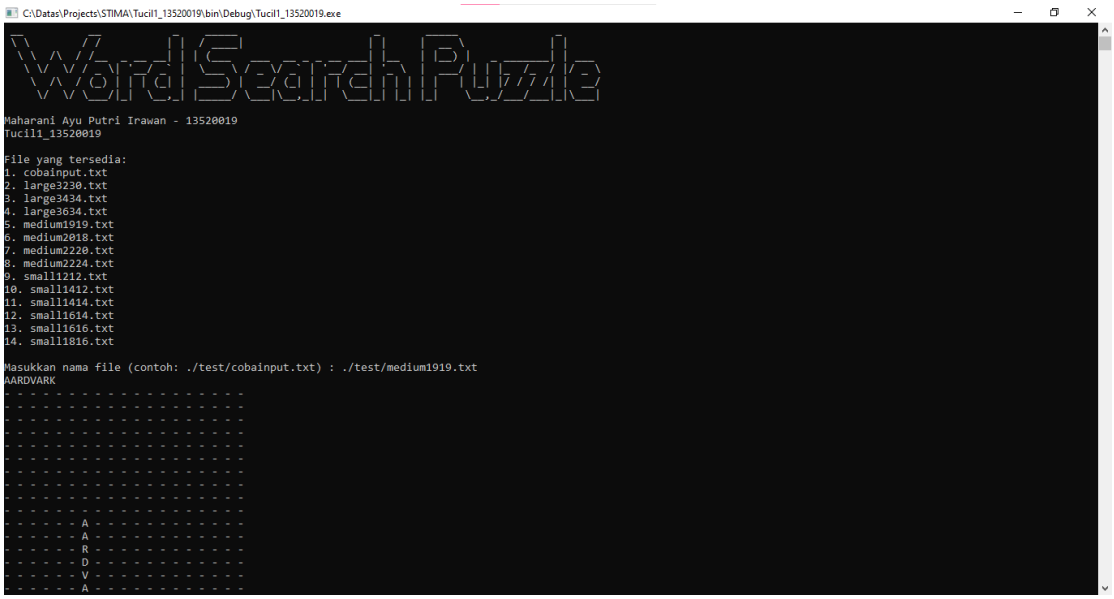

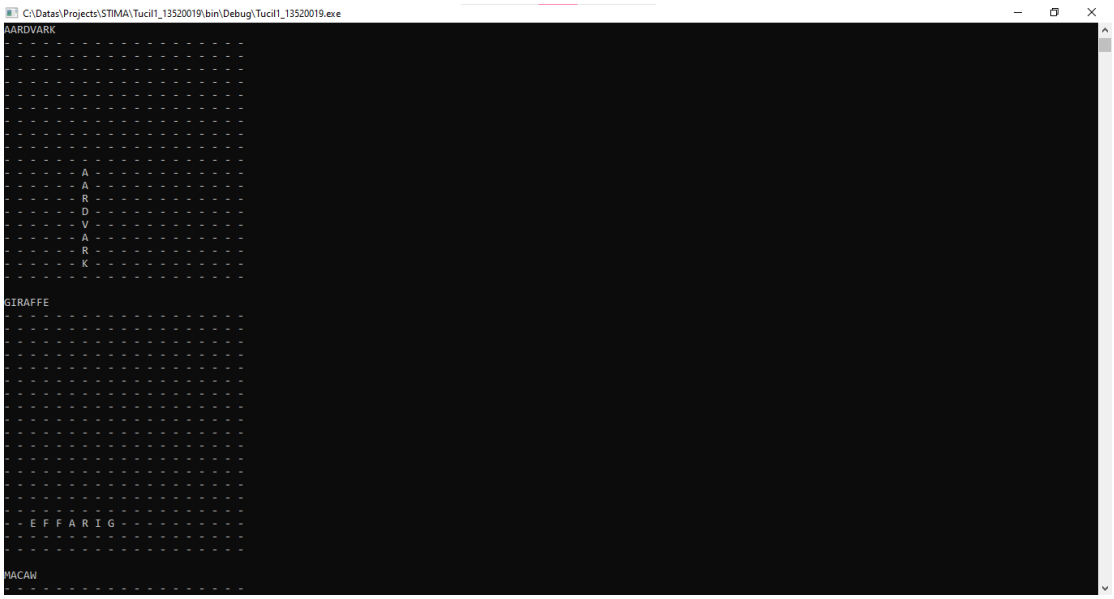
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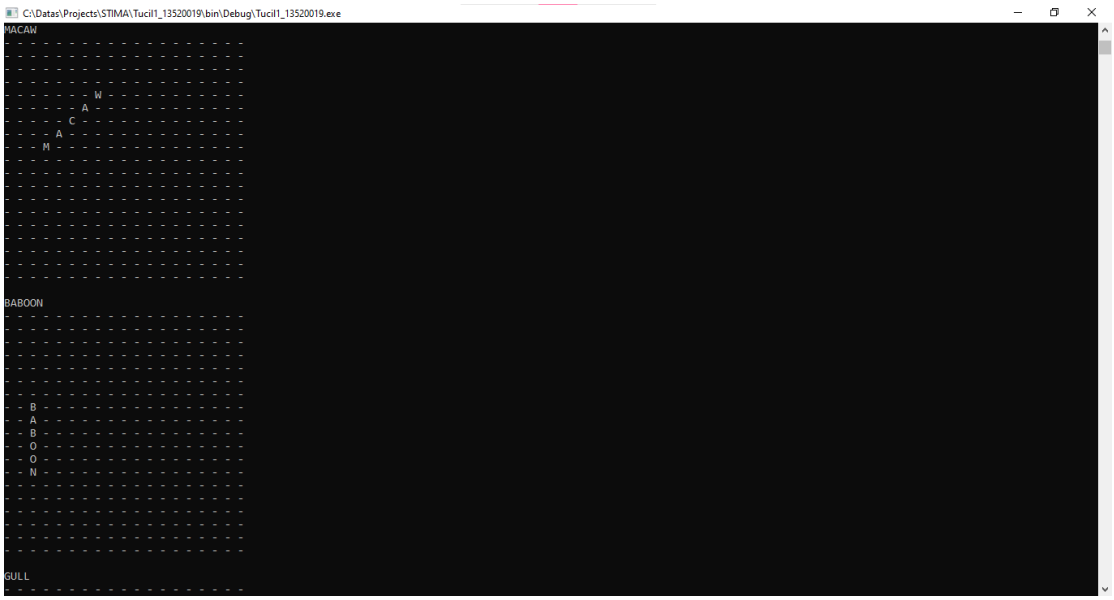
AARDVARK
GIRAFFE
MACAW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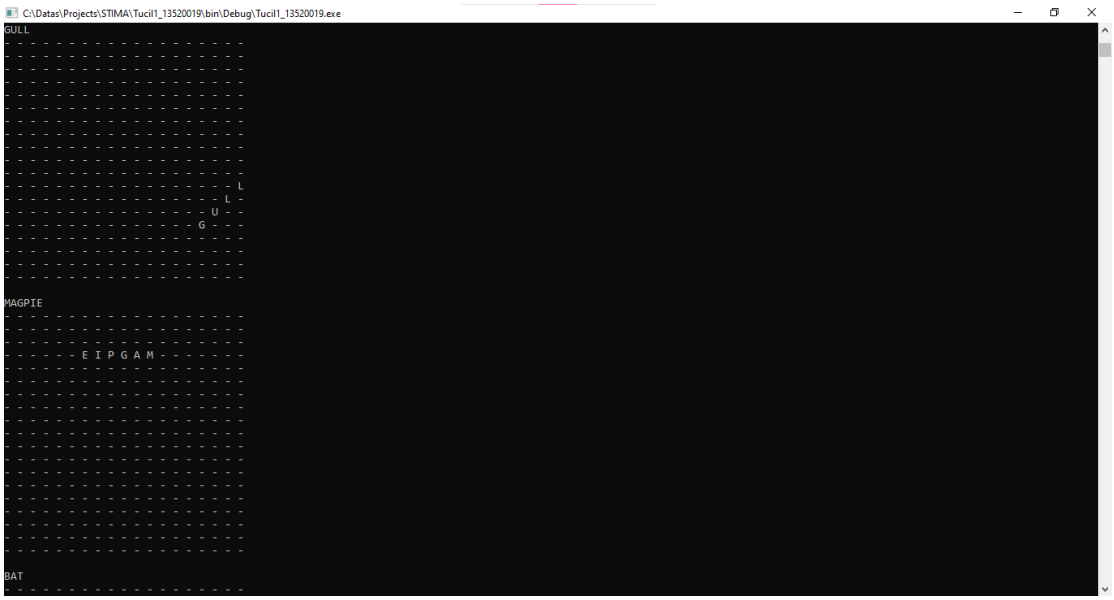
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GULL
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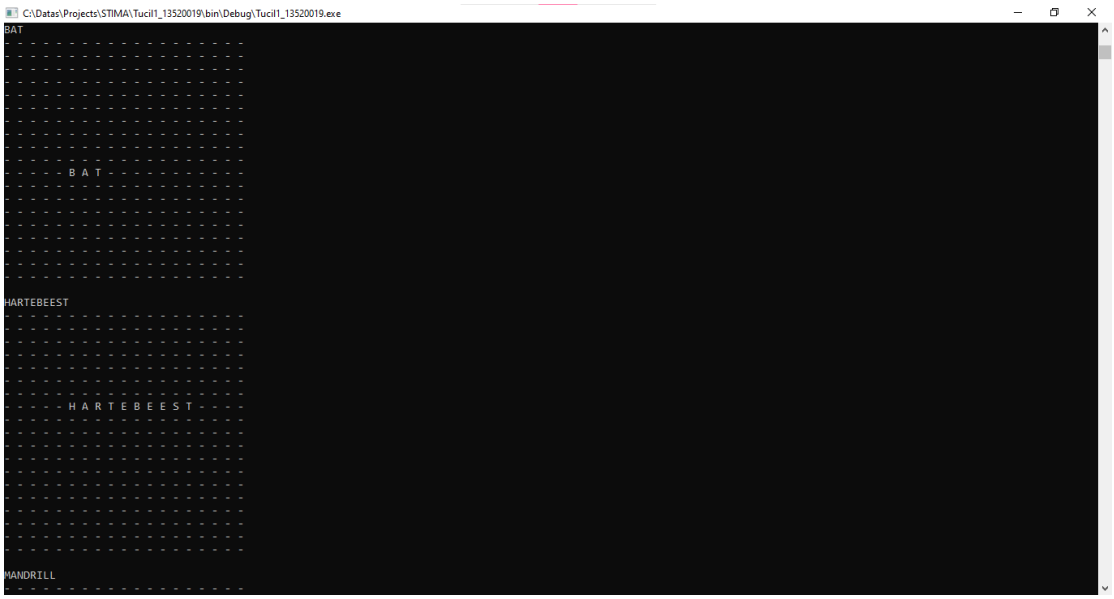
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BAT
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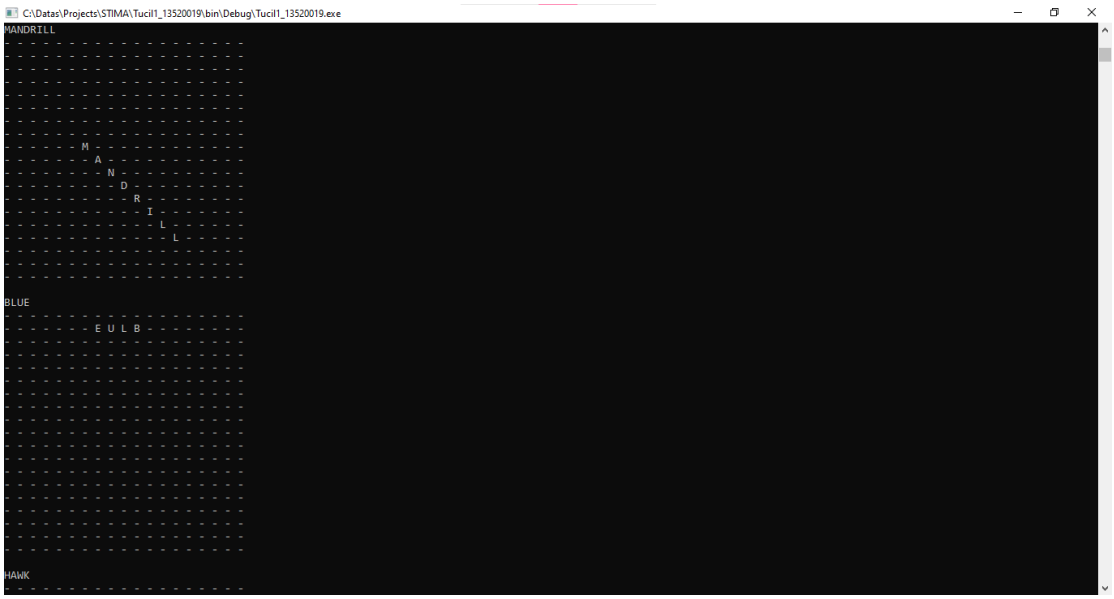
C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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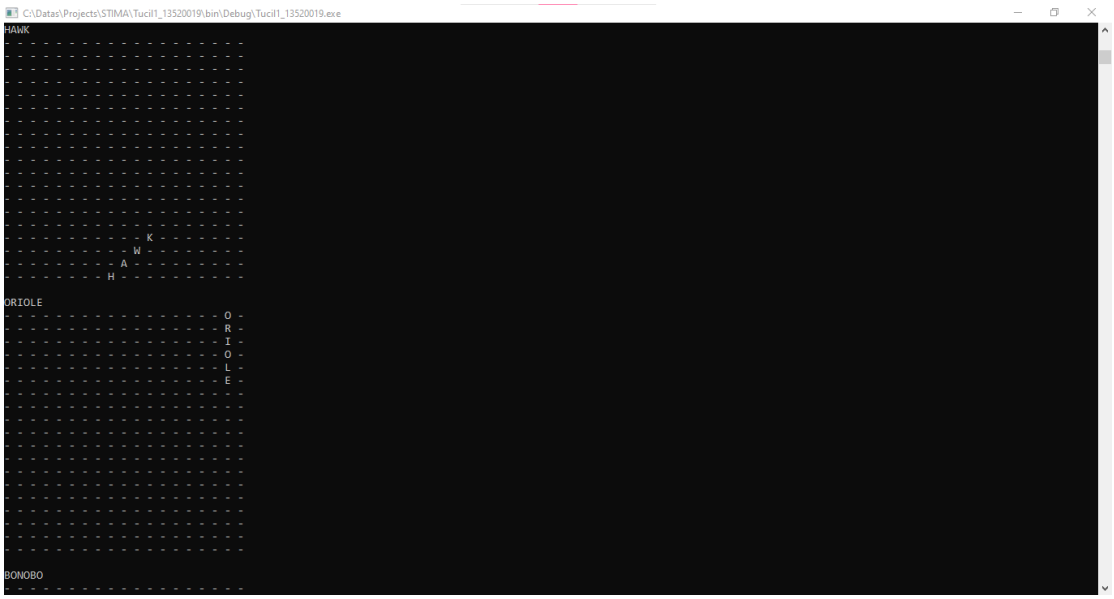
C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
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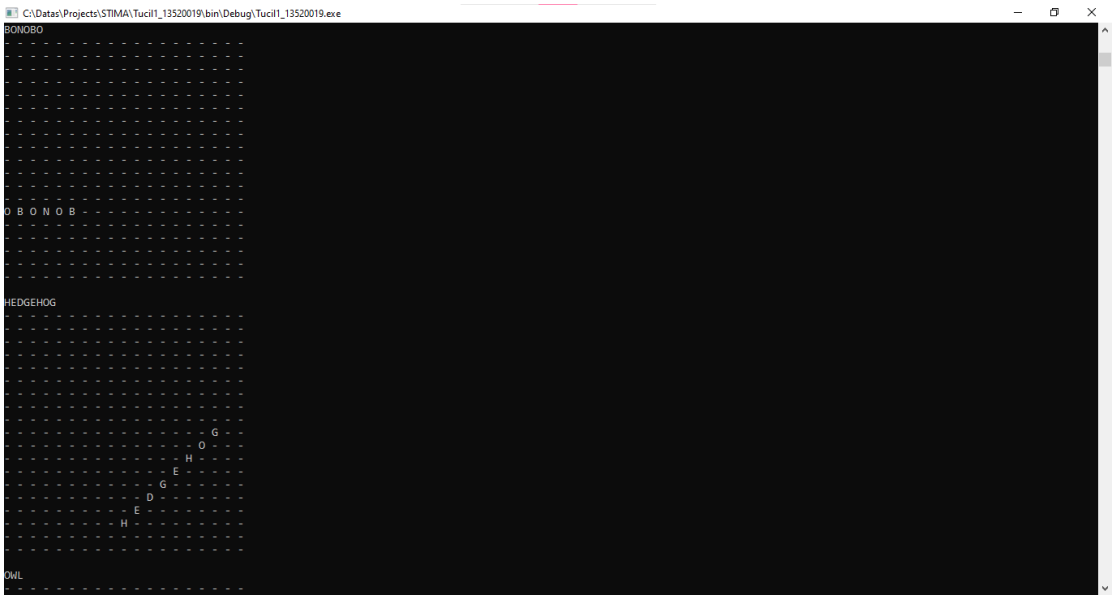
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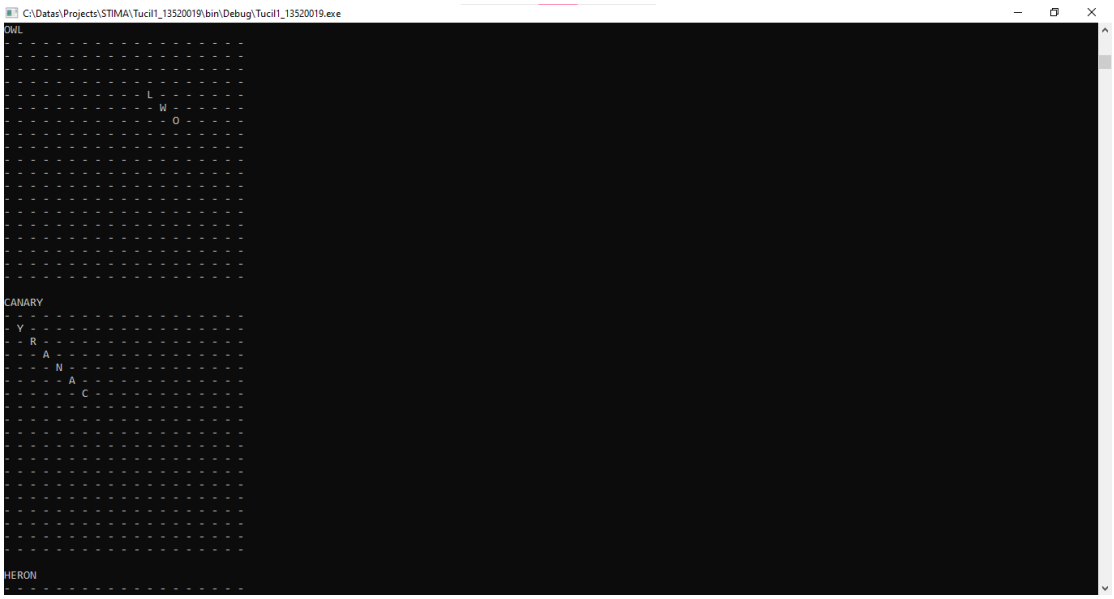
BONOBO
O B O N O B
HEDGEHOG
OWL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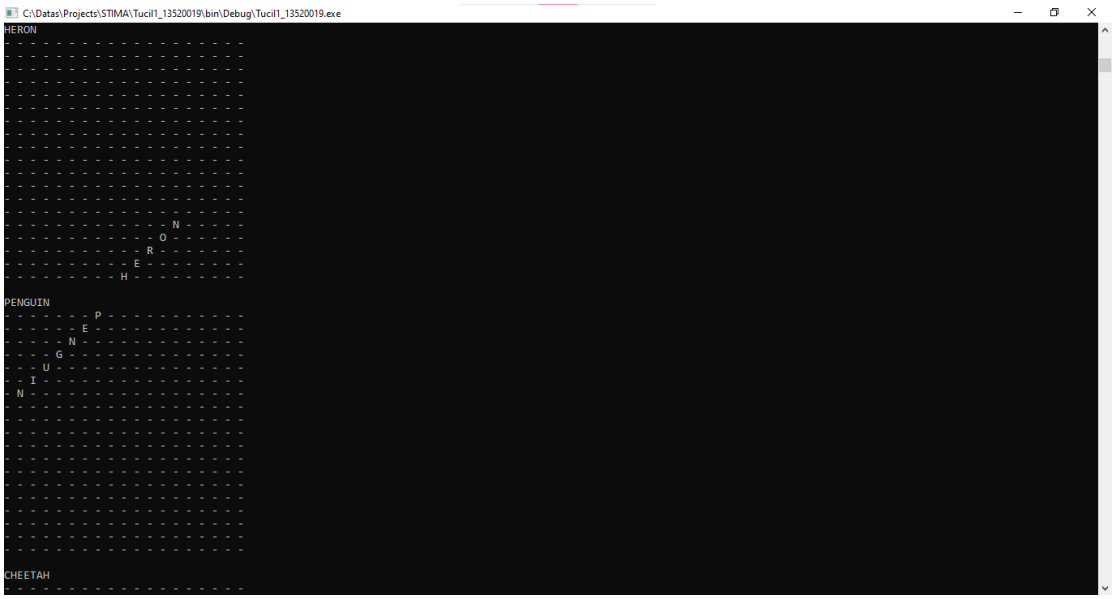
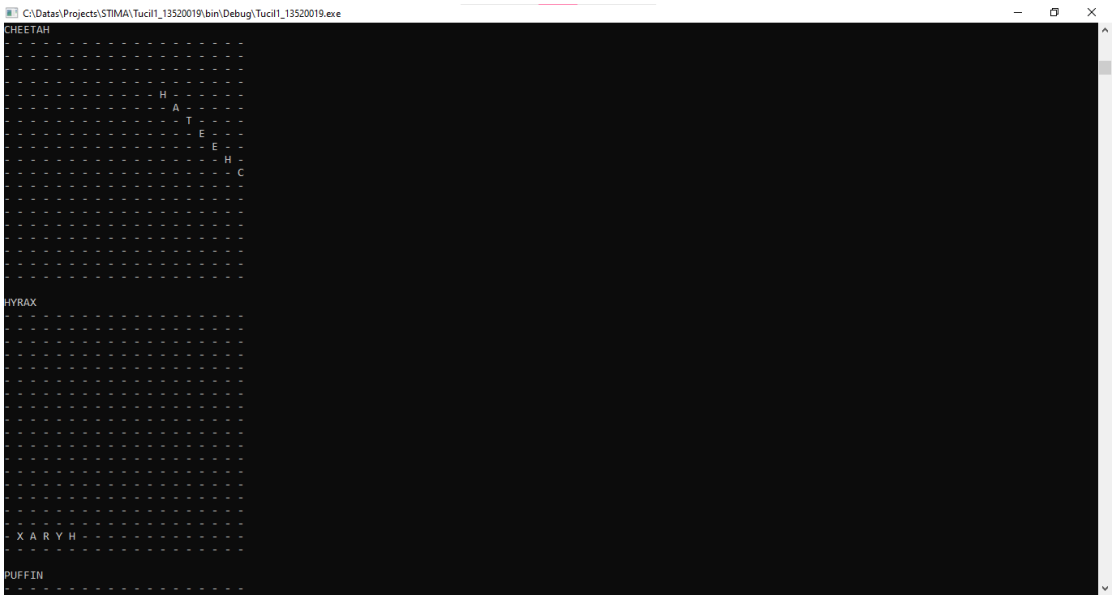
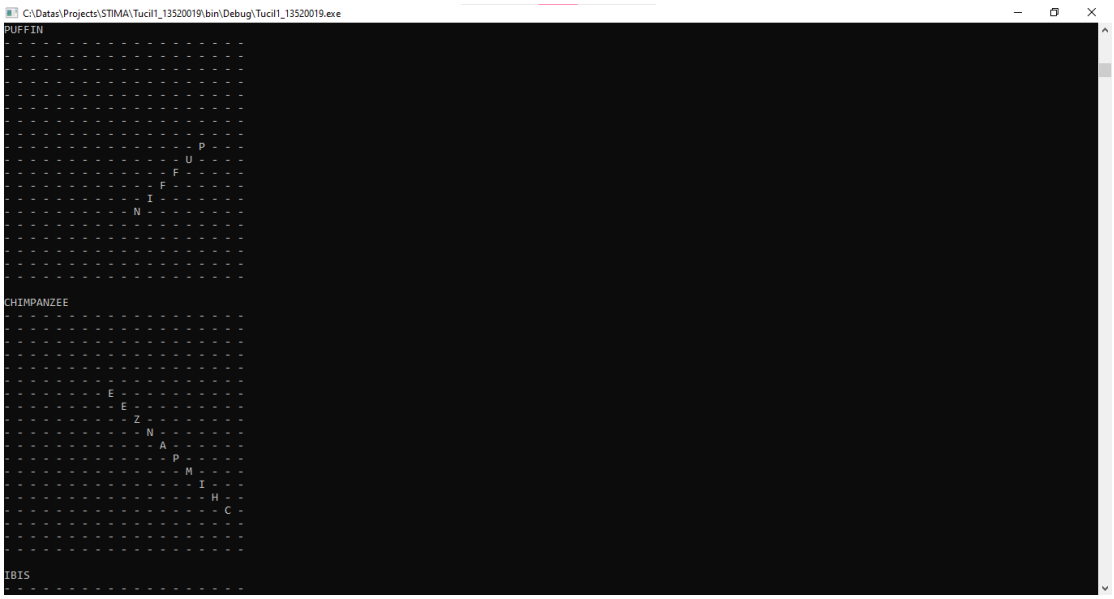
OWL
CANARY
HERON


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
HERON
PENGUIN
CHEETAH


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
CHEETAH
HYRAX
X A R Y H
PUFFIN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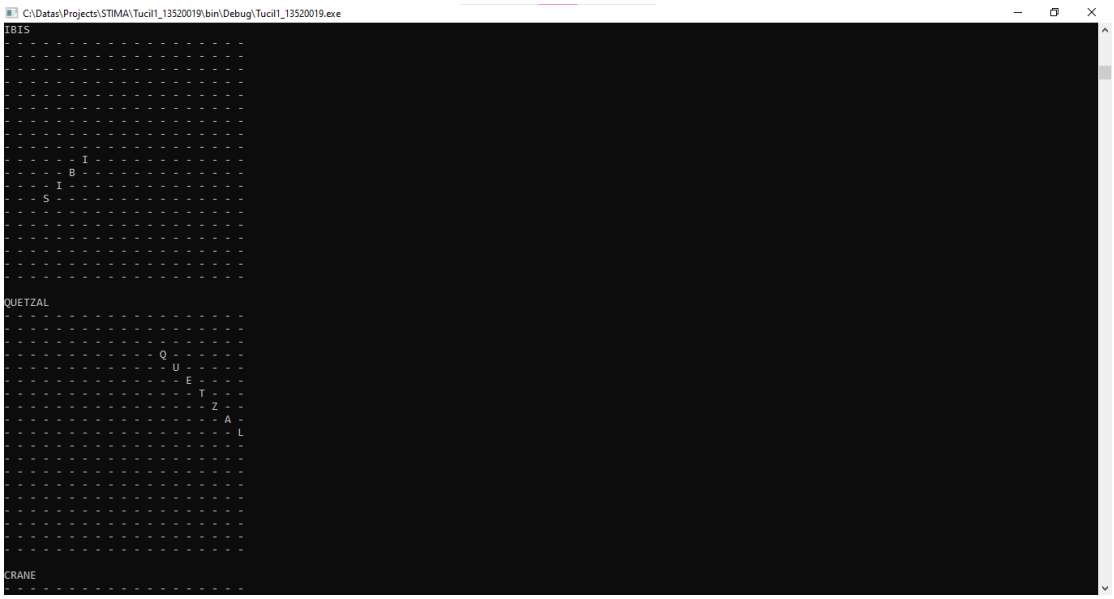
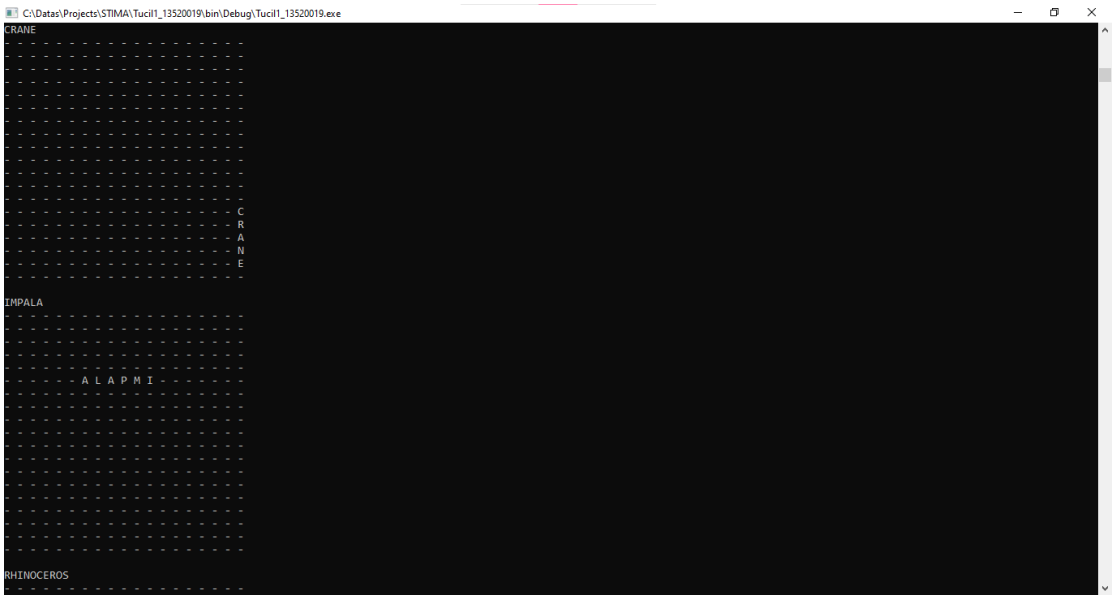
PUFFIN
CHIMPANZEE
IBIS


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
IBIS
QUETZAL
CRANE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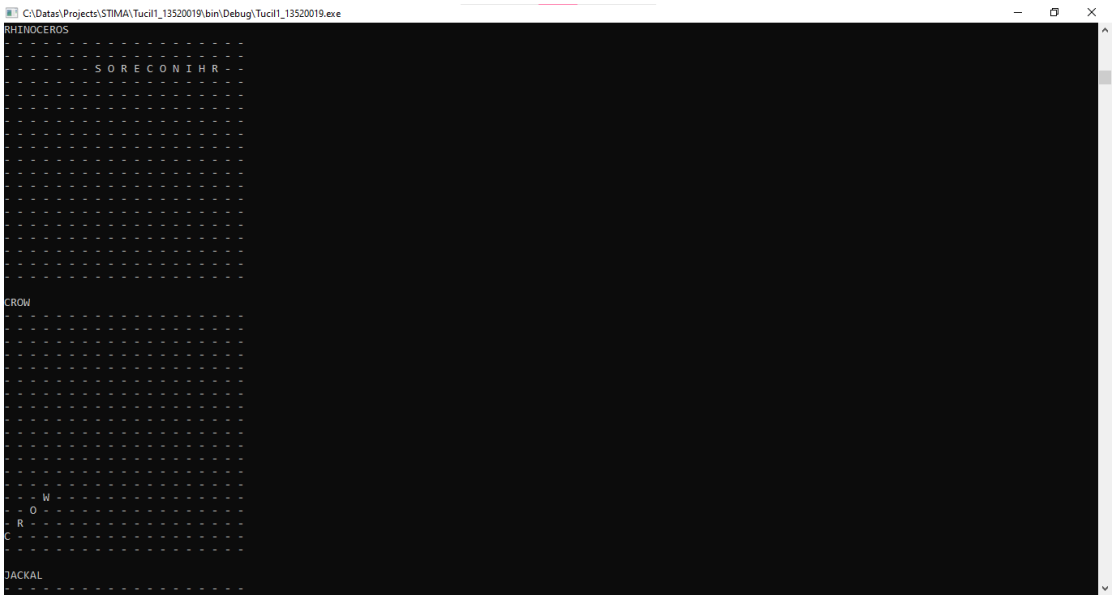
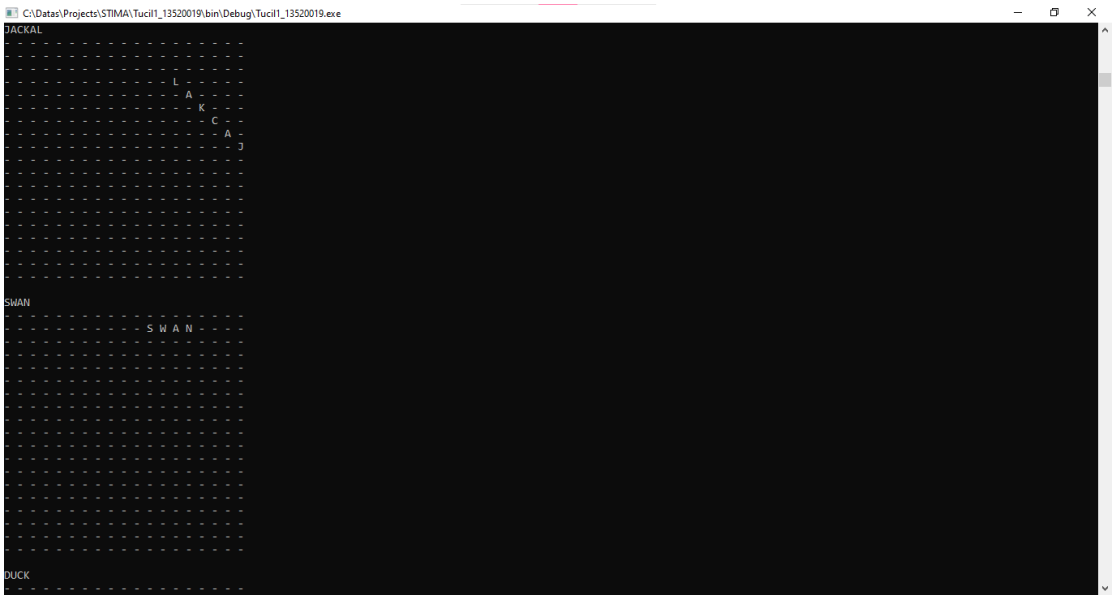
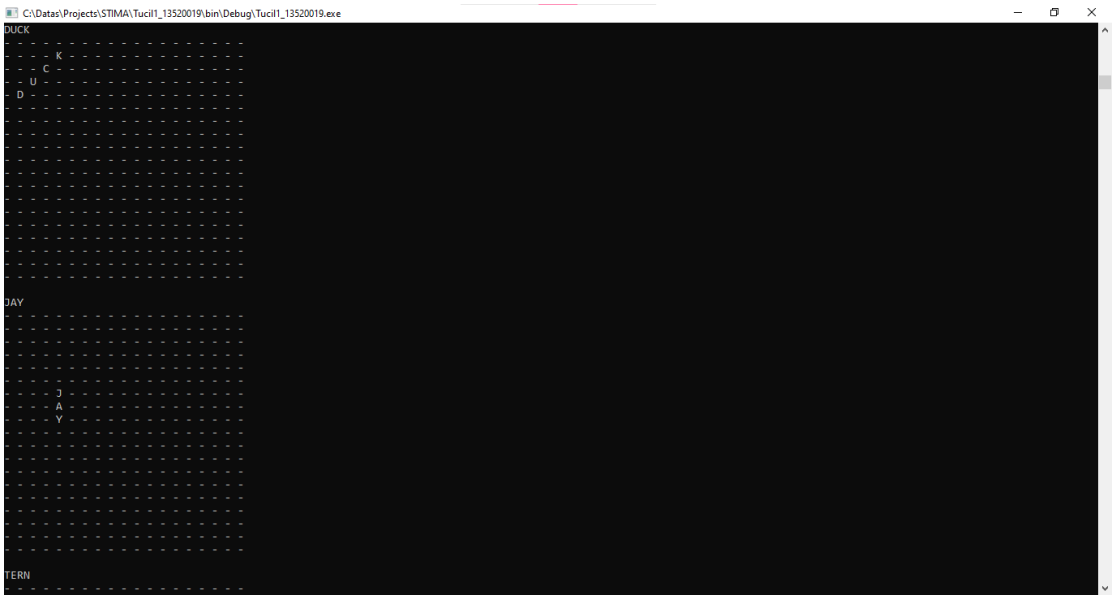
CRANE
IMPALA
A L A P M I
RHINOCEROS


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
RHINOCEROS
S O R E C O N I H R
CROW
W
O
R
C
JACKAL


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
JACKAL
L
A
K
C
A
J
SWAN
S W A N
DUCK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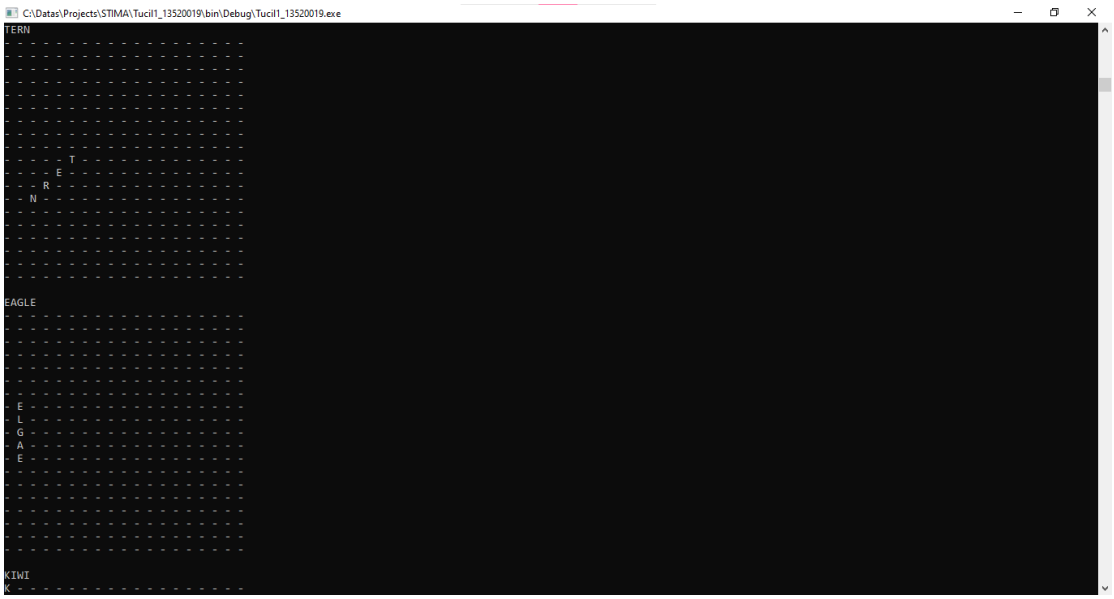
DUCK
DAY
TERN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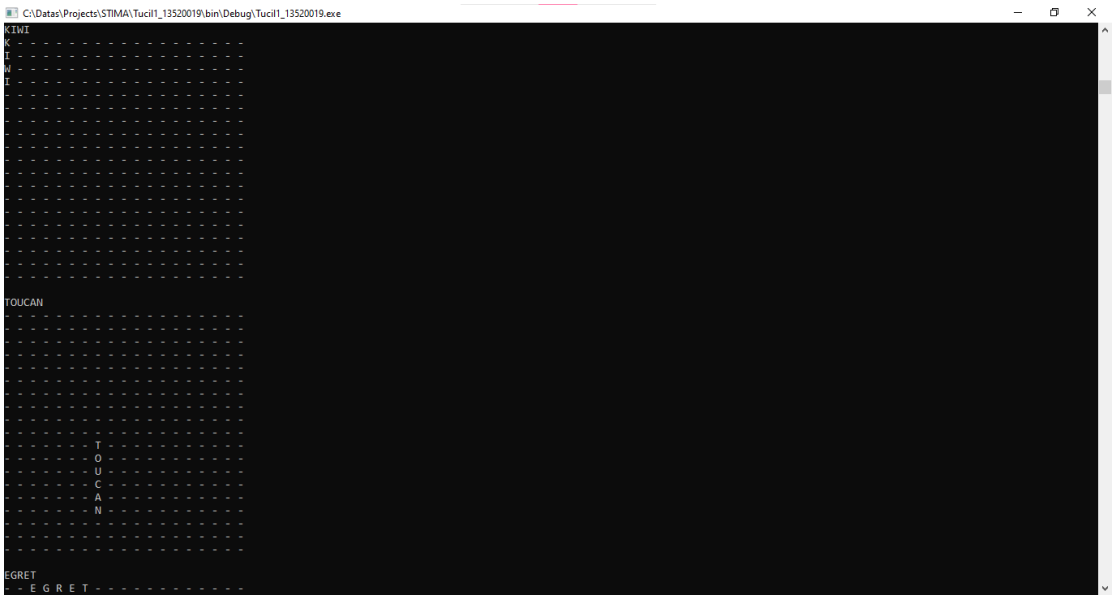
TERN
EAGLE
KIWI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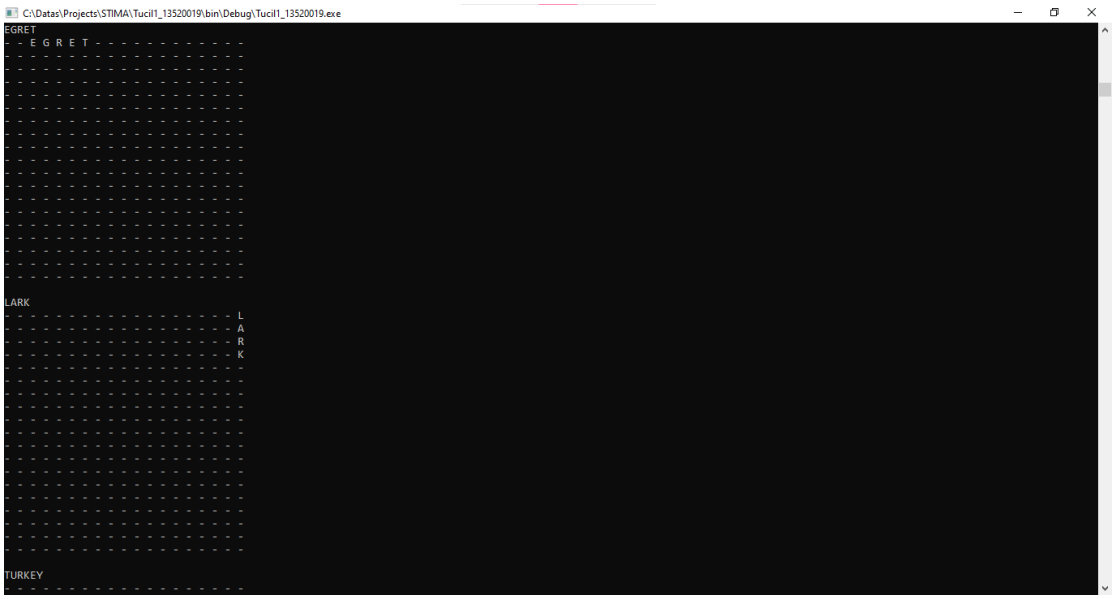
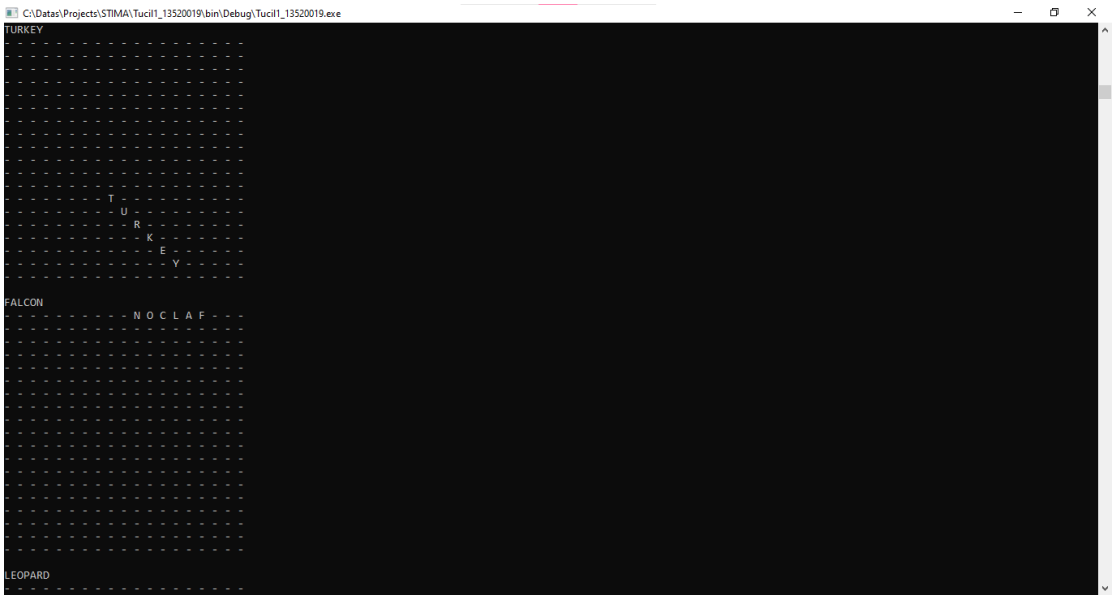
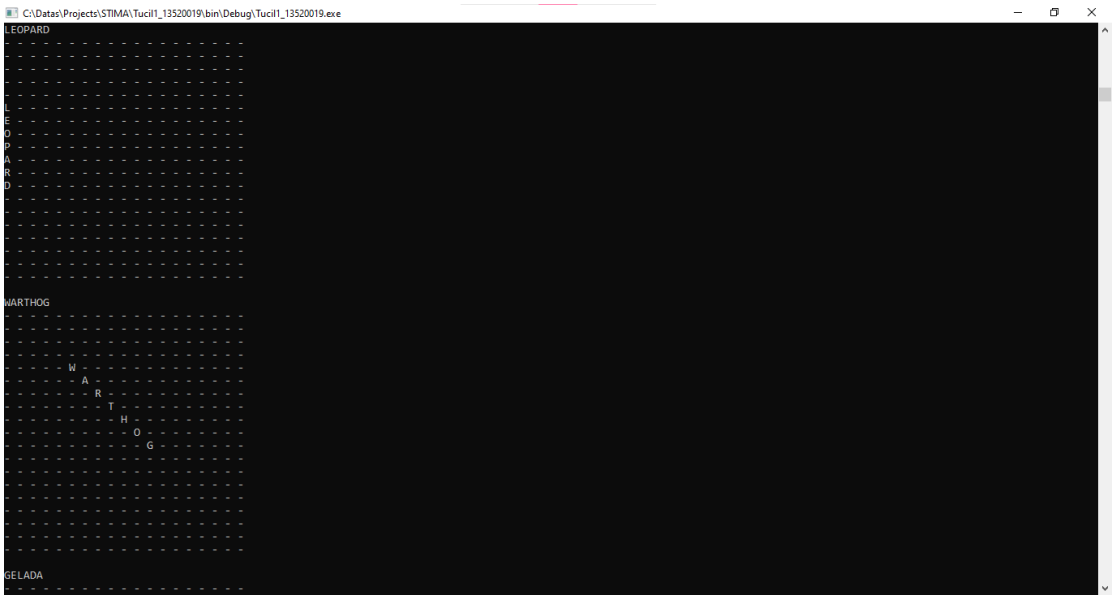
KIWI
TOUCAN
EGRET
E G R E T


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
EGRET
- - E G R E T - - - - - - - - - - - - - -
LARK
- - - - - - - - - - - - - - - - - - - L
- - - - - - - - - - - - - - - - - - - A
- - - - - - - - - - - - - - - - - - - R
- - - - - - - - - - - - - - - - - - - K
TURKEY
- - - - - - - - - - - - - - - - - - -


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
TURKEY
- - - - - - - - - - T - - - - - - - - -
- - - - - - - - - U - - - - - - - - - -
- - - - - - - - - R - - - - - - - - - -
- - - - - - - - - K - - - - - - - - - -
- - - - - - - - - E - - - - - - - - - -
- - - - - - - - - Y - - - - - - - - - -
FALCON
- - - - - - - - - - N O C L A F - - -
LEOPARD
- - - - - - - - - - - - - - - - - - - -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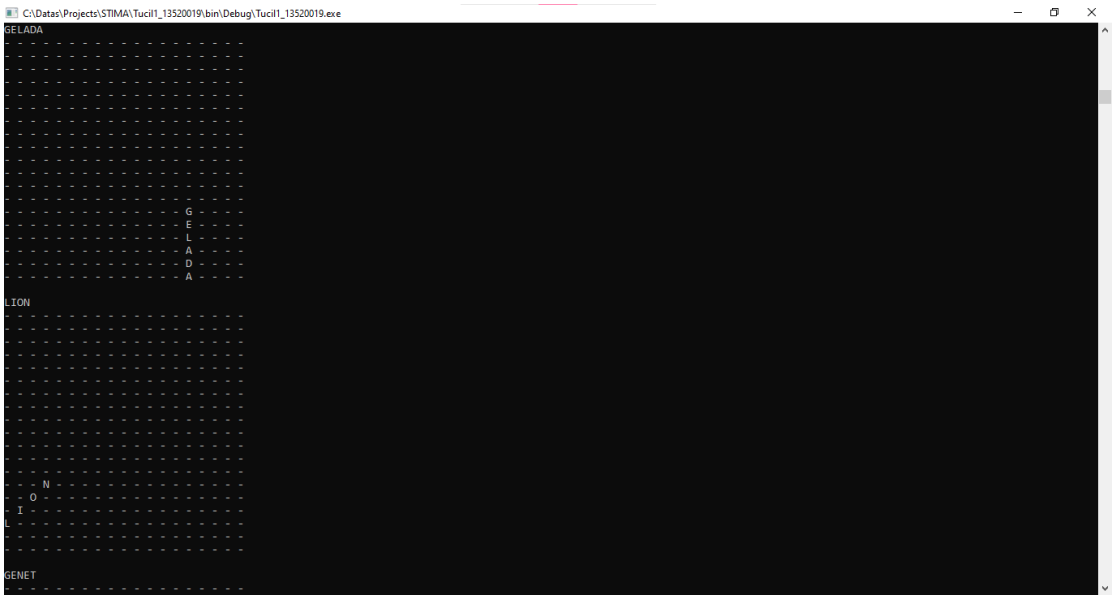
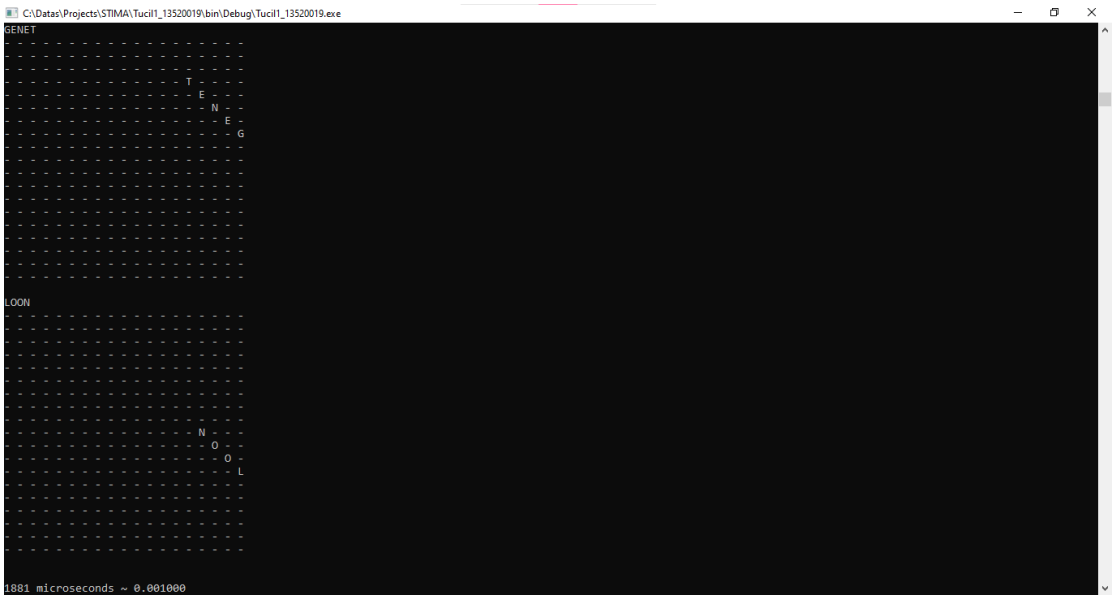
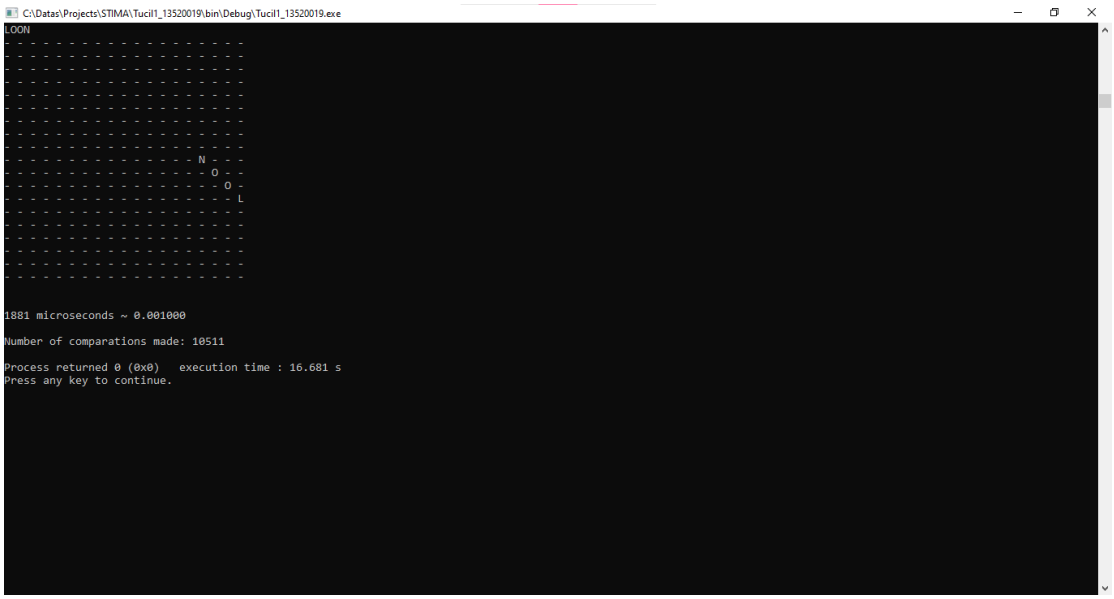
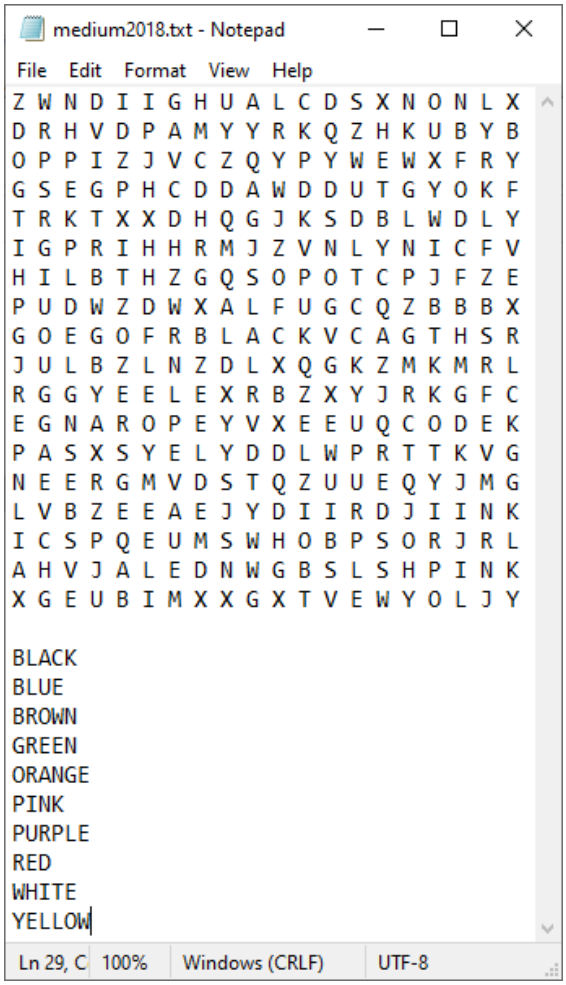
LEOPARD
L - - - - - - - - - - - - - - - - - - -
E - - - - - - - - - - - - - - - - - - -
O - - - - - - - - - - - - - - - - - - -
P - - - - - - - - - - - - - - - - - - -
A - - - - - - - - - - - - - - - - - - -
R - - - - - - - - - - - - - - - - - - -
D - - - - - - - - - - - - - - - - - - -
WARTHOG
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - - W - - - - - - - - - - - -
- - - - - - - A - - - - - - - - - - -
- - - - - - - - R - - - - - - - - - -
- - - - - - - - - T - - - - - - - - -
- - - - - - - - - - H - - - - - - - -
- - - - - - - - - - - O - - - - - - -
- - - - - - - - - - - - G - - - - - -
GELADA
- - - - - - - - - - - - - - - - - - -

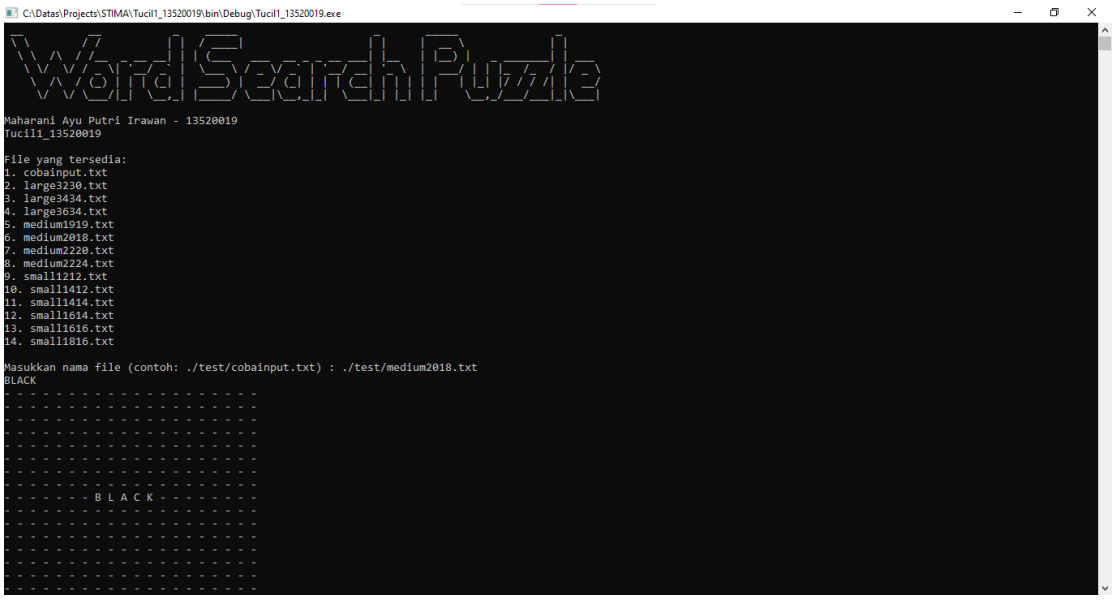

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
GELADA
LION
GENET

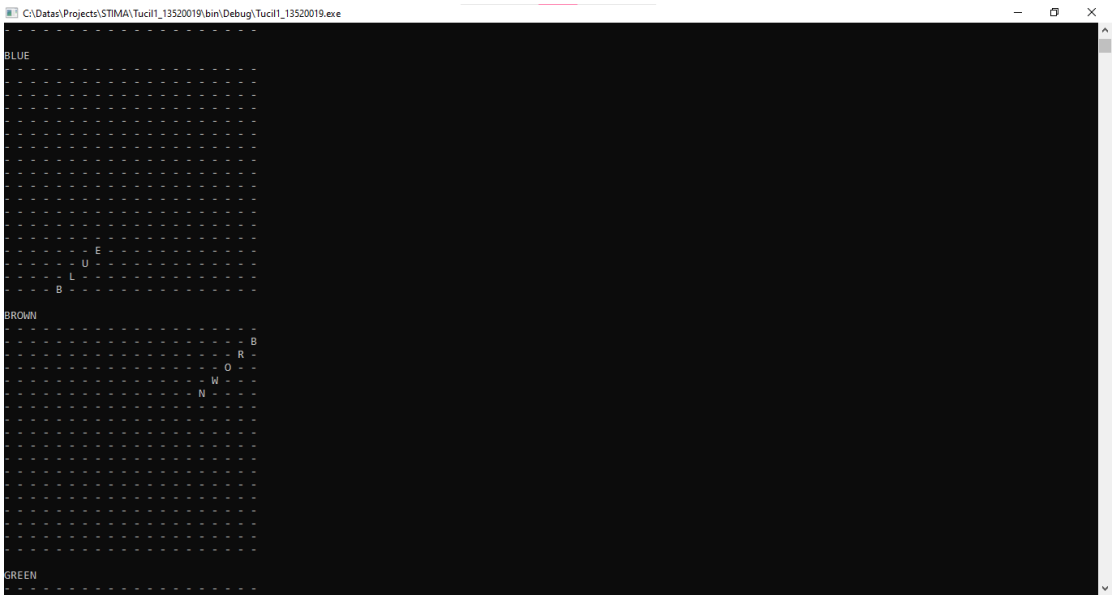

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
GENET
LOON
1881 microseconds ~ 0.001000

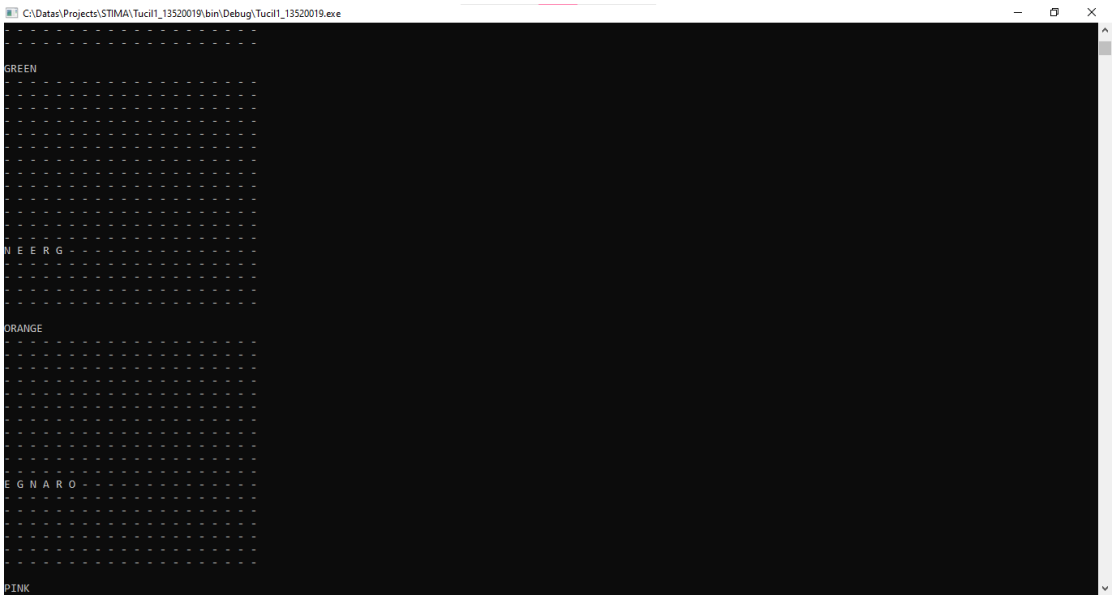

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
LOON
1881 microseconds ~ 0.001000
Number of comparations made: 10511
Process returned 0 (0x0) execution time : 16.681 s
Press any key to continue.

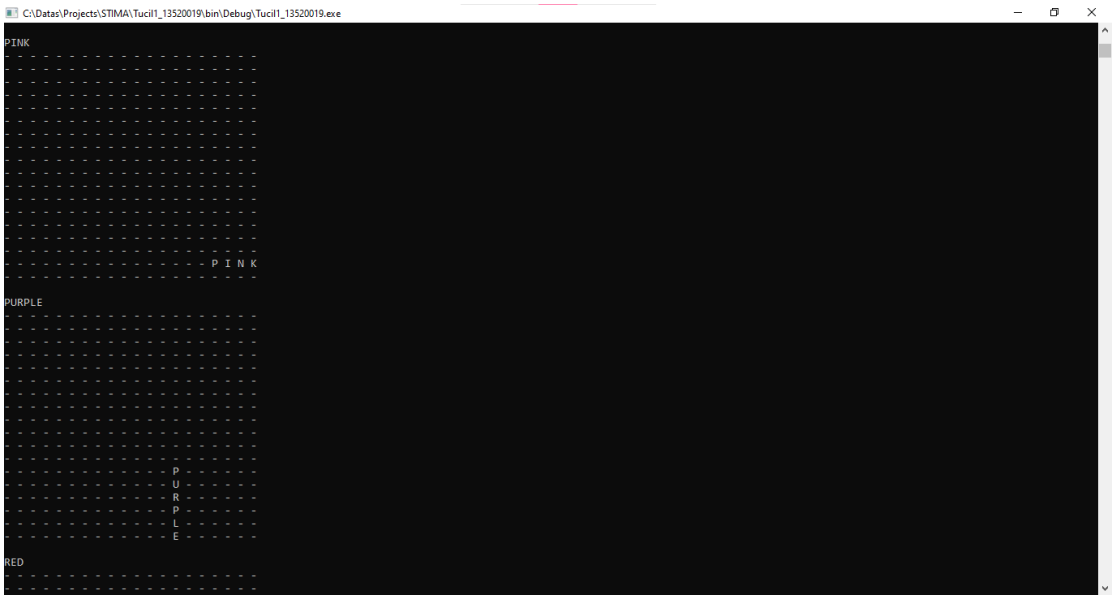
G. Eksperimen 7 (Word puzzle berukuran 20 x 18)

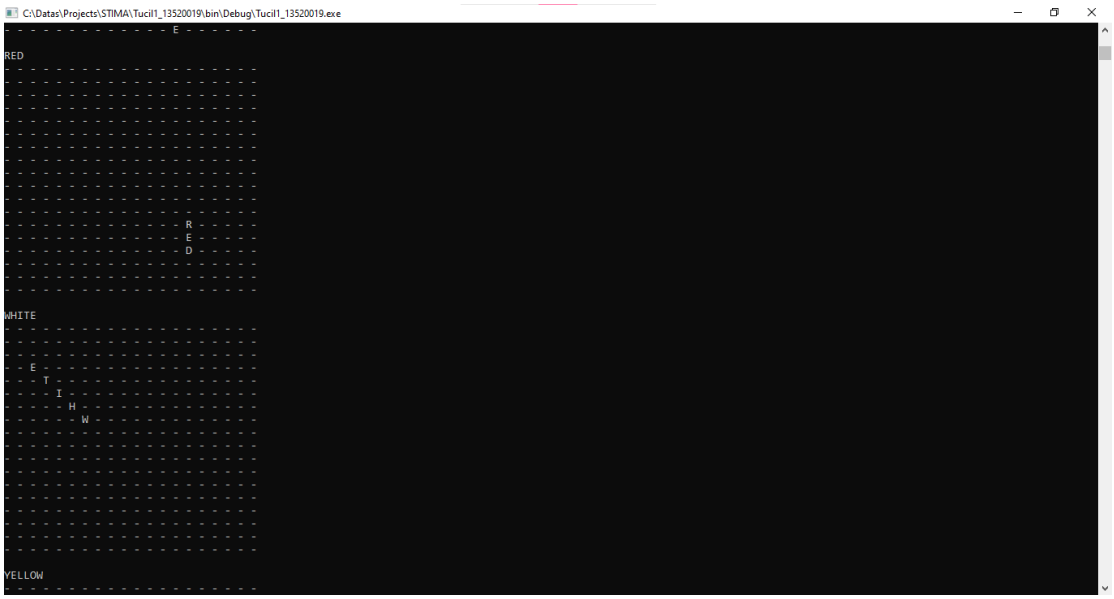


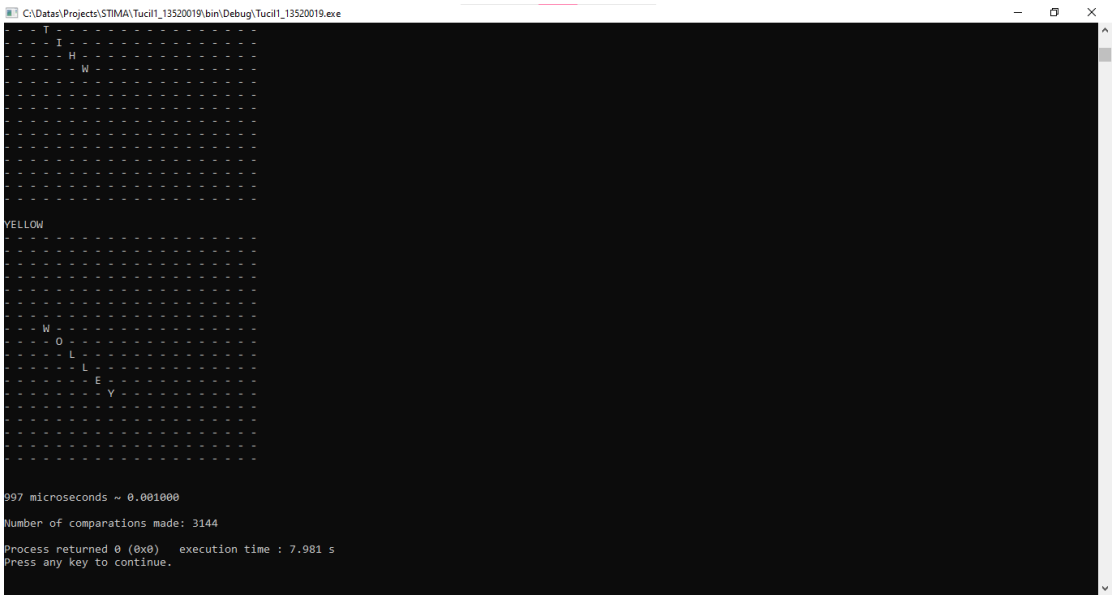



C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
BLUE
BROWN
GREEN

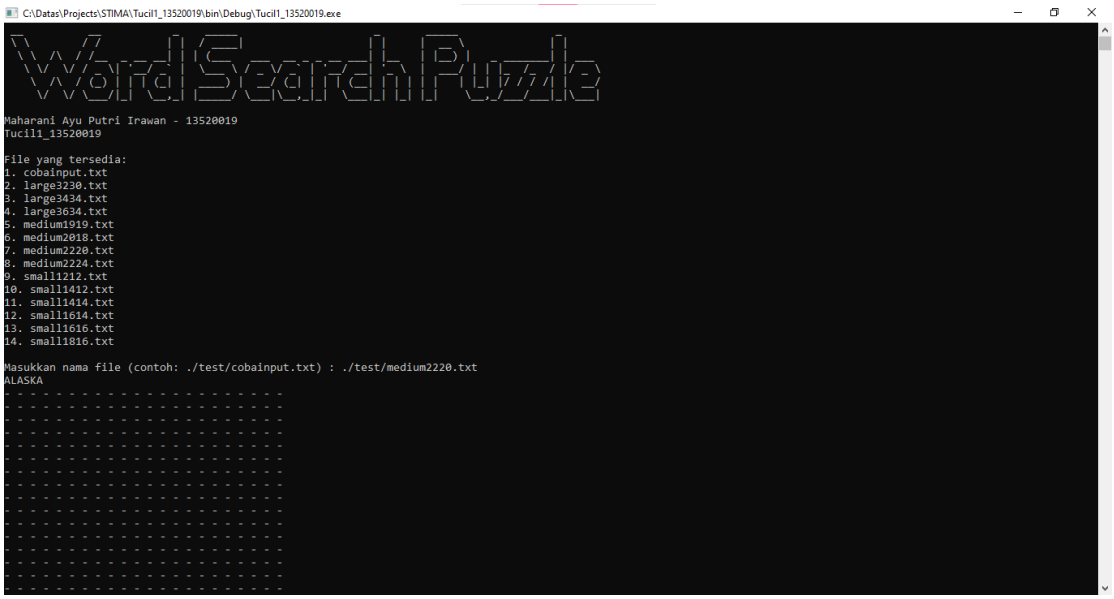

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
GREEN
N E E R G
ORANGE
E G N A R O
PINK

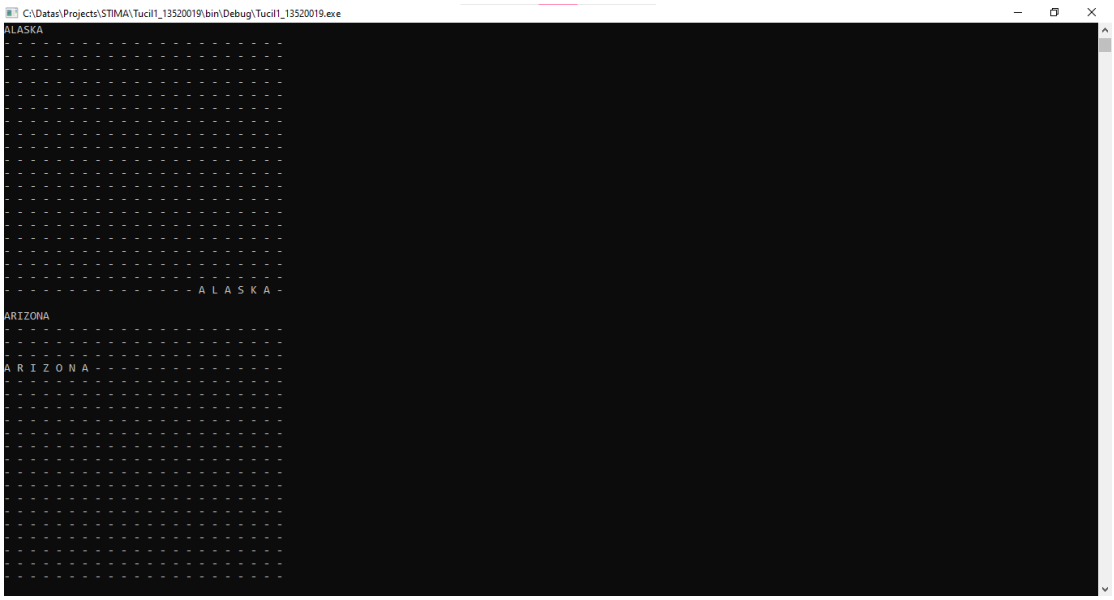

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
PINK
P I N K
PURPLE
P
U
R
P
L
E
RED

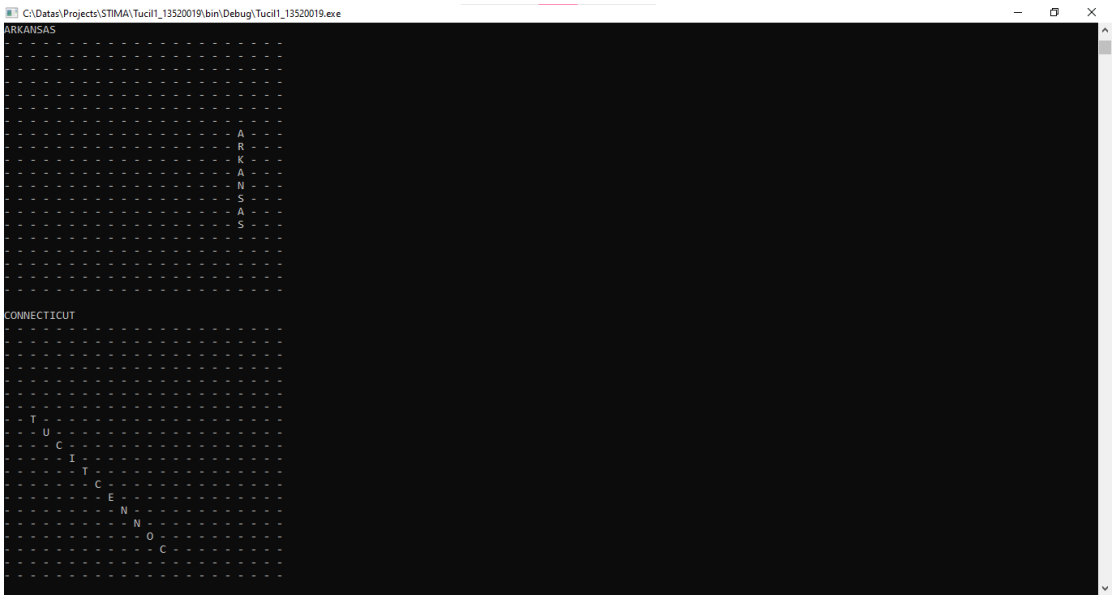

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
RED
WHITE
YELLOW

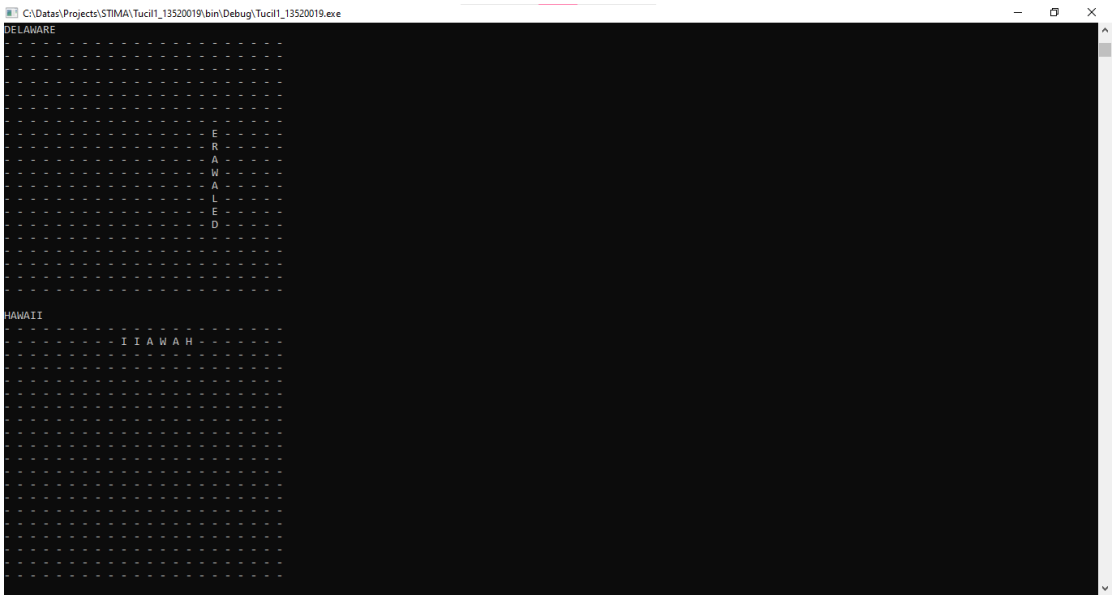

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
YELLOW
997 microseconds ~ 0.001000
Number of comparations made: 3144
Process returned 0 (0x0) execution time : 7.981 s
Press any key to continue.

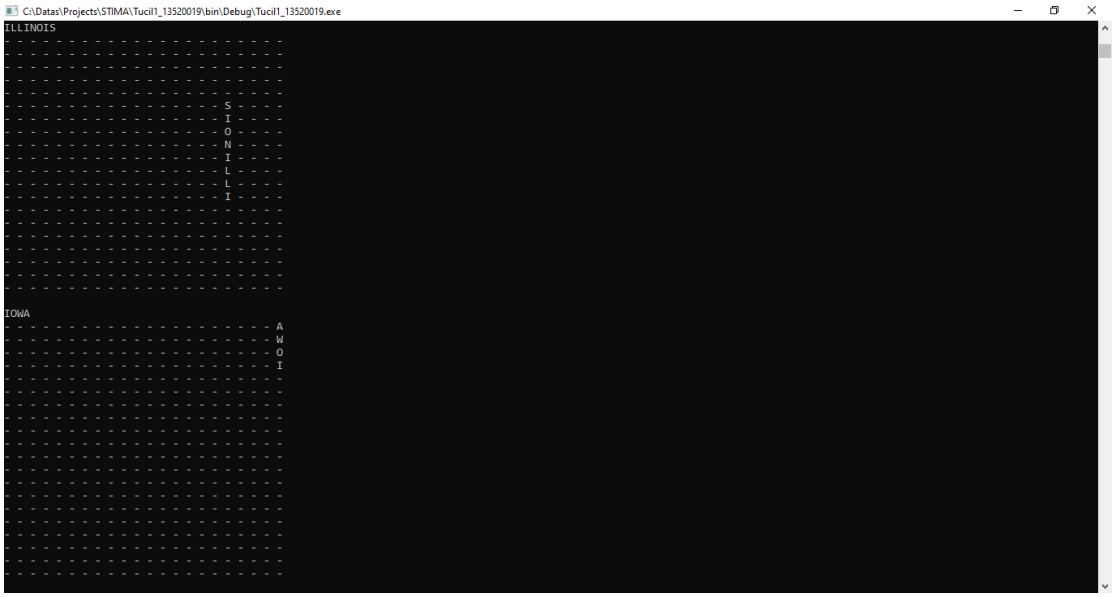
H. Eksperimen 8 (Word puzzle berukuran 22 x 20)

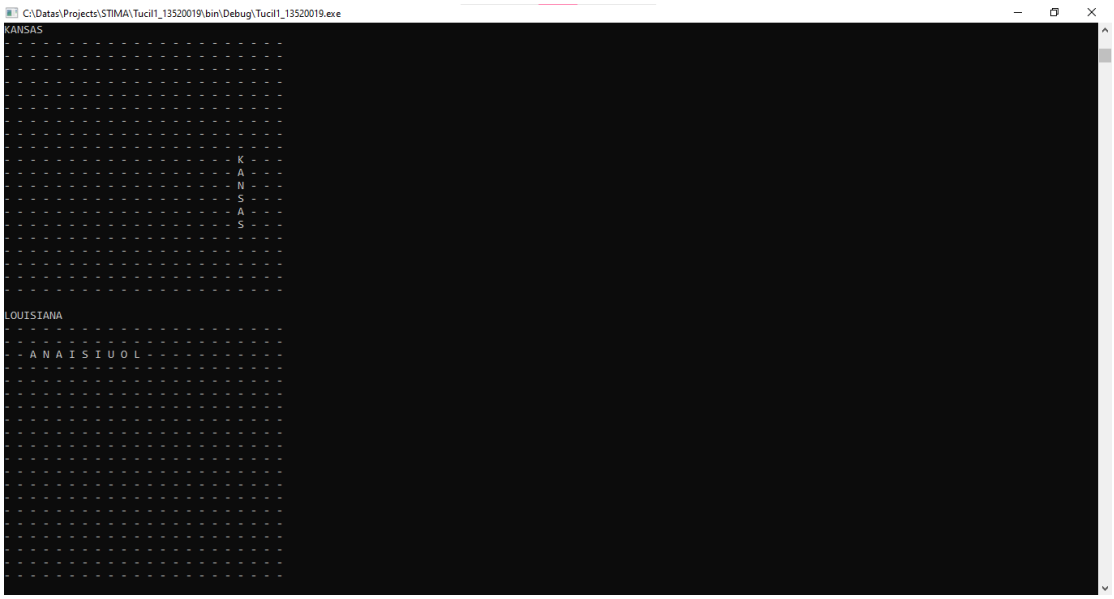


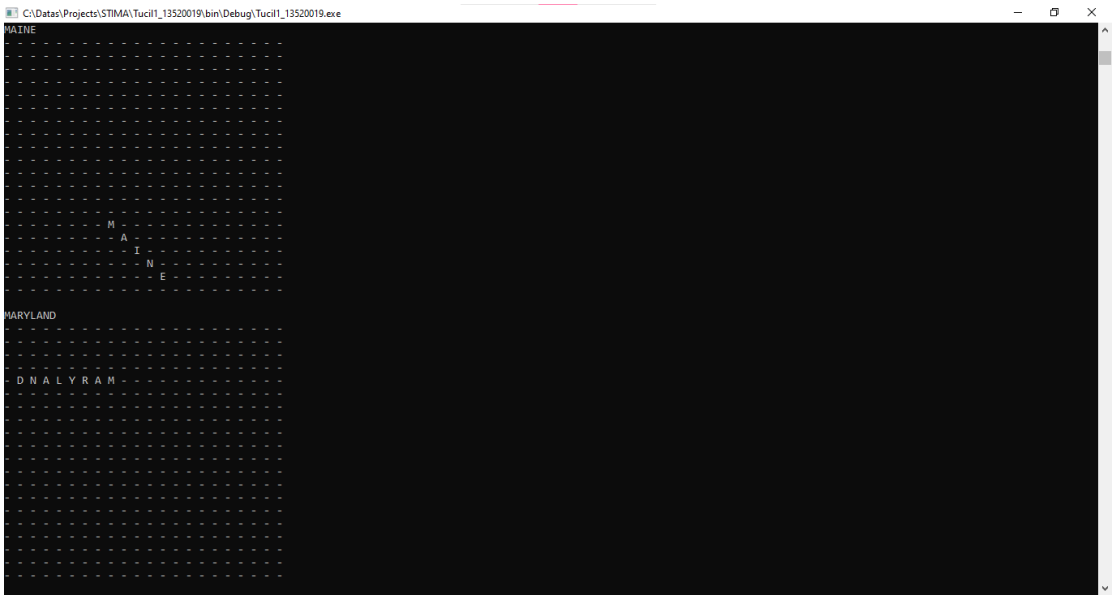


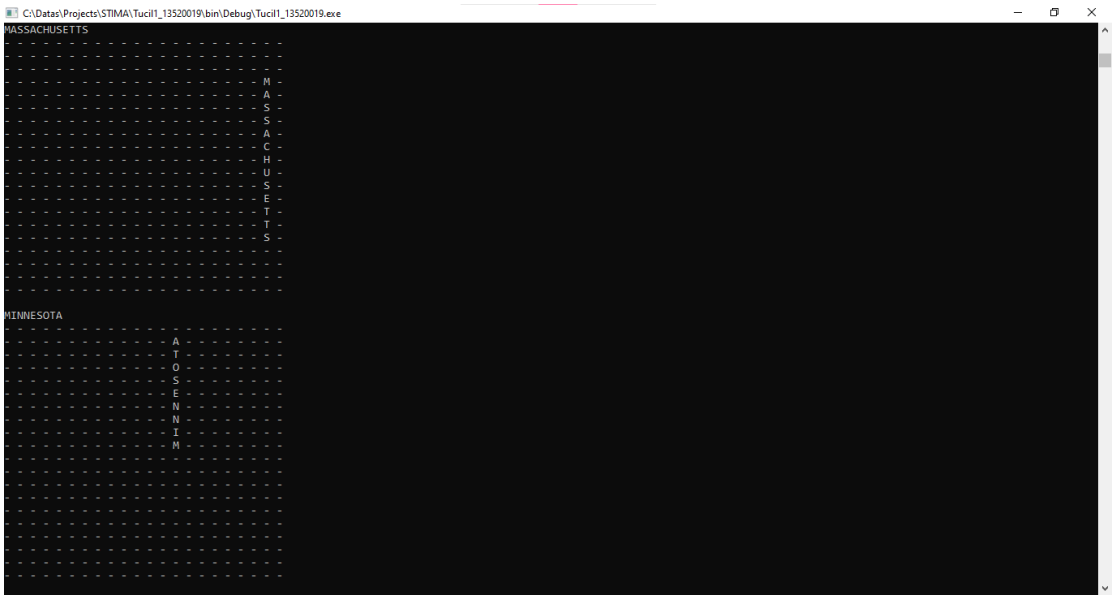

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
ARKANSAS
CONNECTICUT

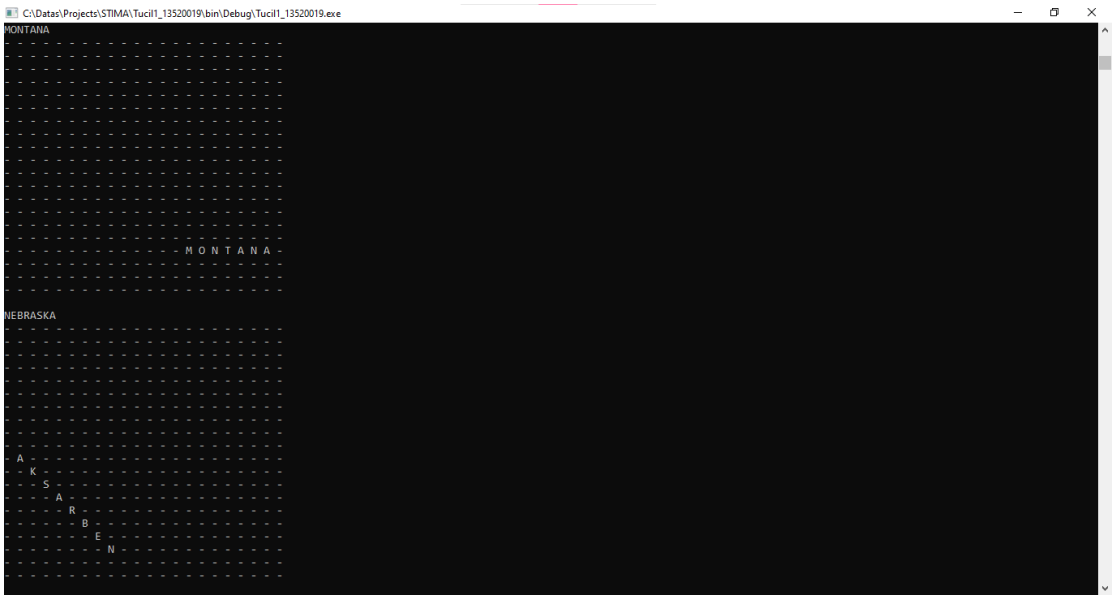

C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
DELAWARE
HAWAII


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
ILLINOIS
IOWA


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
KANSAS
K
A
N
S
A
S
LOUISIANA
A N A I S I U O L


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
MAINE
M
A
I
N
E
MARYLAND
D N A L Y R A M


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
MASSACHUSETTS
M
A
S
S
A
C
H
U
S
E
T
T
S
MINNESOTA
A
I
O
S
E
N
N
I
M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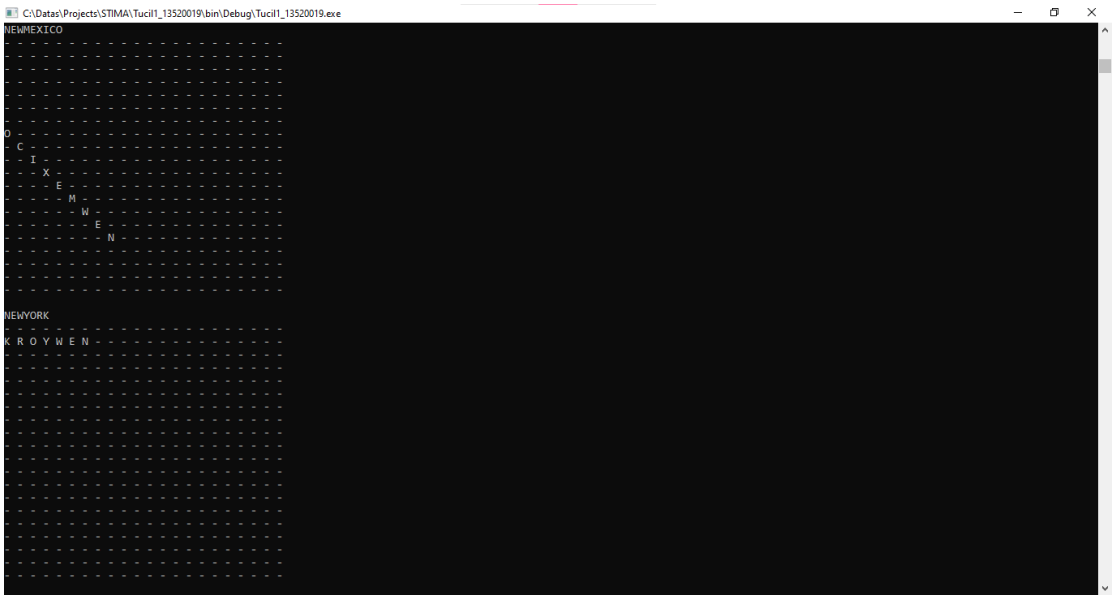
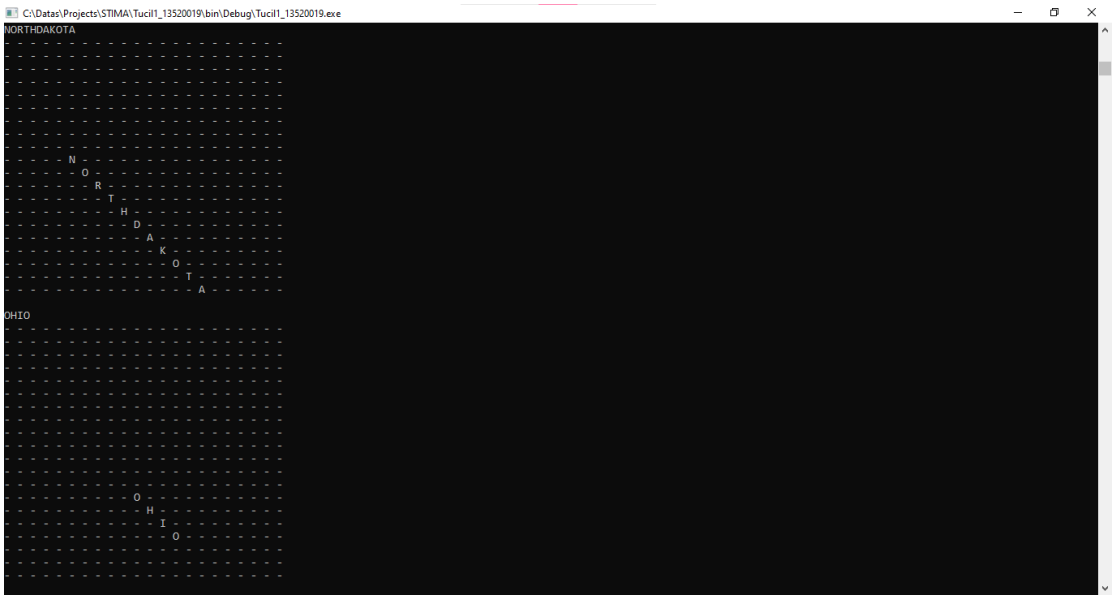
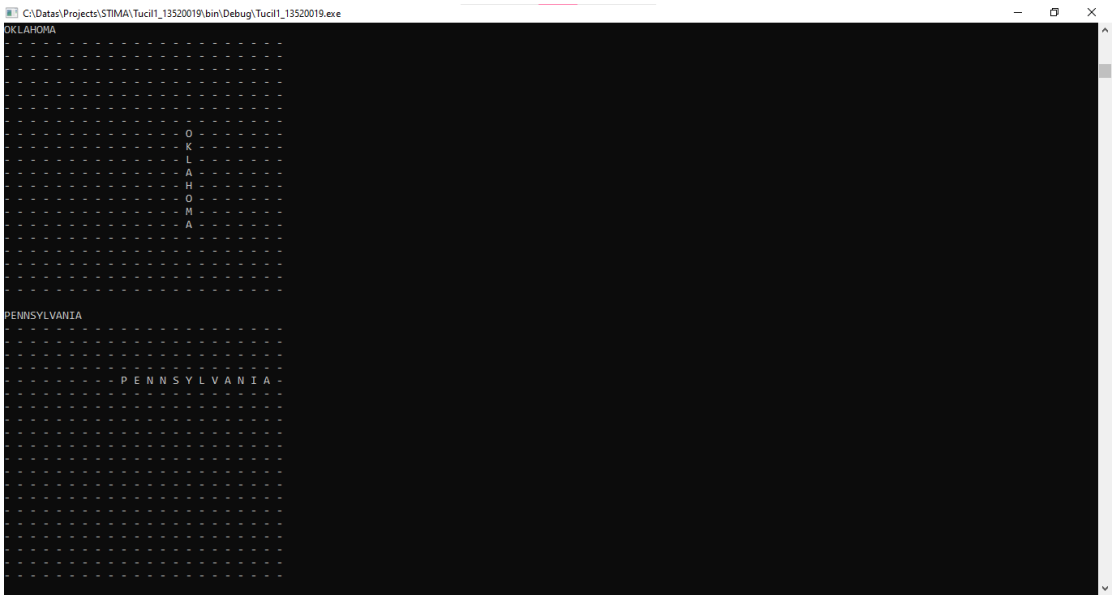
MONTANA
MONTANA
NEBRASKA


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
NEWMEXICO
NEWYORK
K R O Y W E N


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
NORTHDAKOTA
OHIO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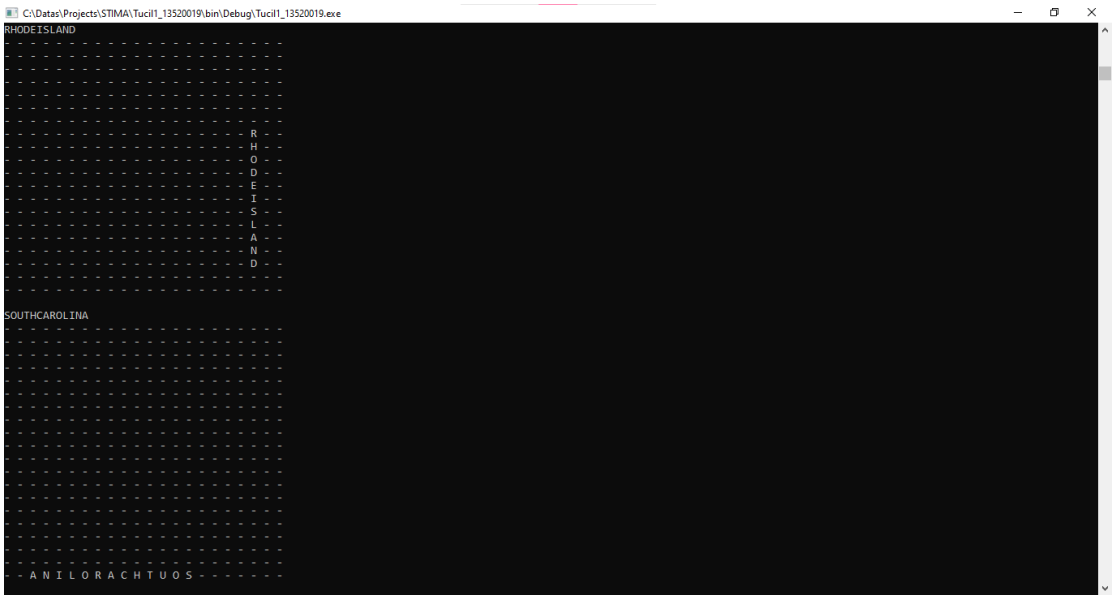
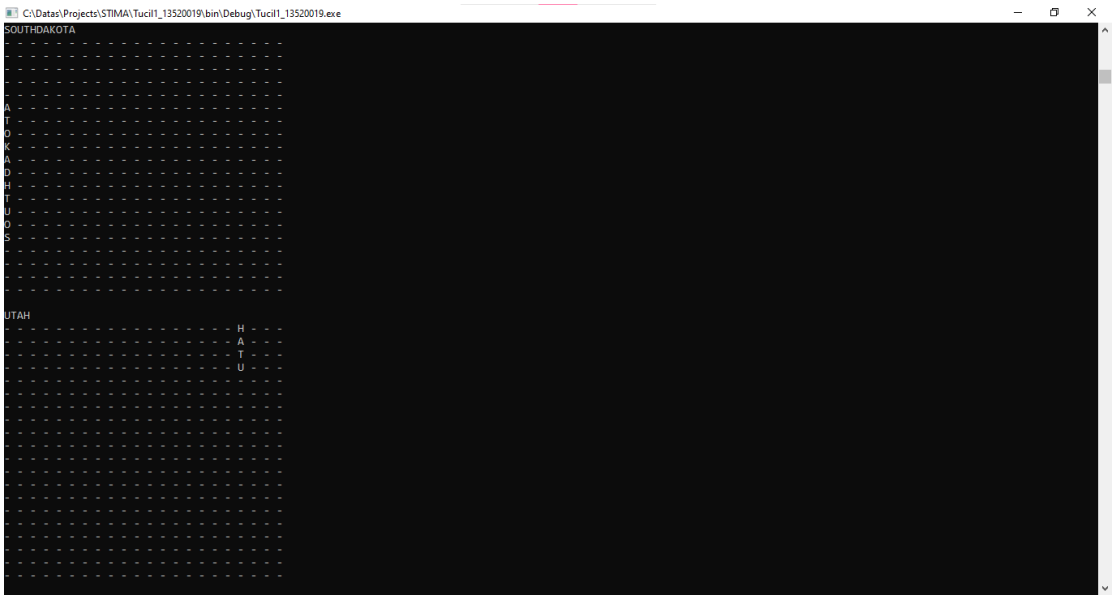
OKLAHOMA
PENNSYLVANIA
P E N N S Y L V A N I A


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
RHODEISLAND
SOUTHCAROLINA
A N I L O R A C H T U O S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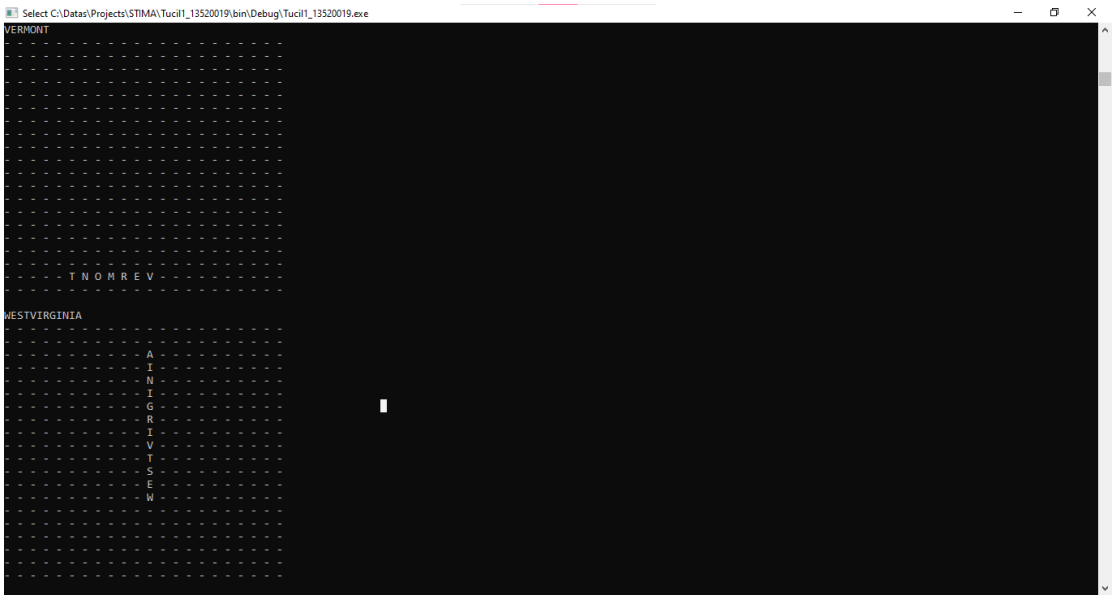
SOUTHDAKOTA
UTAH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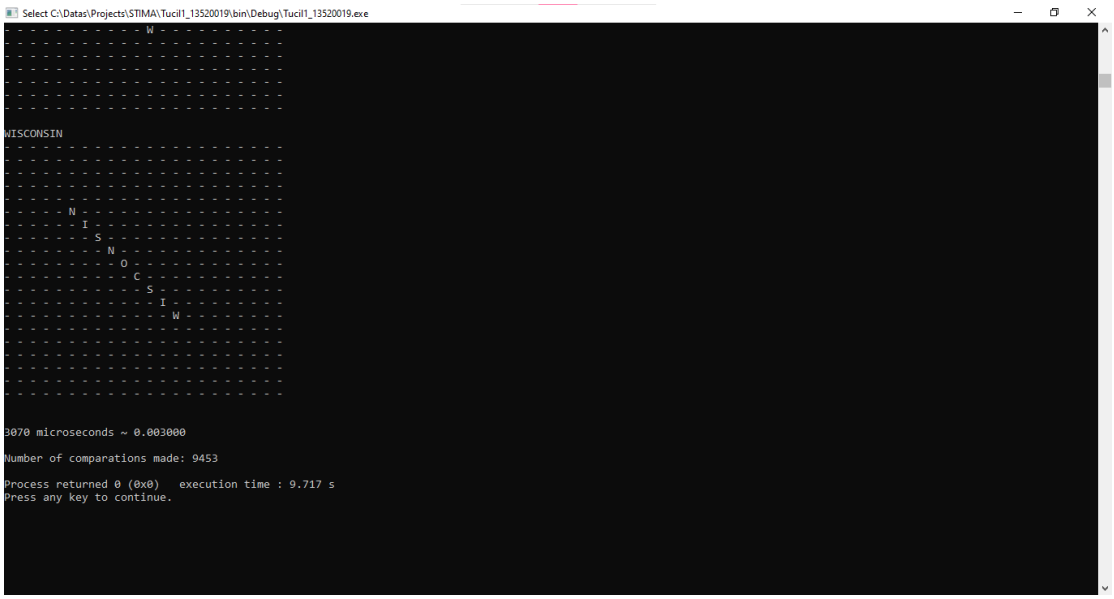
VERMONT
TNOMREV
WESTVIRGINIA
AINIGRIVTSEW


Select C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
W
WISCONSIN
N
I
S
N
O
C
S
I
W
3070 microseconds ~ 0.003000
Number of comparations made: 9453
Process returned 0 (0x0)   execution time : 9.717 s
Press any key to continue.

I. Eksperimen 9 (Word puzzle berukuran 22 x 24)

```
R H F Q F A K R D R O F T R A H H F S H I A   BATONROUGE
J G K N M Z S U B M U L O C P C U J R Q J G   BISMARCK
E I C M I G P R E I L E P T N O M E E J E L   BOISE
R E R N N R R N M E L A S I J E A F V B P V   BOSTON
L L A Q D E O O F E G Q I C I N D F O L B P   CARSONCITY
Z A M G H V V T Q L L Z J L X N I E D U U E   CHARLESTON
J R S J Q N I S Y O I S E H D E S R Y B A J   CHEYENNE
A E I H N E D O N P Y P L M I Y O S T O E A   COLUMBIA
H E B G A D E B L H U R L L N E N O I L N Y   COLUMBUS
S I L O P A N A I D N I I A O H T N C Y U T   CONCORD
Y A S Z H O C L R E V N V N U C Y C A M J I   DENVER
C N D V N L E C S O N G H S D O J I M P W C   DESMOINES
H F P H O E N I X I T F S I E N G T O I Y N   DOVER
A G R U D W S F A X X I A N S C R Y H A R O   FRANKFORT
R I B A T O N R O U G E N G M O U D A D E S   HARRISBURG
L C E M R Y A A N O M L V B O R B N L E M R   HARTFORD
E D U L U L O N O H A D G H I D S O K F O A   HELENA
S U W O E M Y K N T N I S Q N O I M O A G C   HONOLULU
T W L F S M L F D N E F B O E R R H T T T Y   INDIANAPOLIS
O F L I I G C O O P L S J M S Y R C V N N O   JEFFERSONCITY
N F X R O U W R P E E F G U U Q A I M A O V   JUNEAU
Z L V G B P Z T U E H X X W U L H R D S M W   LANSING
O T N E M A R C A S O M R T C L O S R T C W   MADISON
A E O Z R A T A L L A H A S S E E C H O H D   MONTGOMERY
                                             MONTPELIER
                                             NASHVILLE
                                             OKLAHOMACITY
                                             OLYMPIA
                                             PHOENIX
                                             PROVIDENCE
                                             RALEIGH
                                             RICHMOND
                                             SACRAMENTO
                                             SALEM
                                             SANTAFE
                                             SPRINGFIELD
                                             TALLAHASSEE
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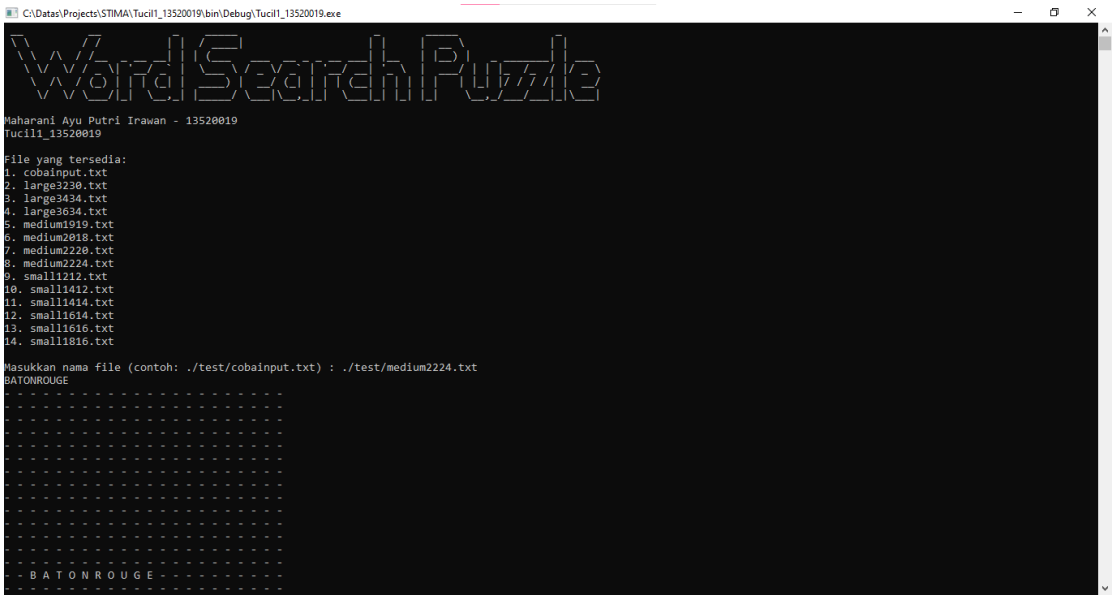

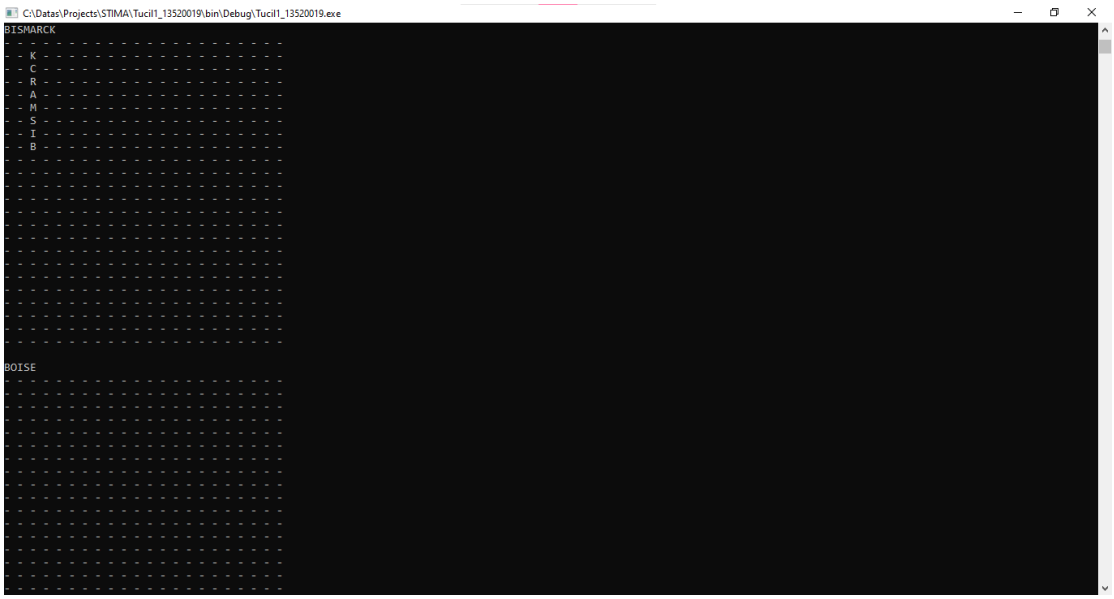
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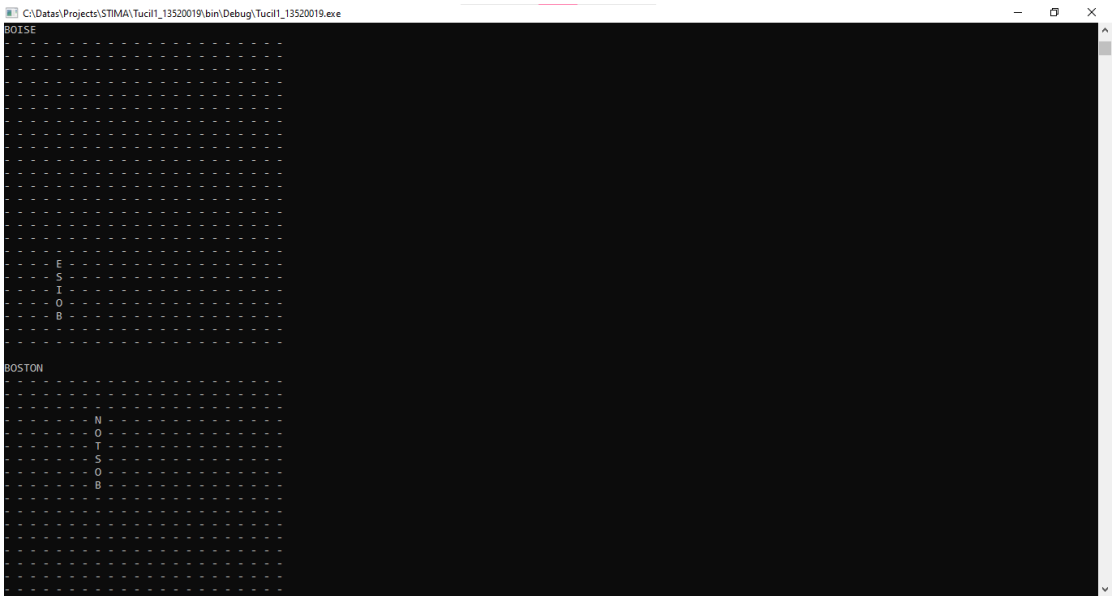
S
I
B
BOISE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BOISE
E
S
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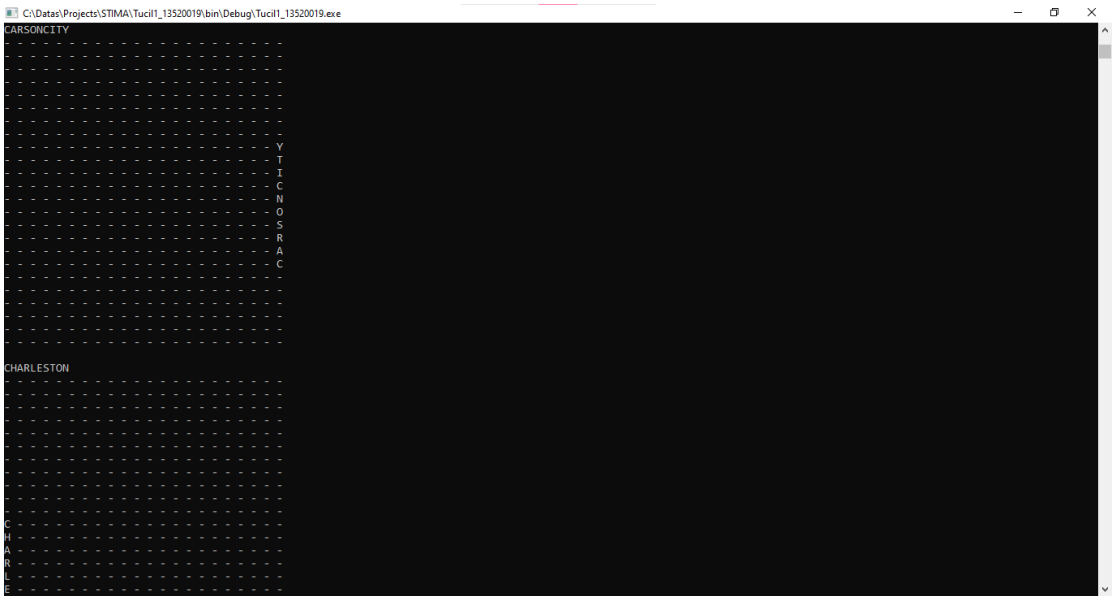
B
BOSTON
N
O
T
S
O
B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CARSONCITY
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S
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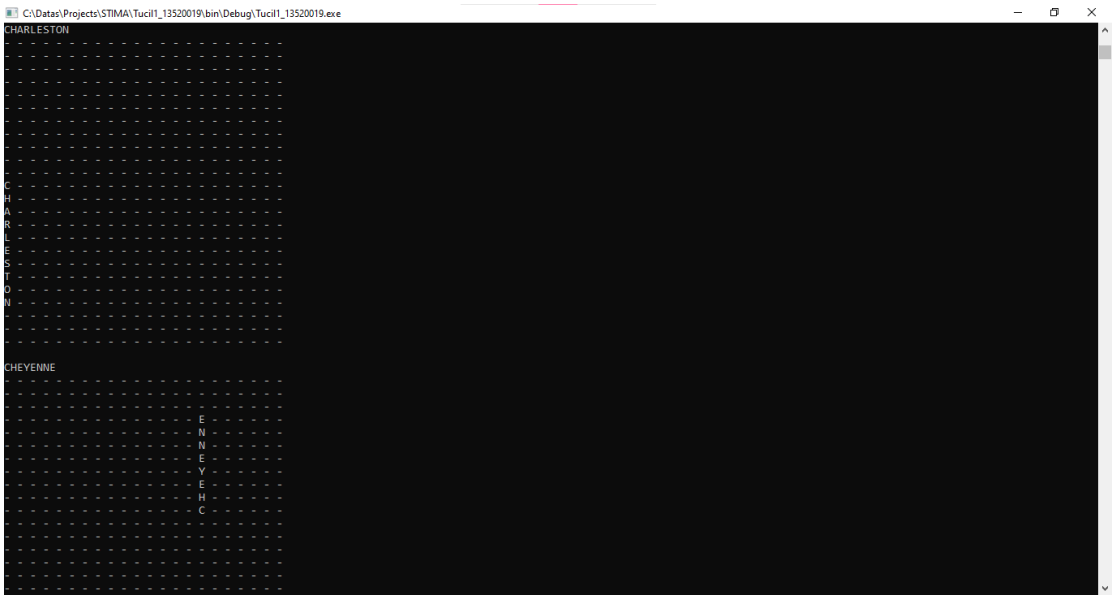
C
CHARLESTON
C
H
A
R
L
E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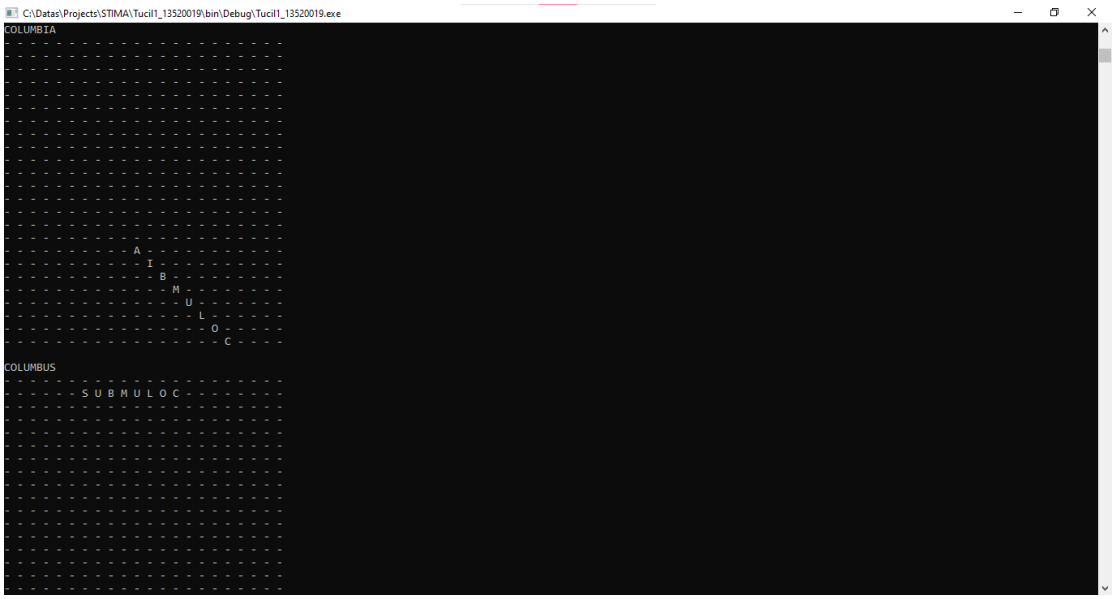
CHARLESTON
CHEYENNE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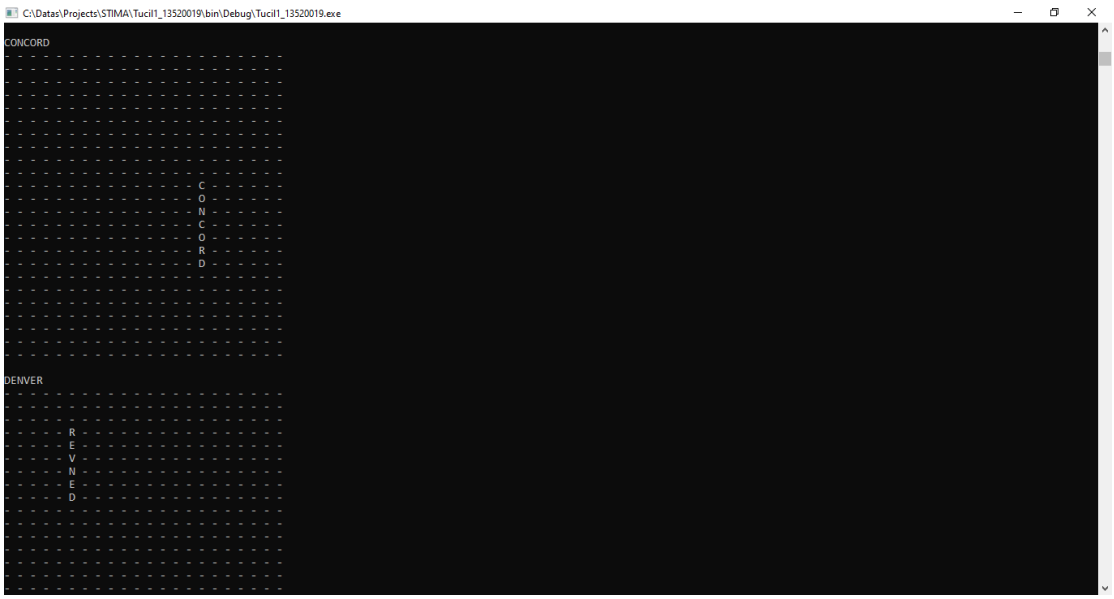
COLUMBIA
COLUMBUS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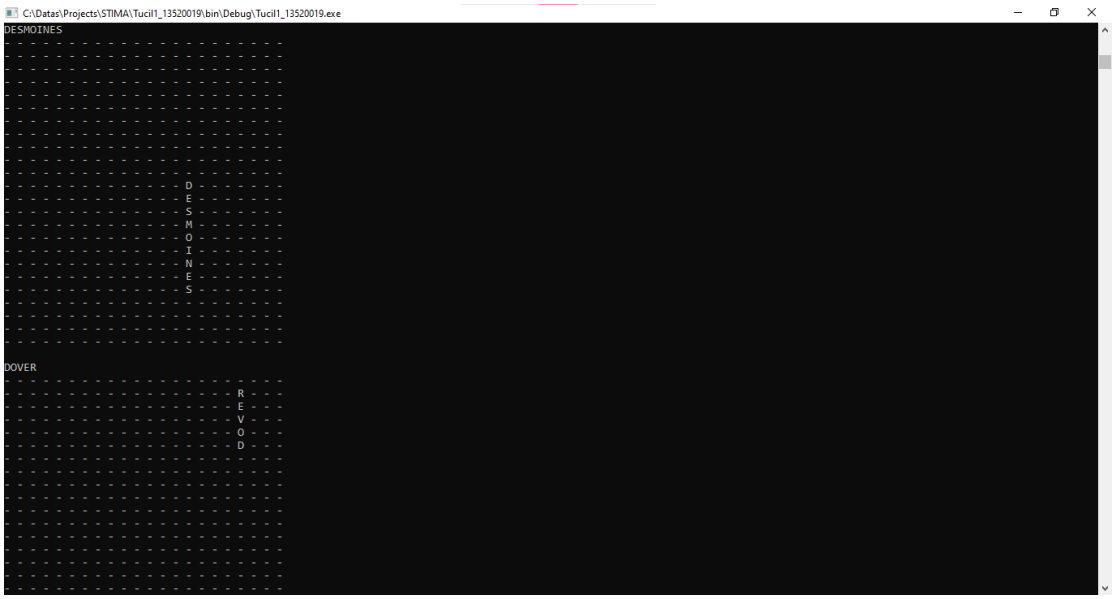
CONCORD
DENVER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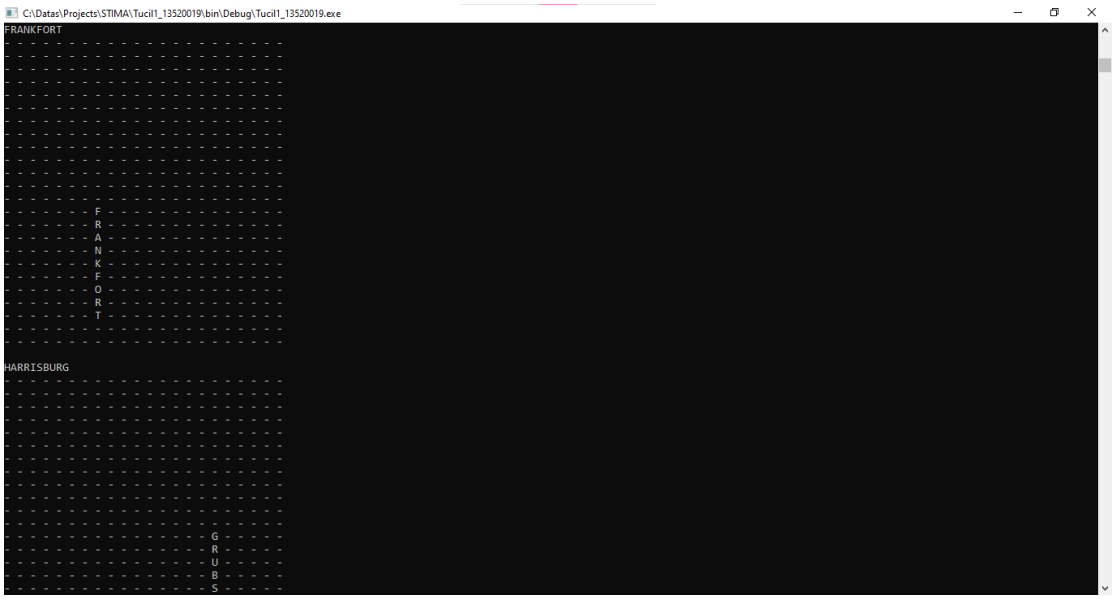
DESMOINES
DESMOINES
DOVER
REVOD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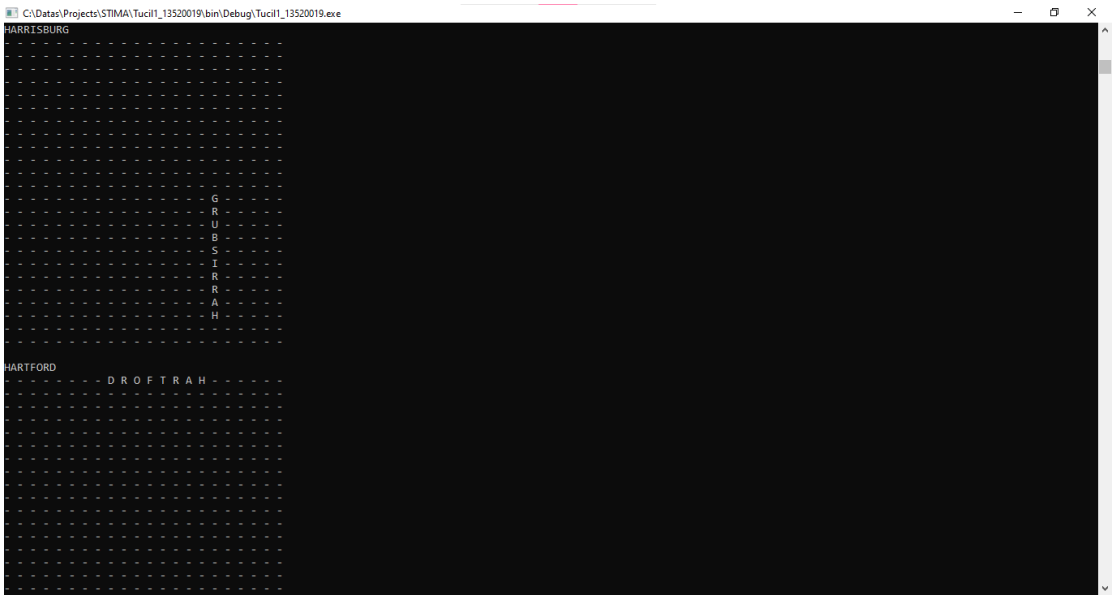
FRANKFORT
FRANKFORT
HARRISBURG
GRUBS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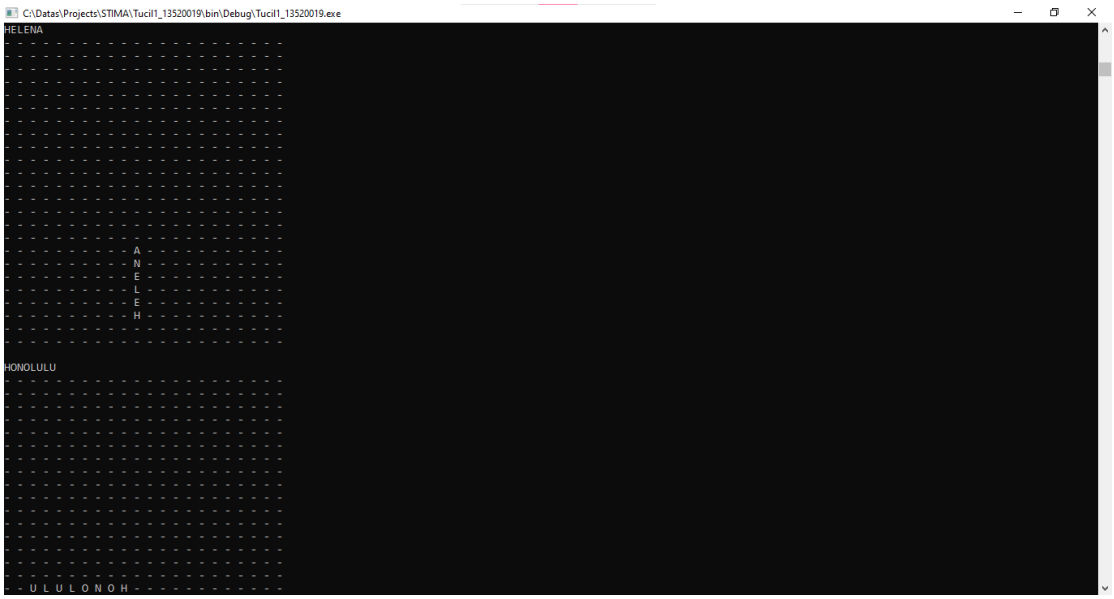
HARRISBURG
GRUBSIRRAH
HARTFORD
DROFTRAH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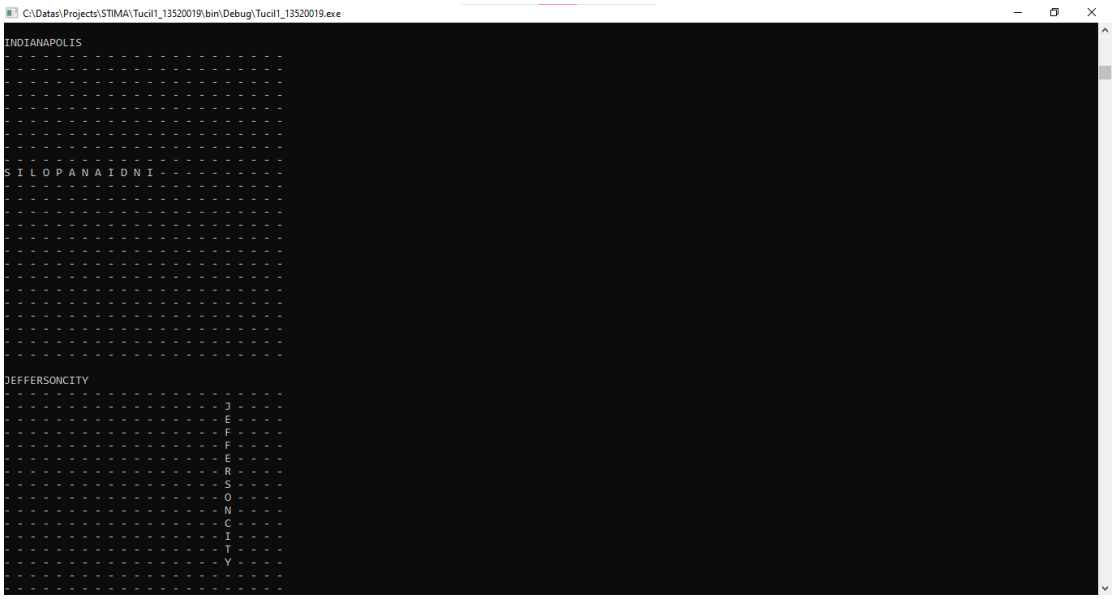
HELENA
HONOLULU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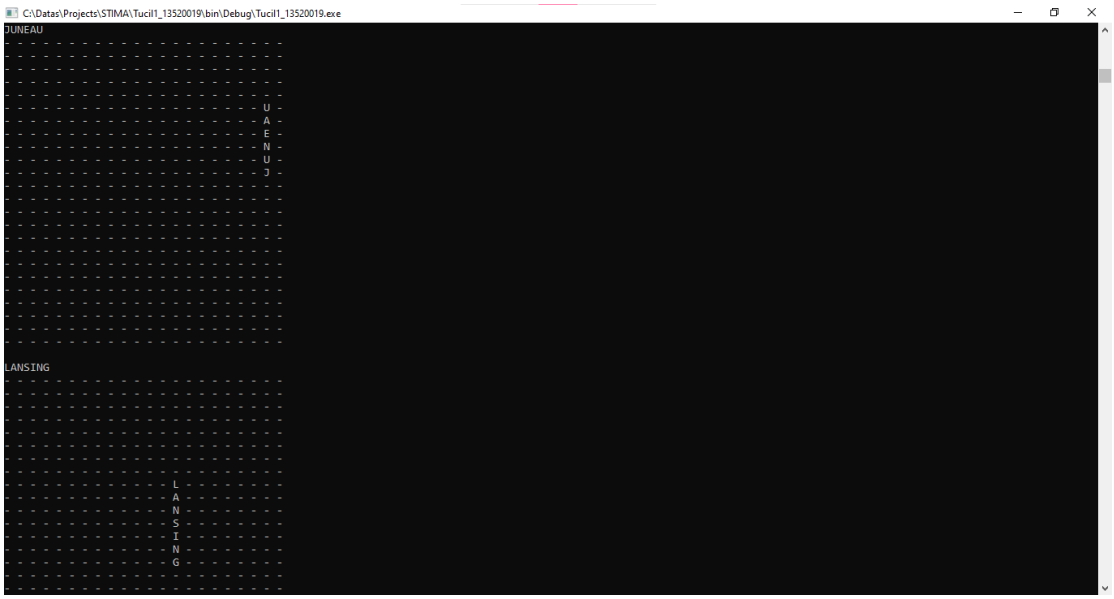
INDIANAPOLIS
JEFFERSONCITY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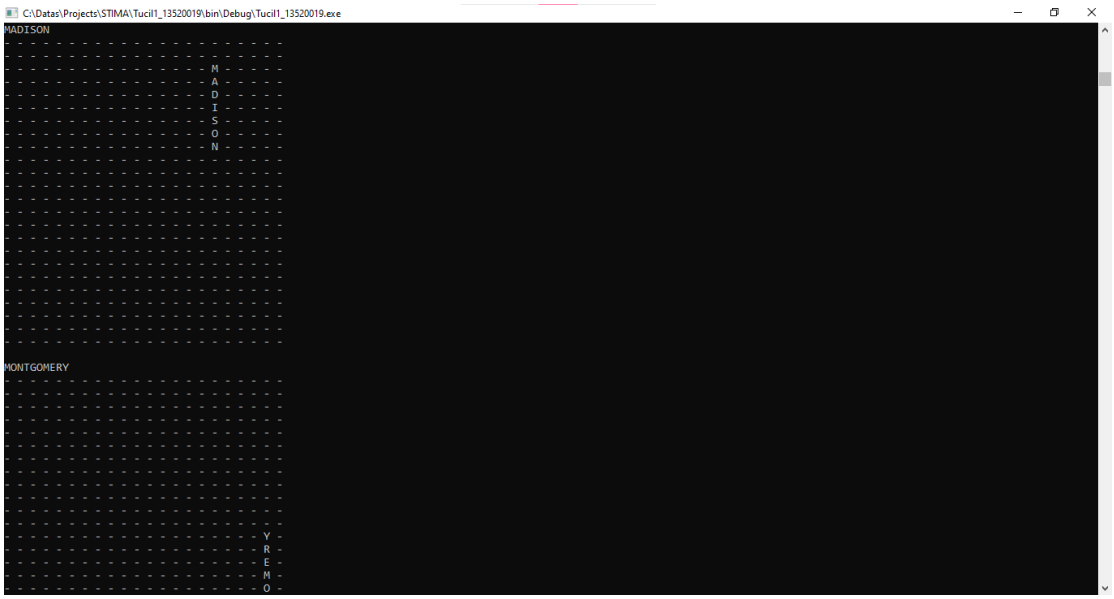
JUNEAU
LANSING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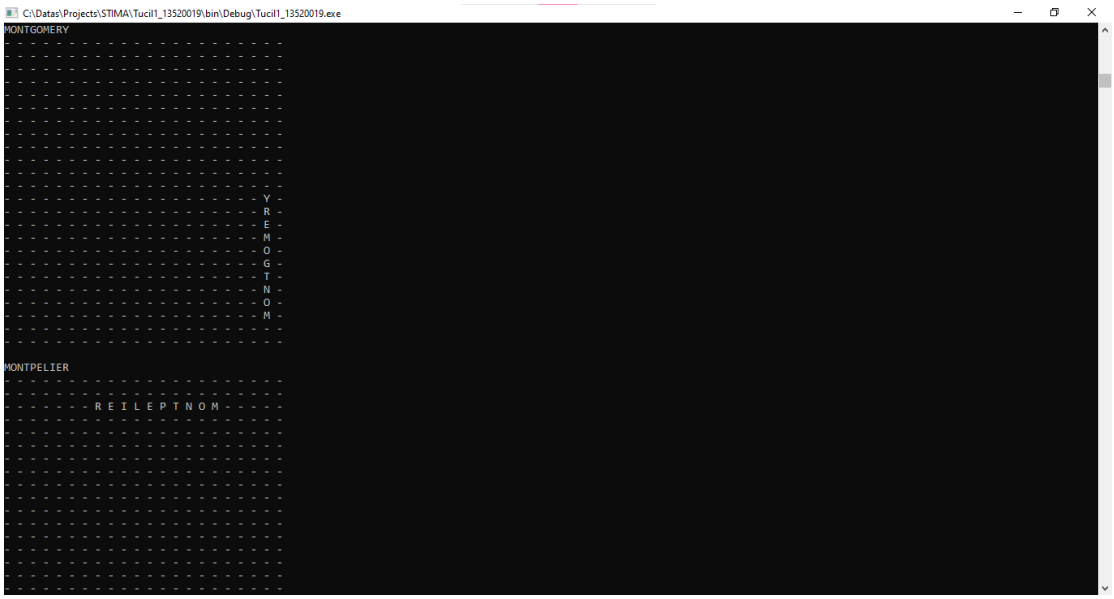
MADISON
MONTGOMERY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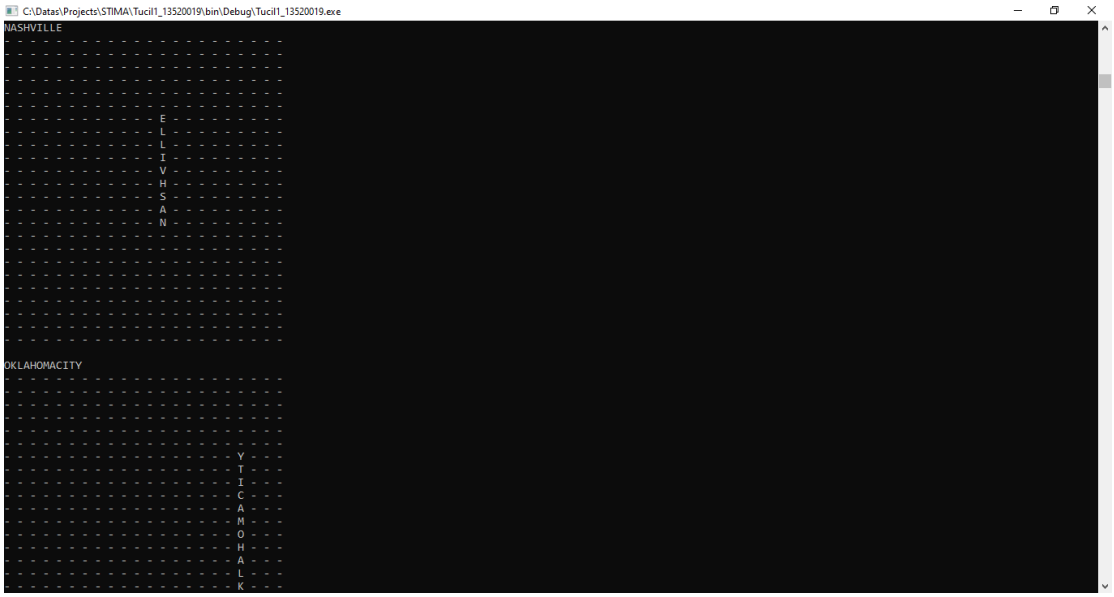
MONTGOMERY
MONTPELIER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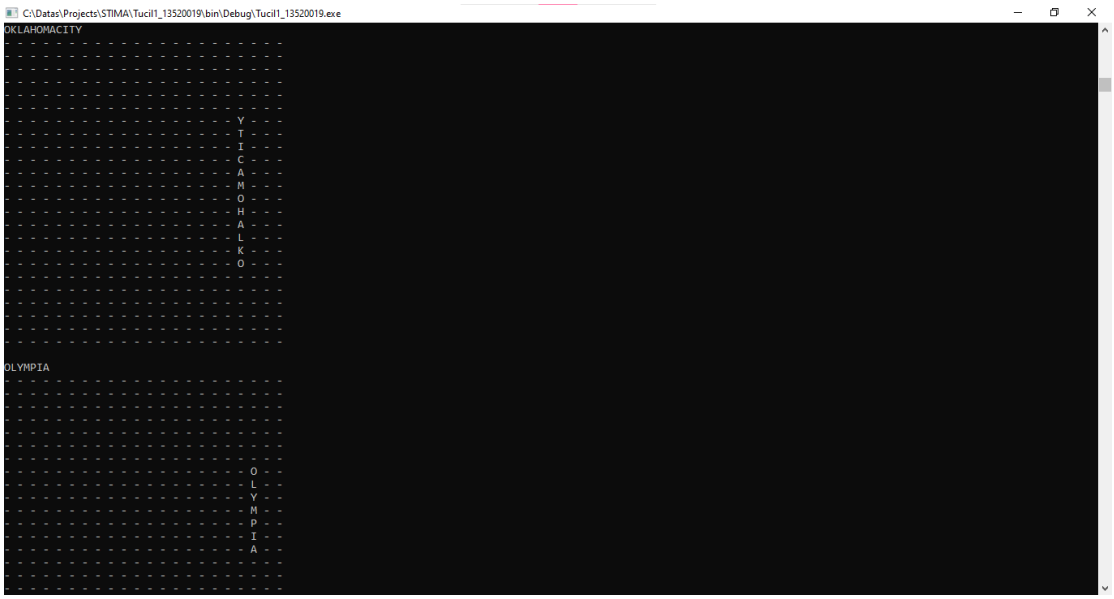
NASHVILLE
OKLAHOMACITY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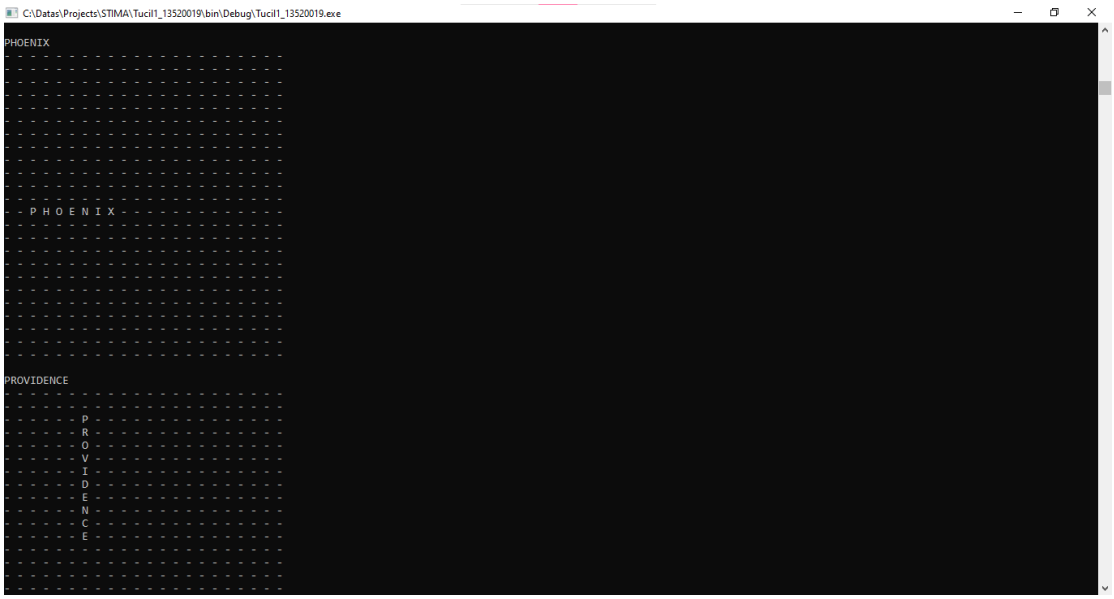
OKLAHOMACITY
OLYMPIA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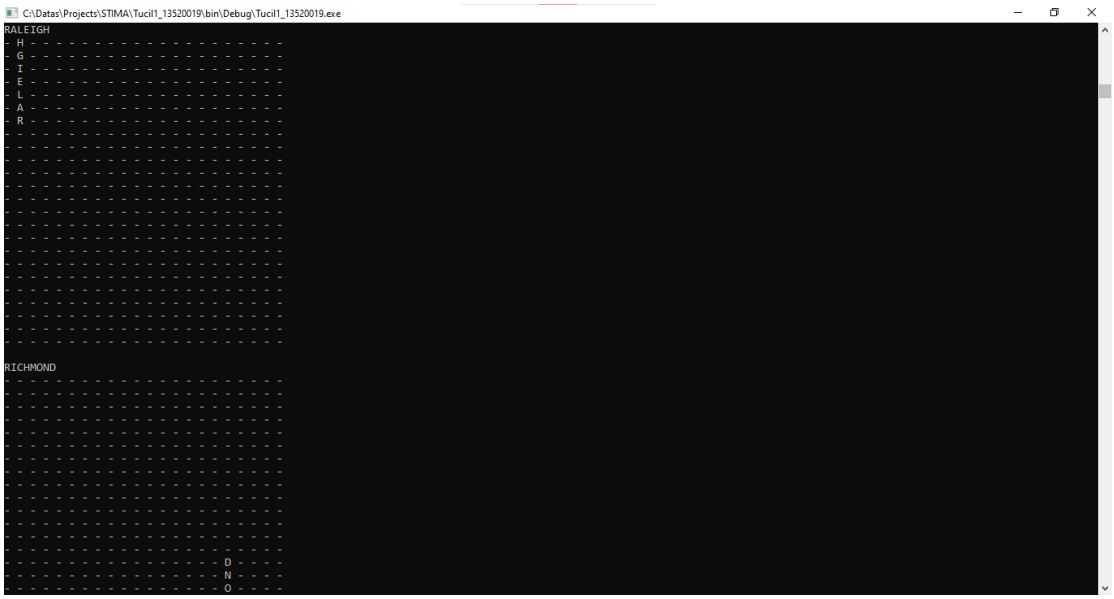
PHOENIX
PROVIDENCE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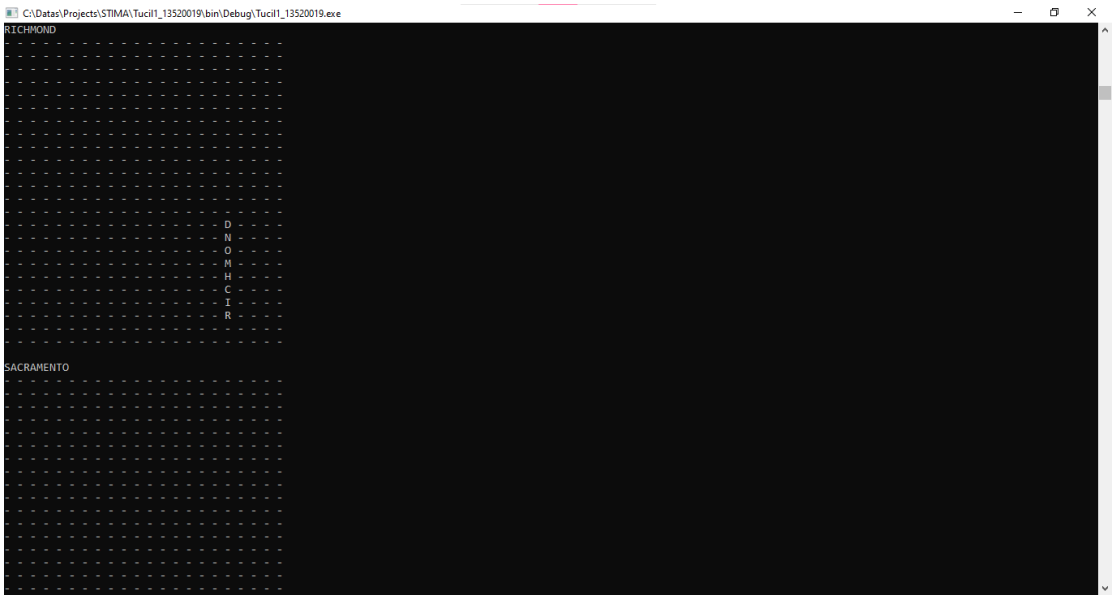
RALEIGH
RICHMOND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RICHMOND
D
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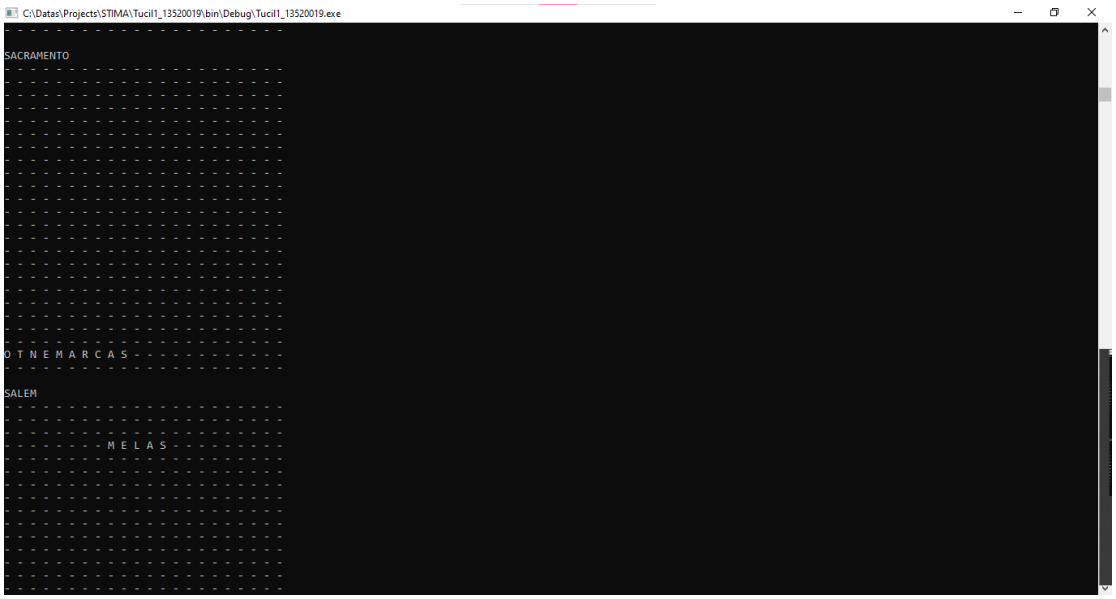
O
M
H
C
I
R
SACRAMENTO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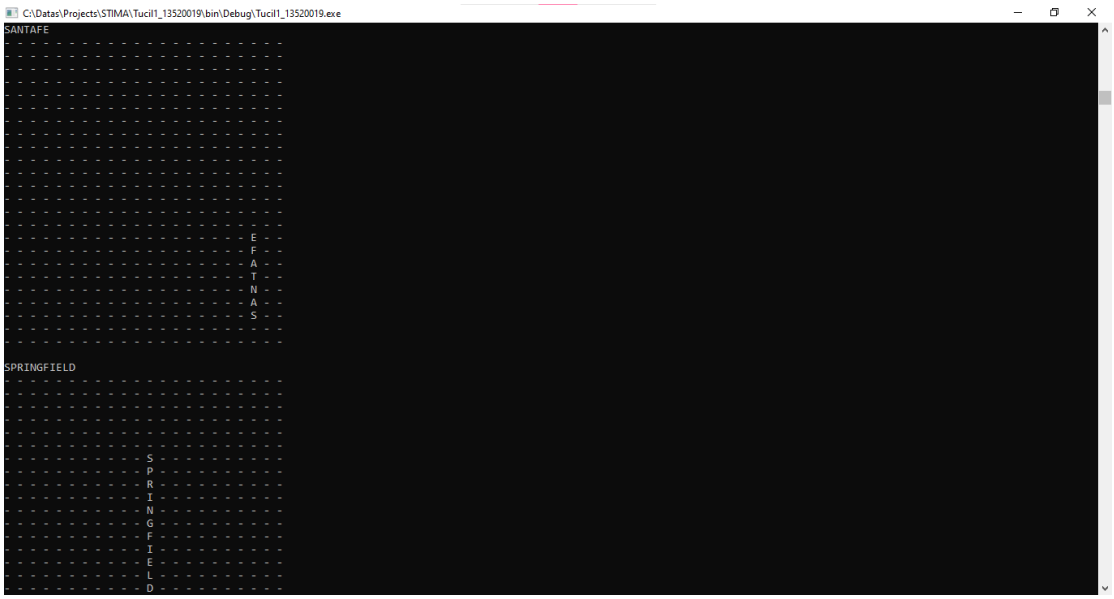
SACRAMENTO
O T N E M A R C A S
SALEM
M E L A S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SANTAFE
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E
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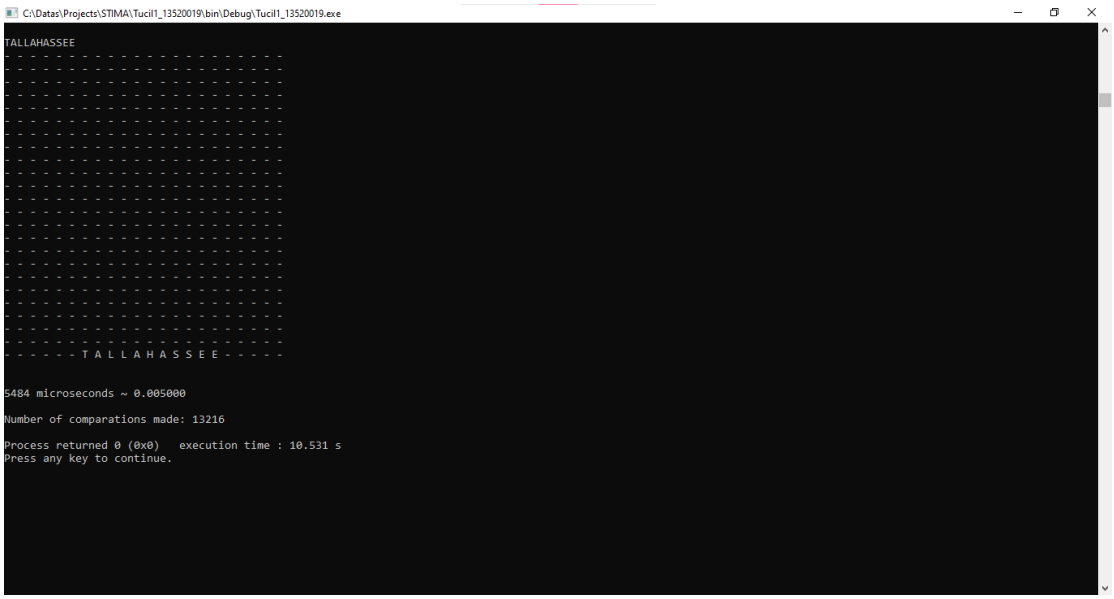
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TALLAHASSEE
T A L L A H A S S E E
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Process returned 0 (0x0) execution time : 10.531 s
Press any key to continue.

J. Eksperimen 10 (Word puzzle berukuran 32 x 30)

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O D V Q D G Q I V Q D A W W A E E F J M B B K M S M Y E N E
O J Y S E D T M A W G R N G W I D I N A R A C E H V B B H L
A I O K O K F G I E B H C A U F W Q X E L S D U D Y K A T U
T I G N A N I P L A K G N A P Q Y H D W S S O B F H B G R K
W C F R H T I A N B N G U C I U V E N M O K L B F U Q E Y R
Y K S Y A X N Y G Y N N S Q R A J W O W T I L G R D T S C N
W I H L H G U I R A O T I W I V S S C I T B B X D J E L S L
P M A H T W P P R J T Z K C D Q T E G A L O P J Q F H W G Z
B S S L A Y T A E B E S S R E N G I R W N M R P X P I P N X
W M U N G P M M N K Z D E S K H N Q B L T O D Z Y C C P M O ACEH
Q Y G K E E B K B B A O C P Y H D B T J D U M Y O P T B H B BANDA
J I Y N S E O W J Z T L F M Q I T B P V C A E F U M N I T J BANYUWANGI
G M A S R W O H Q N J O O Z X Z H R A B O D T P X W U B D P BENGKULU
P Y D A G O G H L Y E G T N H P L S P N L W I M O V G J Y G BLITAR
B I F K J T Q D D M T A G Z G P B Z A Z D R N K T V Z K J O DENPASAR
K J A Y D X S C Z J Y V A J I A O W G Q G A B V A F O B T S JEMBER
T N D Z N Y R N G V N U I D A M N W C V Q Y F X Q U L T C U KEDIRI
W D U E K L S W X P B P K I O G U J H O N L I L H H N H L X MADIUN
Q O M K N H S P L L F S F Y G K I I Z X X X G L D N N Q M W MAGELANG
Y K G F S P K V M D K X E S H K G Z I T I M M N I S S W V Q MALANG
E E A N Z J A J O R W D L M C T J A R L W F Z T V P Z I G Q PALU
V V R Q W E K S V N I L J U L U K G N E B Q B J M Z N N J T PANGKALPINANG
R T A L Y H G Z A H A H N T E S C P K Y G K U T O C U X Y M PASURUAN
S S V E U K I N Y R V Z R I I Y U T R G J G S I L U H O T K PEKALONGAN
K L E X B M S T A N W E N N P R O B O L I N G G O C K U D H PROBOLINGGO
M V A W G H T T G B C Q G Y T R R S G Z J A F R G R U P U Z REMBANG
Z T H V S E A G X Z A A O N Q U A U X E Q L N K T I W B V B SABANG
J B G H W U L U P E R S G V T E N Z A J G A Y D I G F O P H SALATIGA
H L L W Y W B L N A U R U S A P C U W A X M R E L L E G Q E SEMARANG
X M J V F V T J J D K I L N K S J U M F N N V E Y X T E E H SINGARAJA
H N H J Z V K A Z I K U E Y L N X Y L Q J A B Y W U L A P E TEGAL
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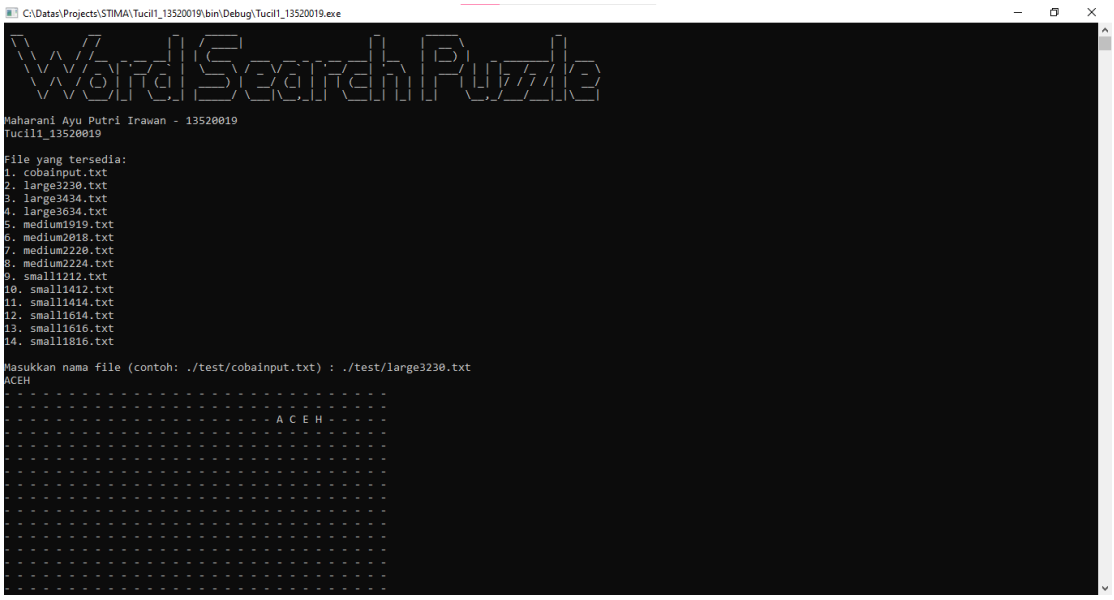

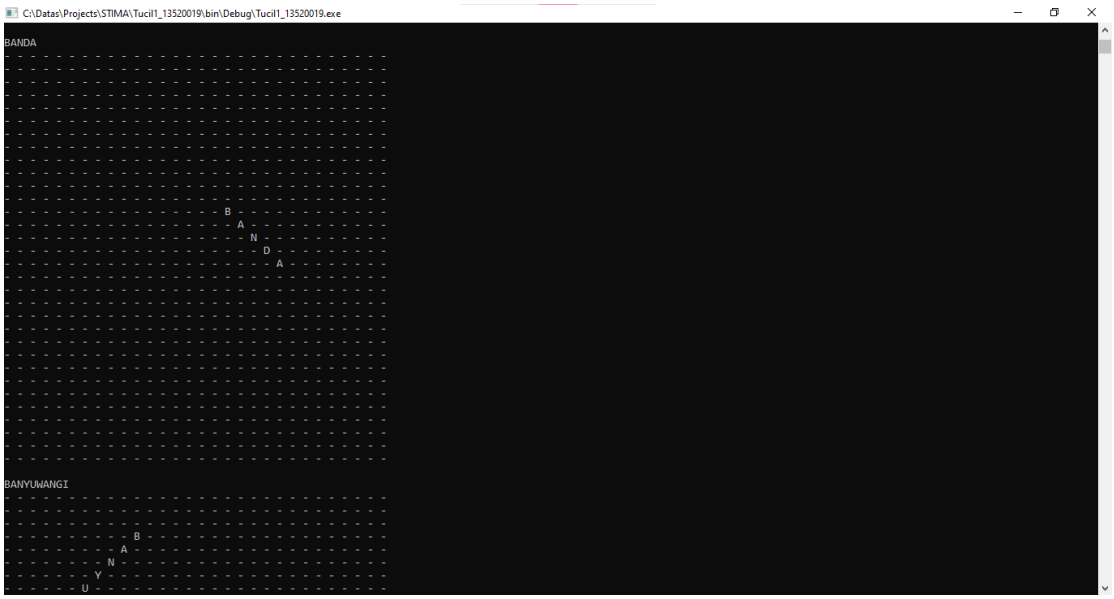
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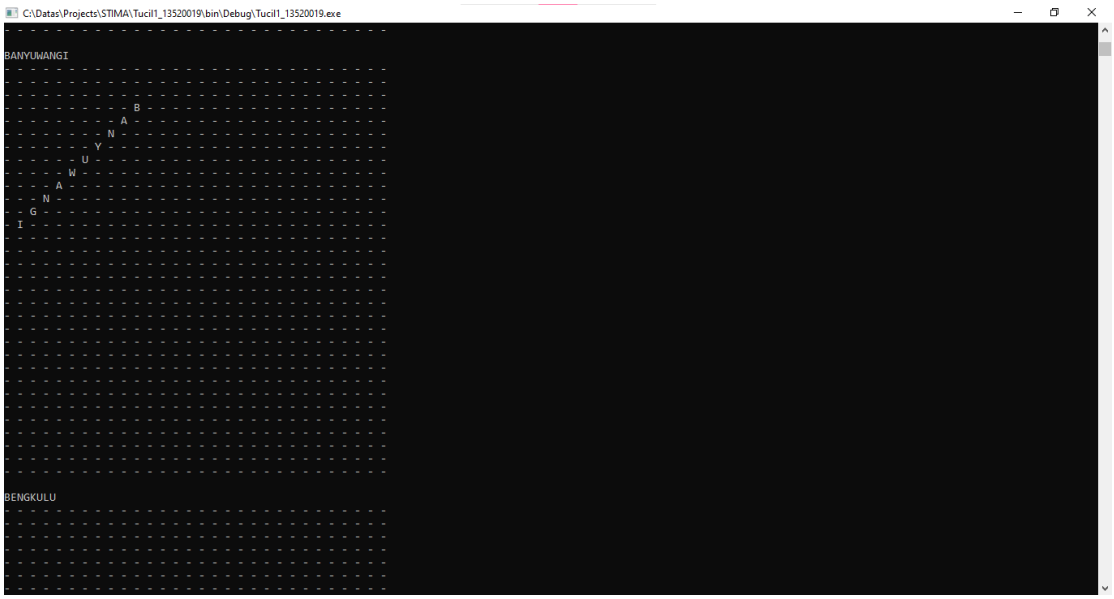
BANDA
BANYUWANGI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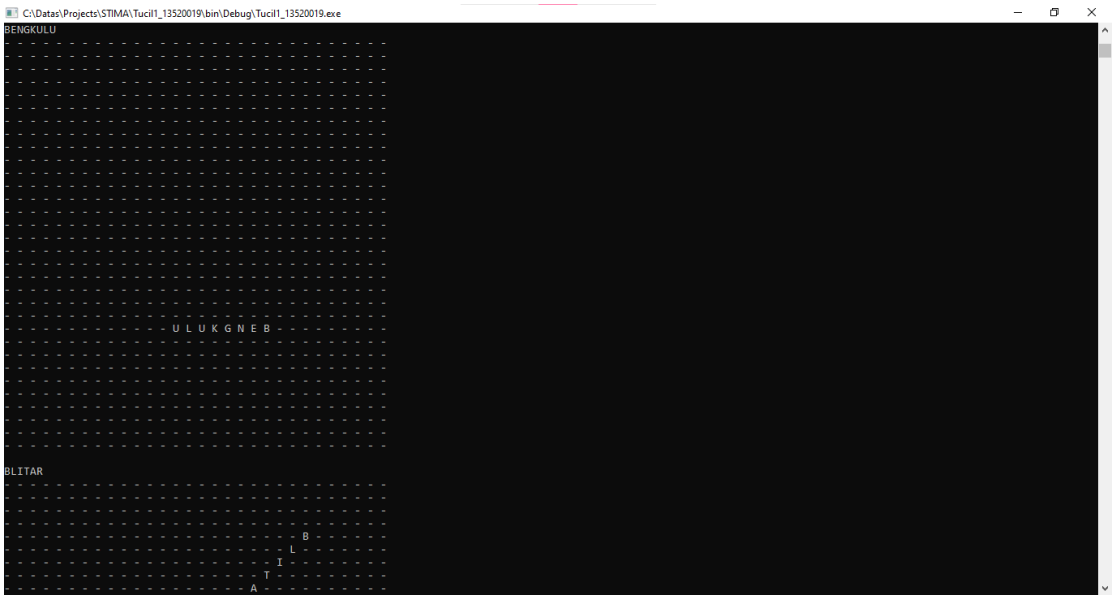
BANYUWANGI
BENGKULU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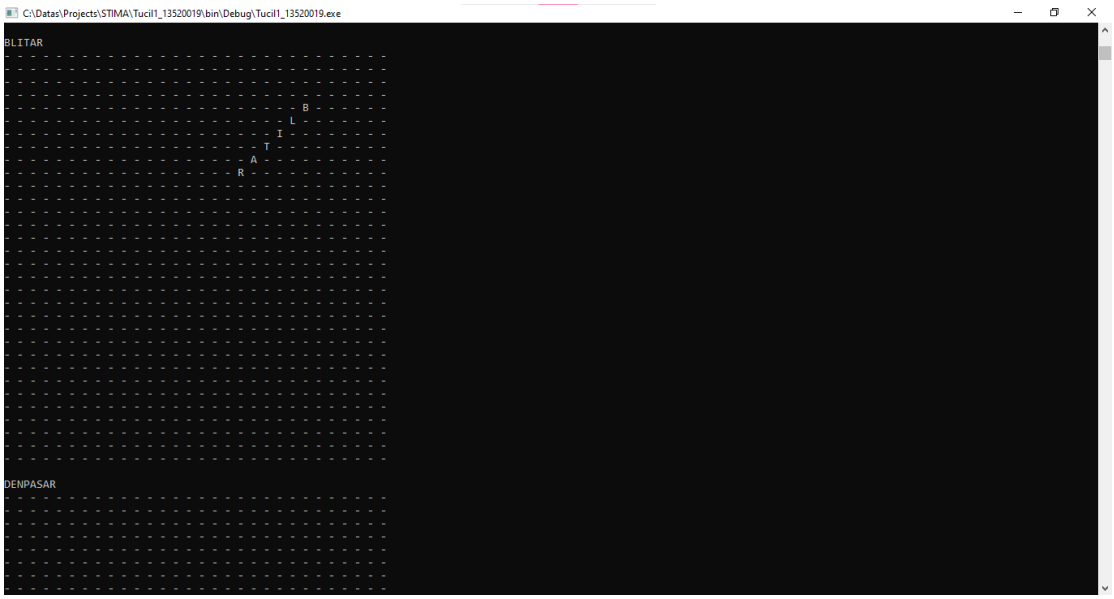
BENGKULU
BLITAR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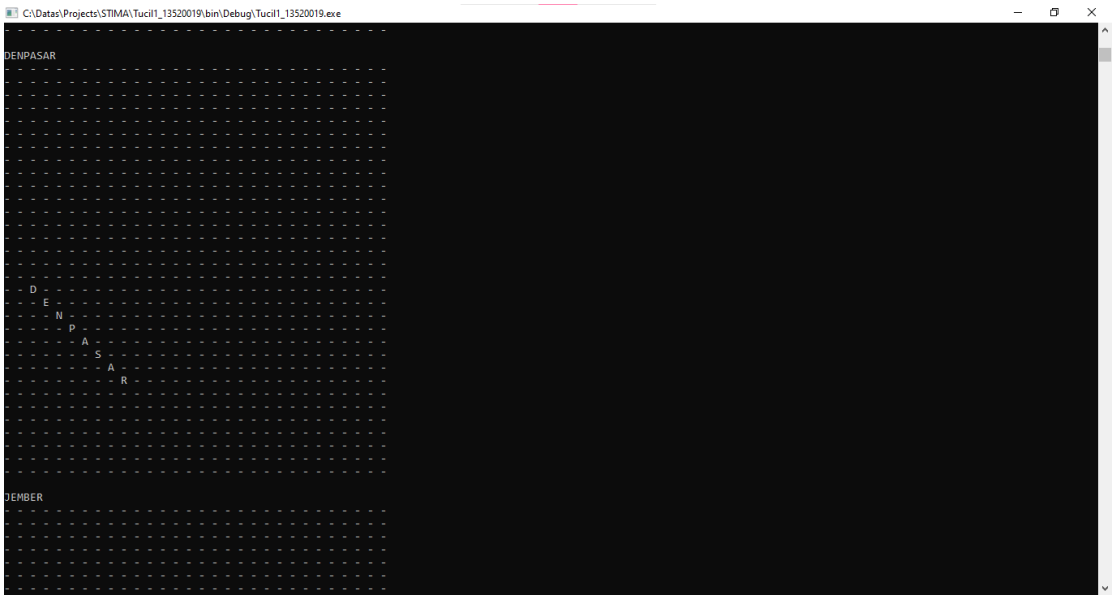
BLITAR
DENPASAR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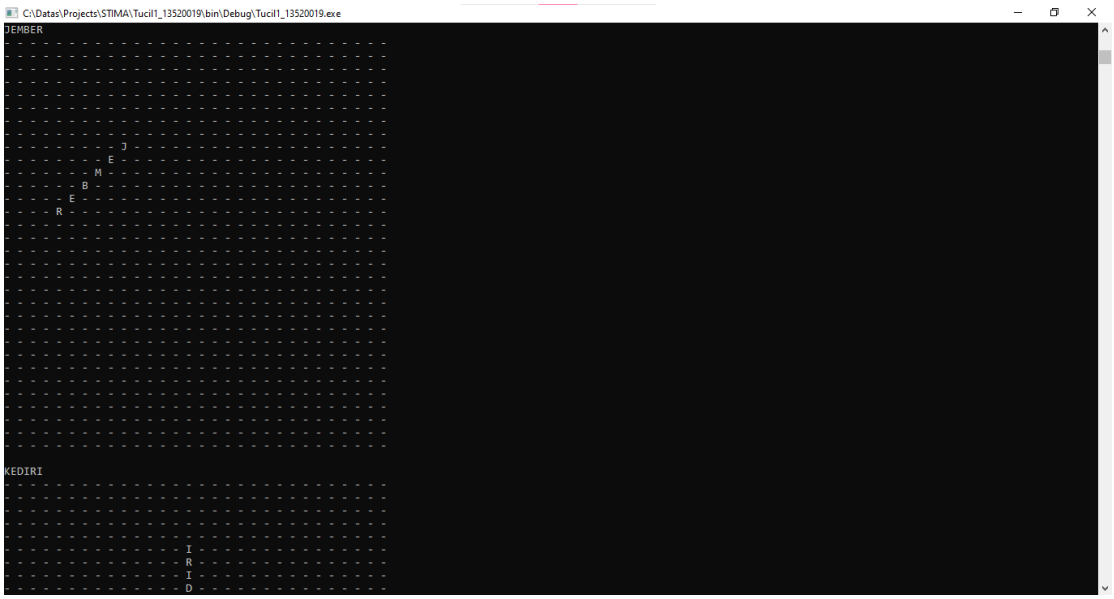
DENPASAR
JEMBER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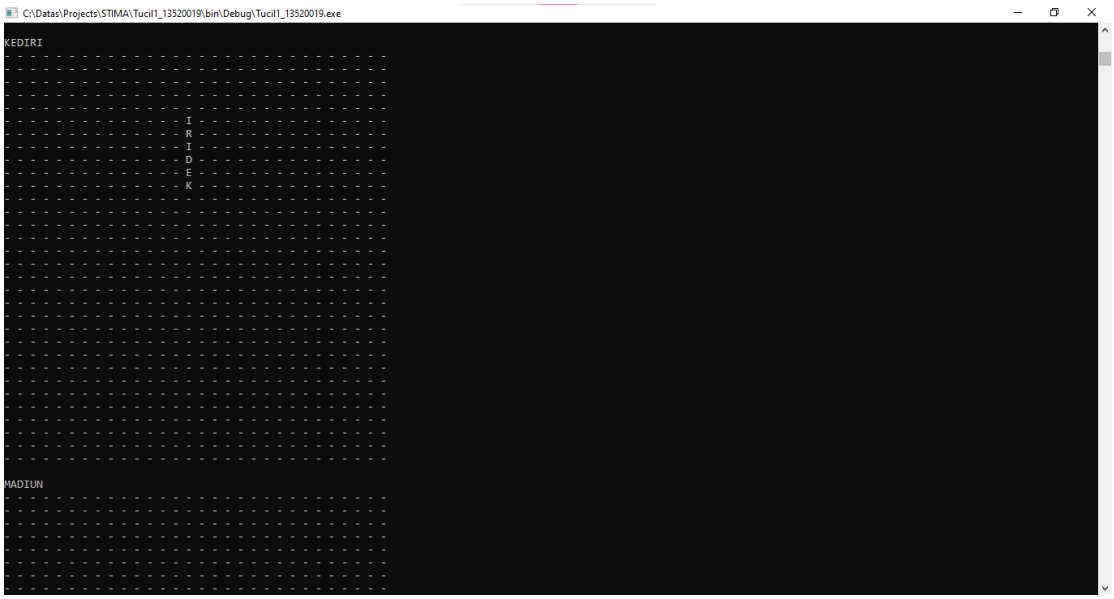
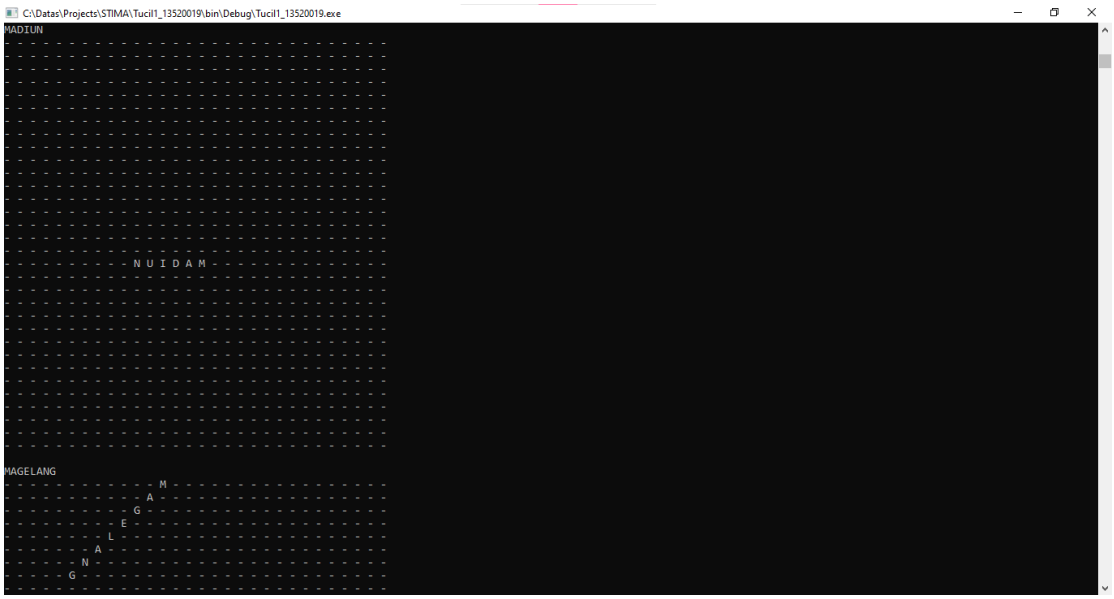
JEMBER
KEDIRI


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
KEDIRI
I
R
I
D
E
K
MADIUN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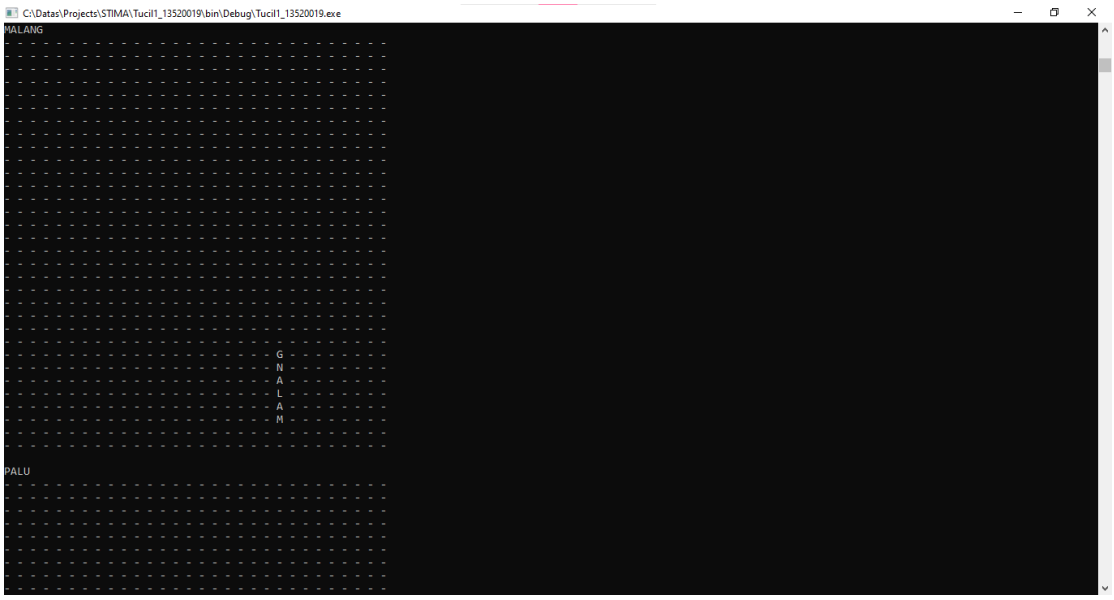
G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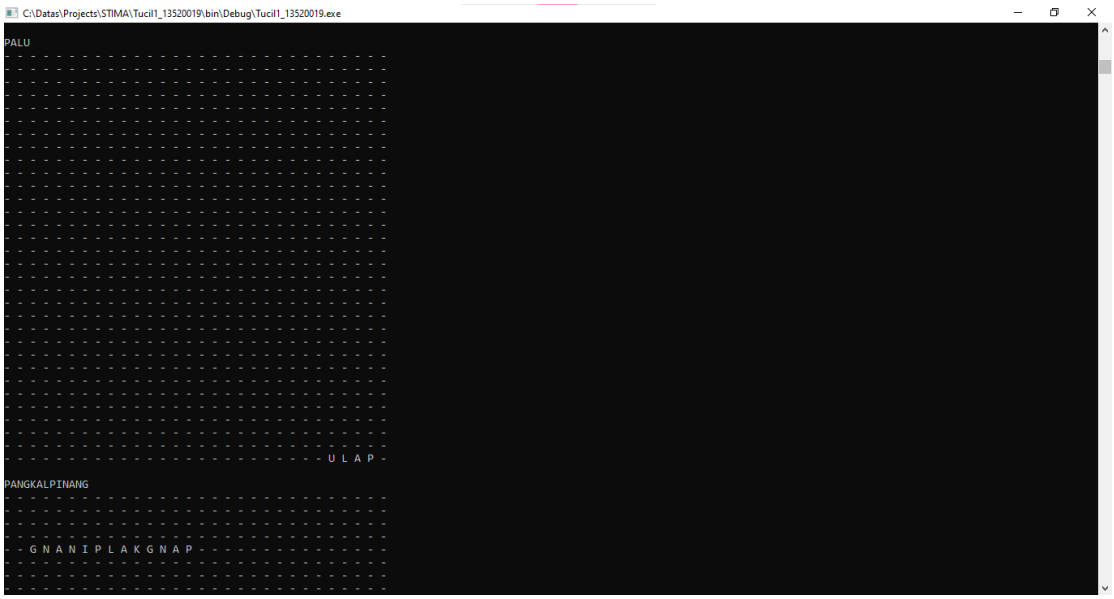
PALU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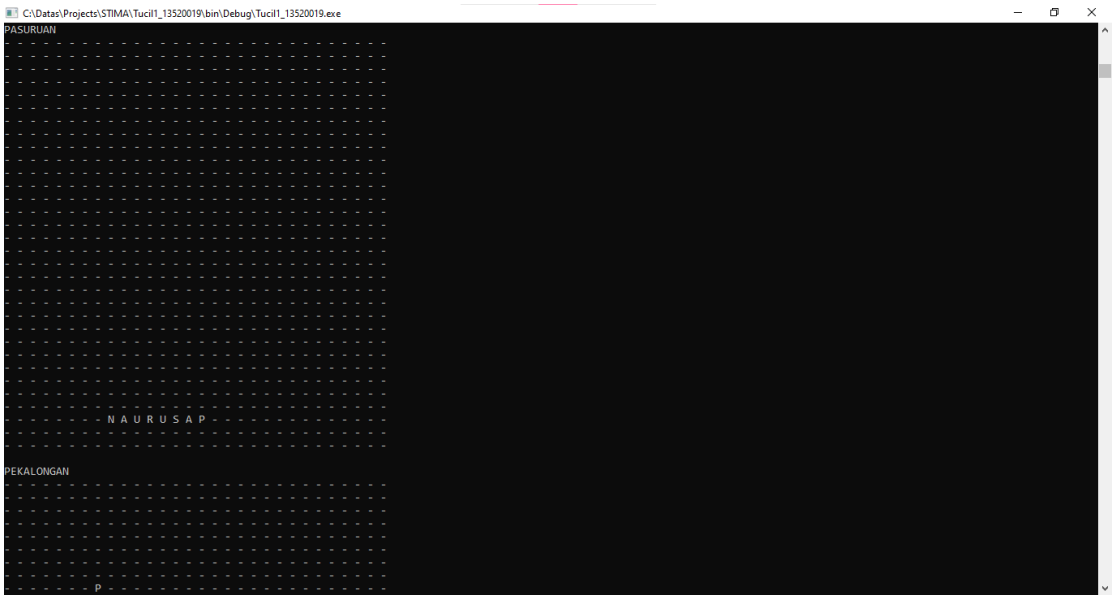
PANGKALPINANG
G N A N I P L A K G N A P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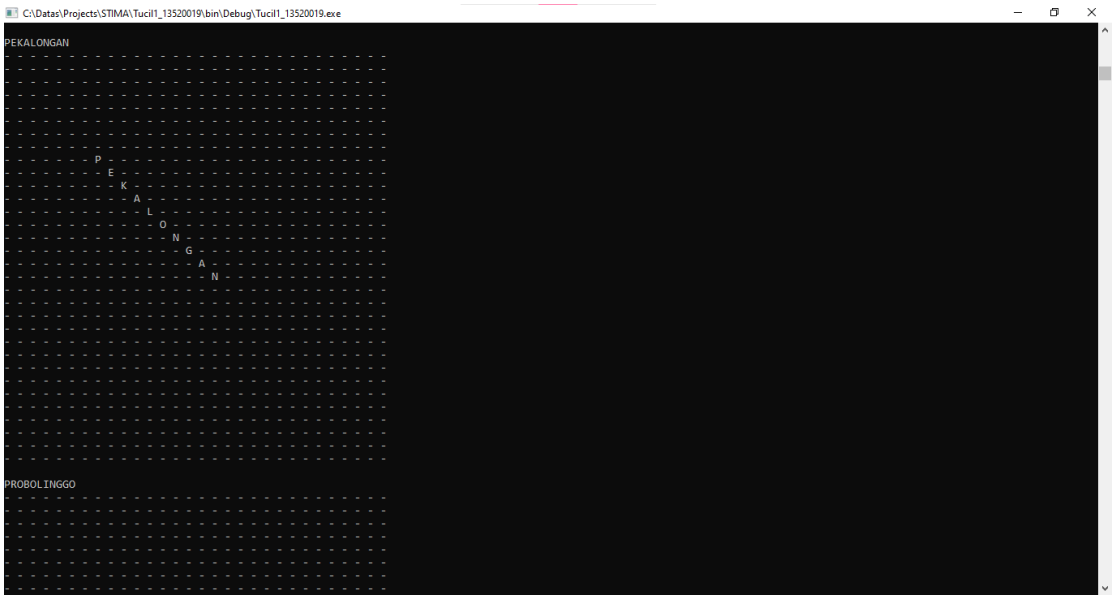
P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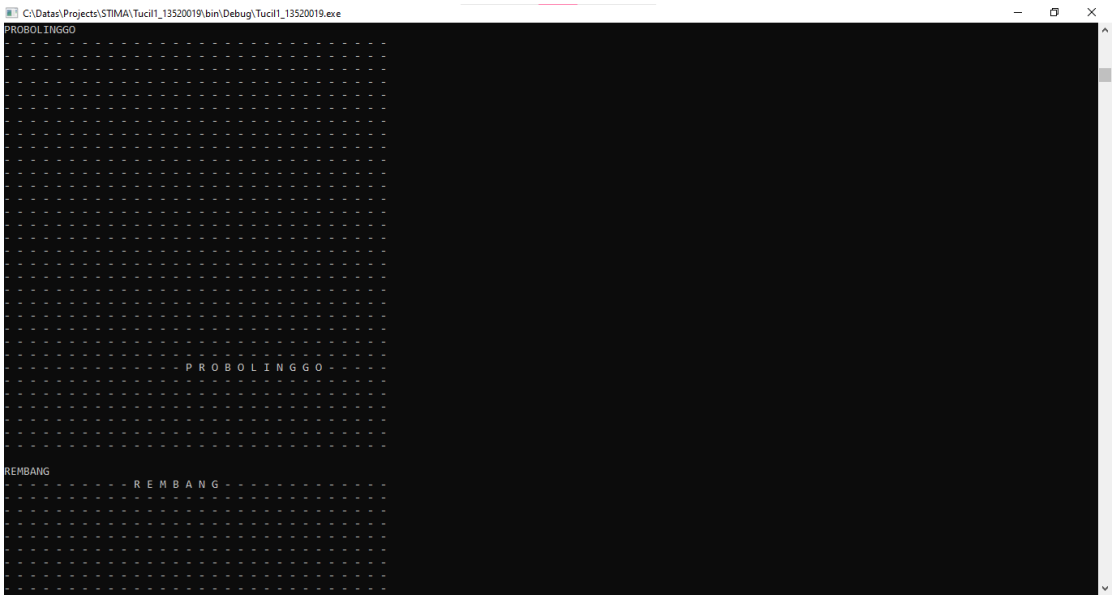
PROBOLINGGO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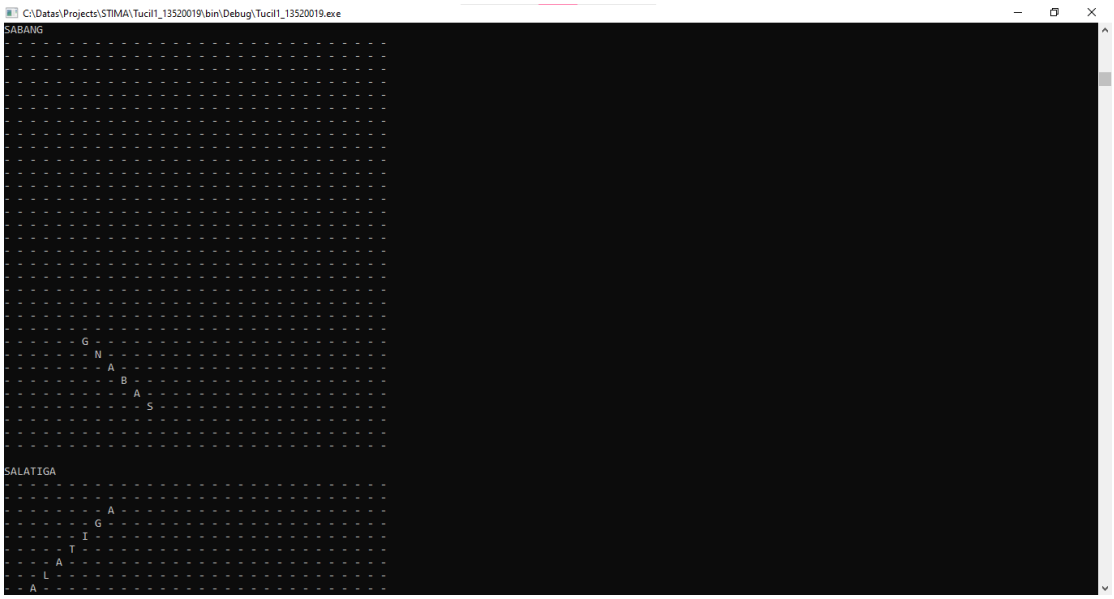
P R O B O L I N G G O
REMBANG
R E M B A N G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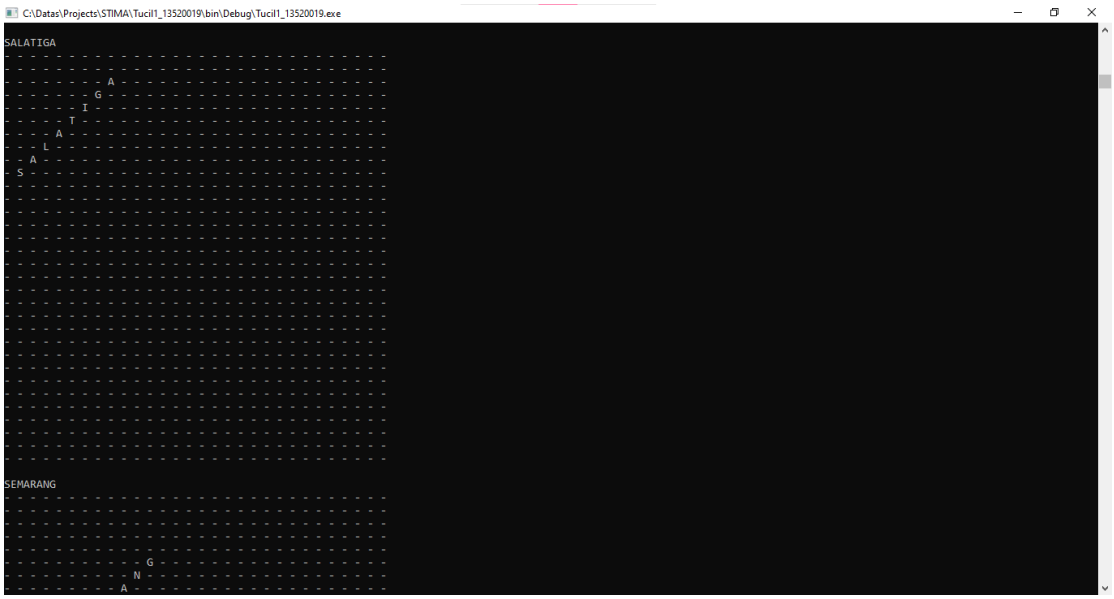
SALATIGA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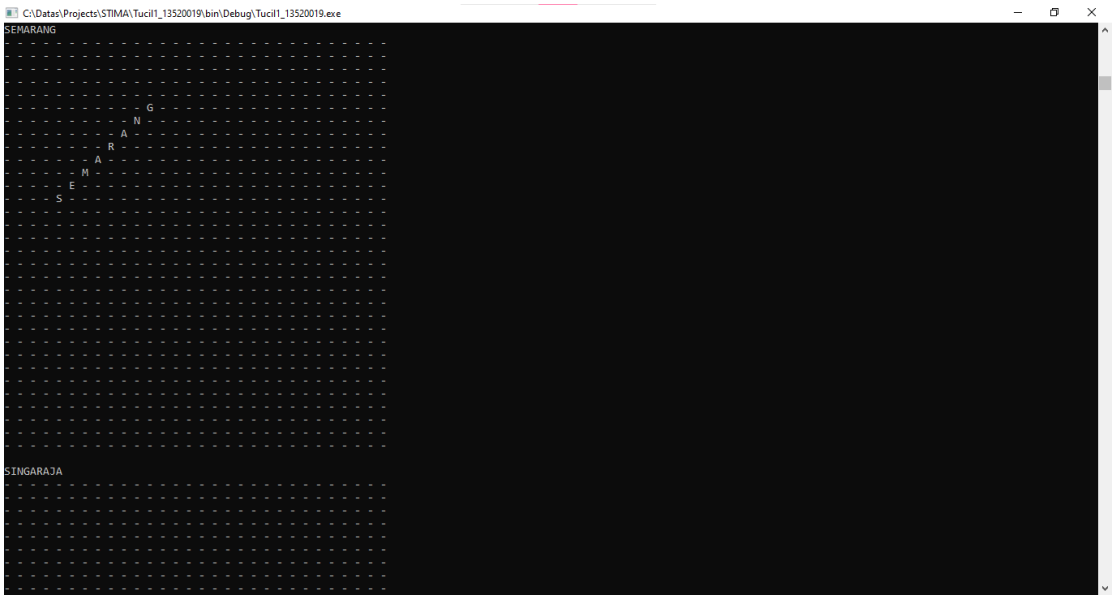
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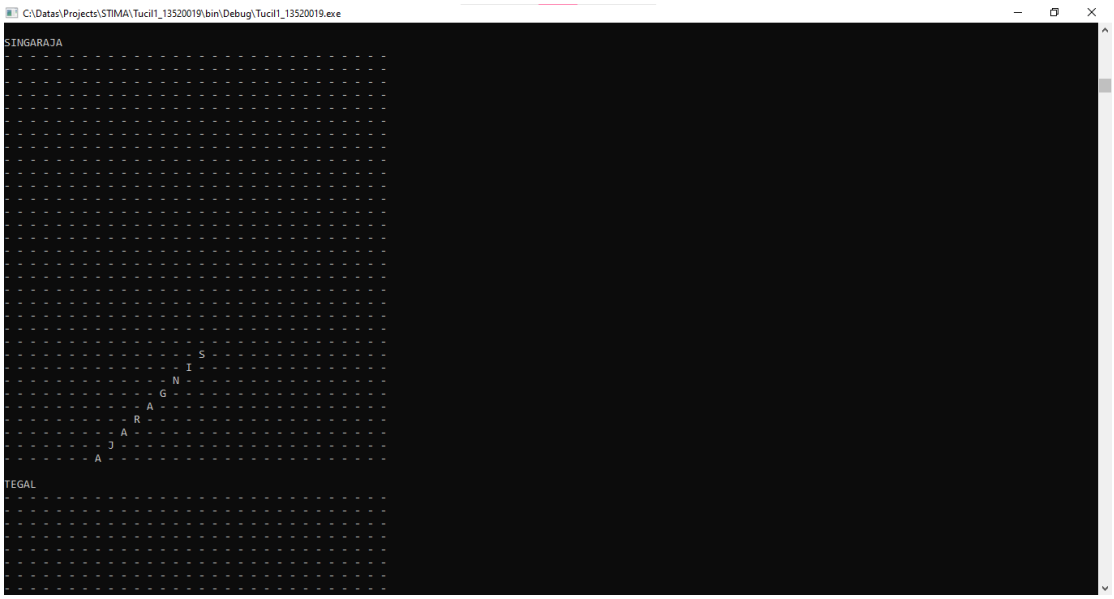
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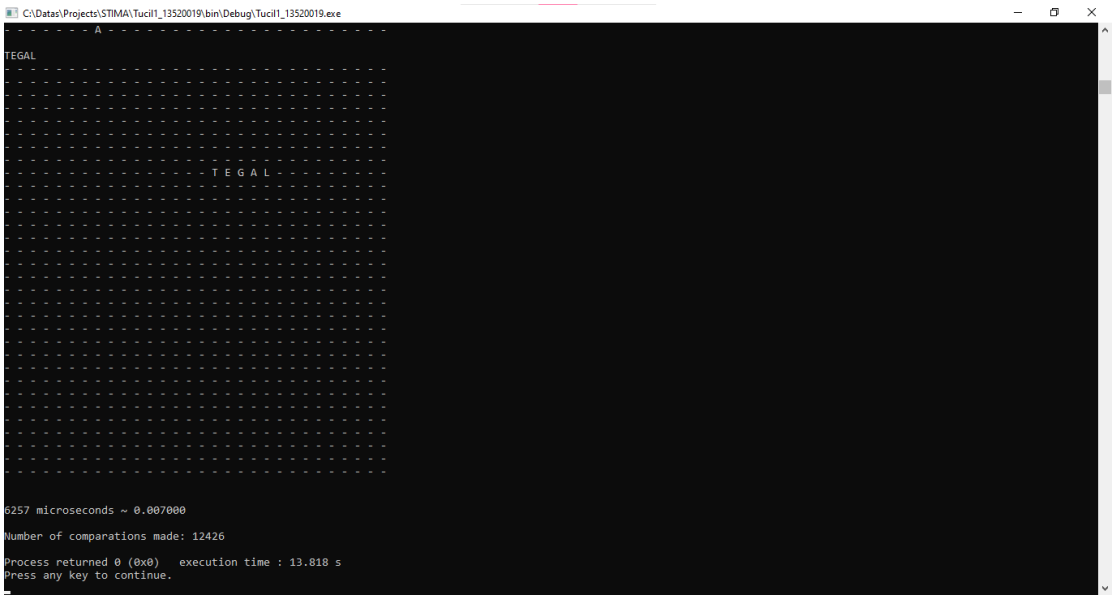
SINGARAJA
TEGAL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TEGAL
6257 microseconds ~ 0.007000
Number of comparations made: 12426
Process returned 0 (0x0) execution time : 13.818 s
Press any key to continue.

K. Eksperimen 11 (Word puzzle berukuran 34 x 34)

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

AMBON
BALIKPAPAN
BANDAR
BANDUNG
BANJARMASIN
BELAWAN
JAKARTA
JAMBI
JAYAPURA
KENDARI
KUPANG
LAMPUNG
MAKASSAR
MANADO
MEDAN
PALANGKARAYA
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PEKANBARU
PEMATANGSIANTAR
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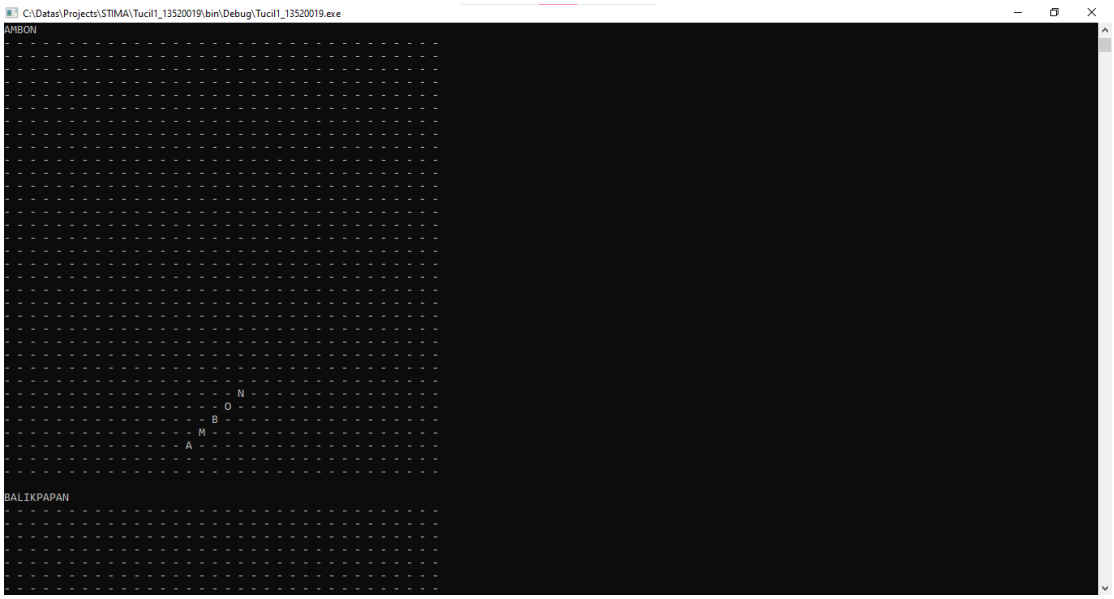
TUBAN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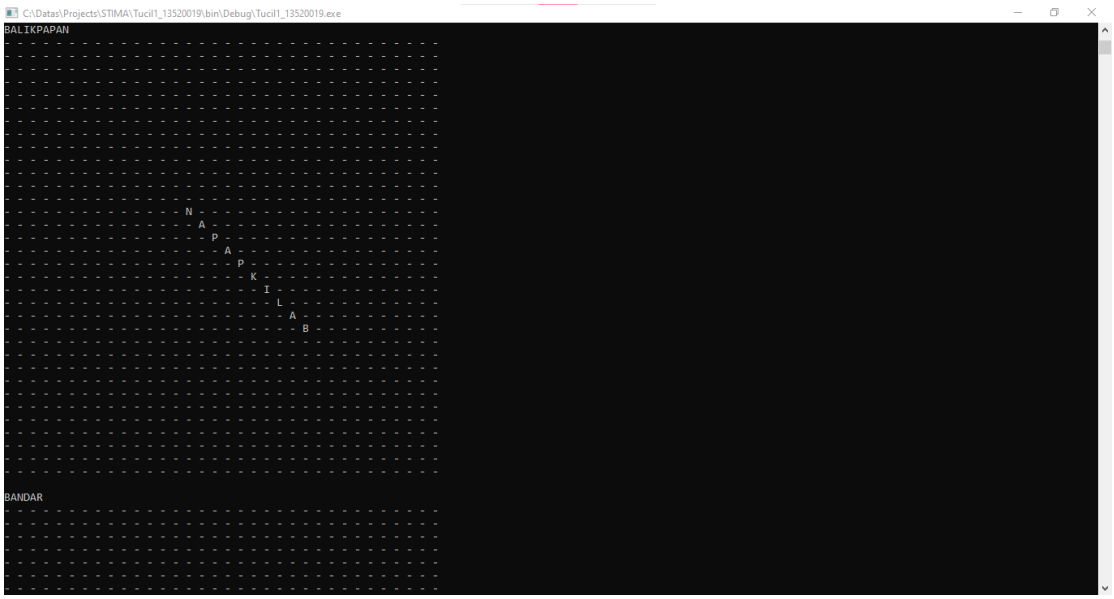
BALIKPAPAN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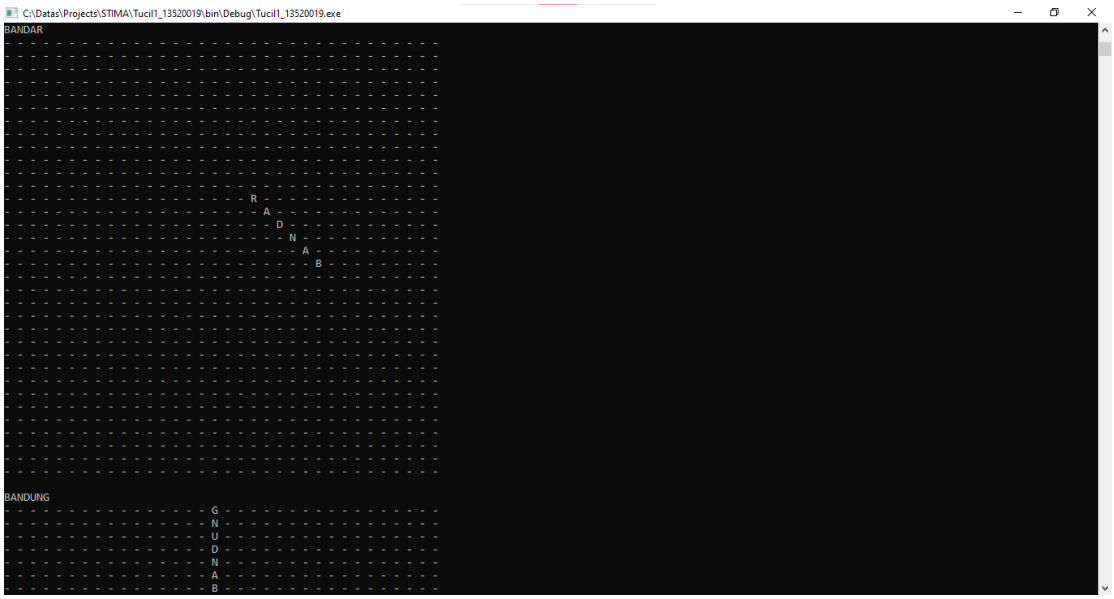
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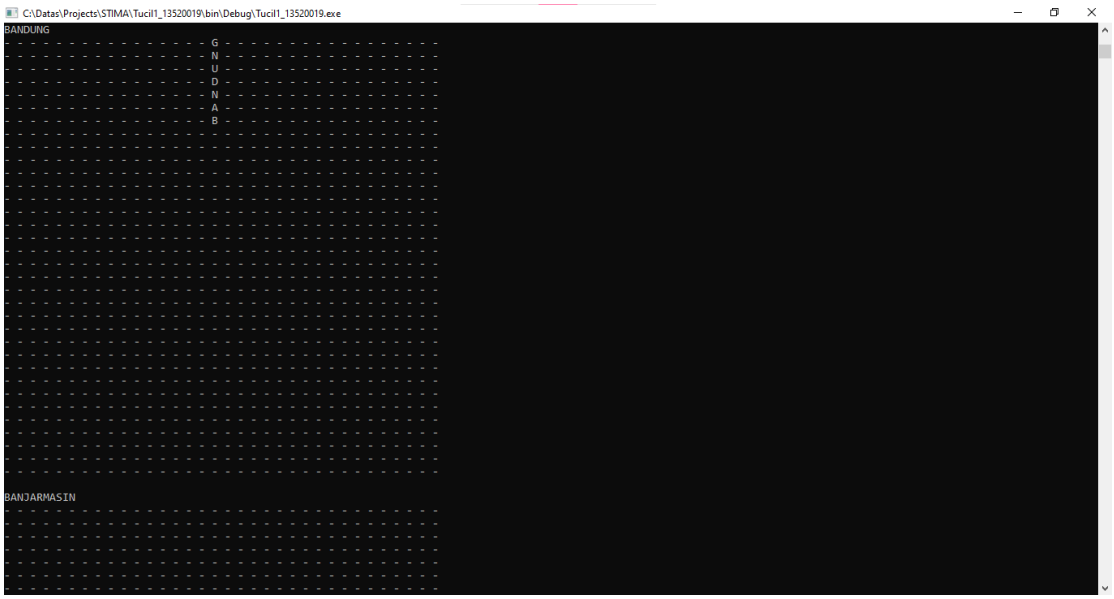
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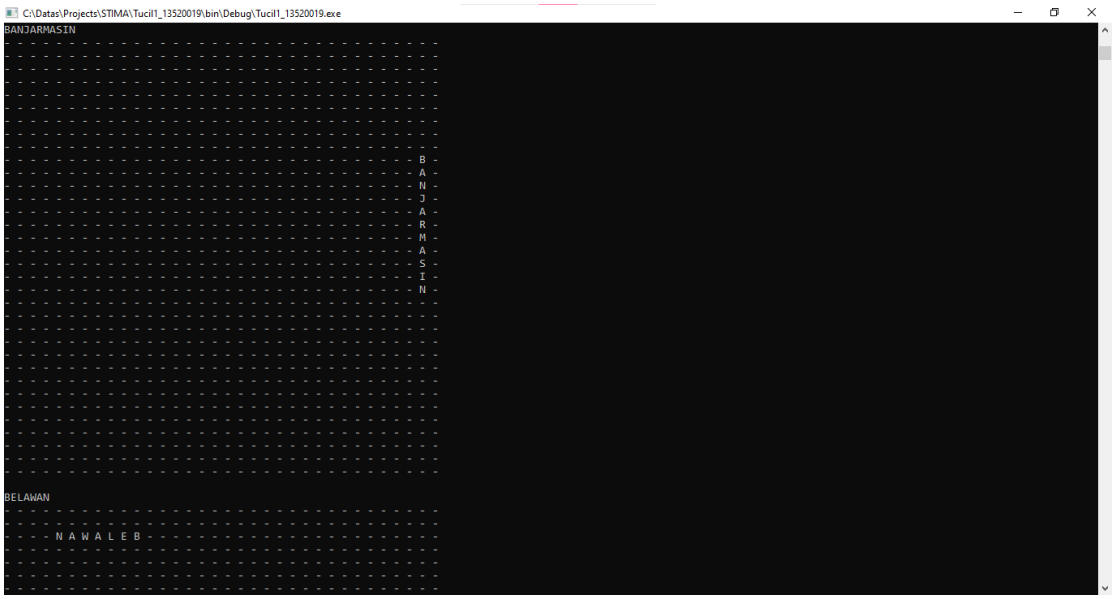
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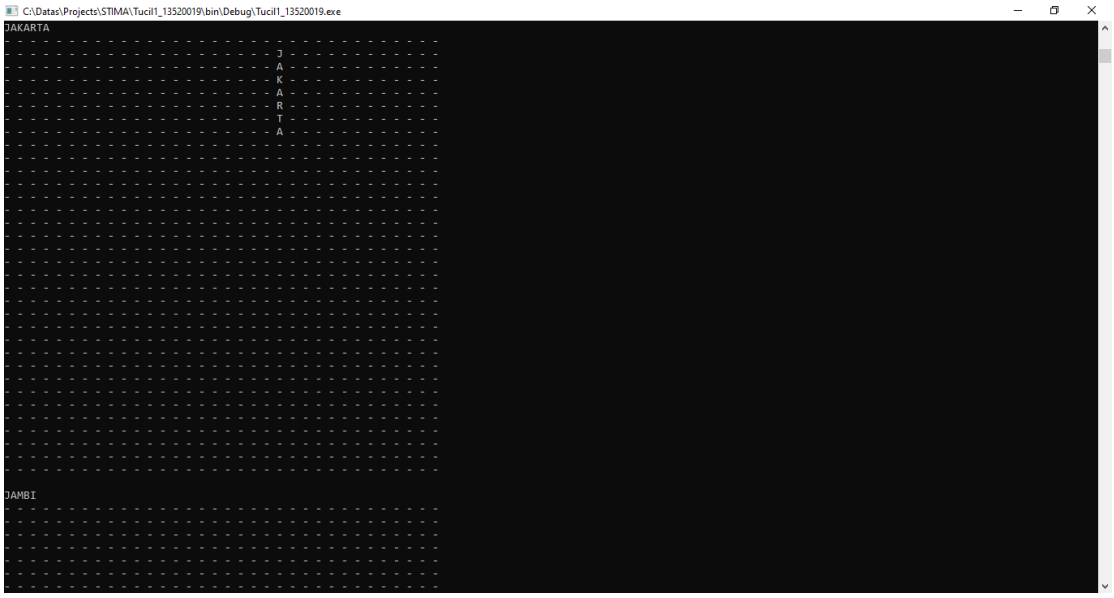
N A W A L E B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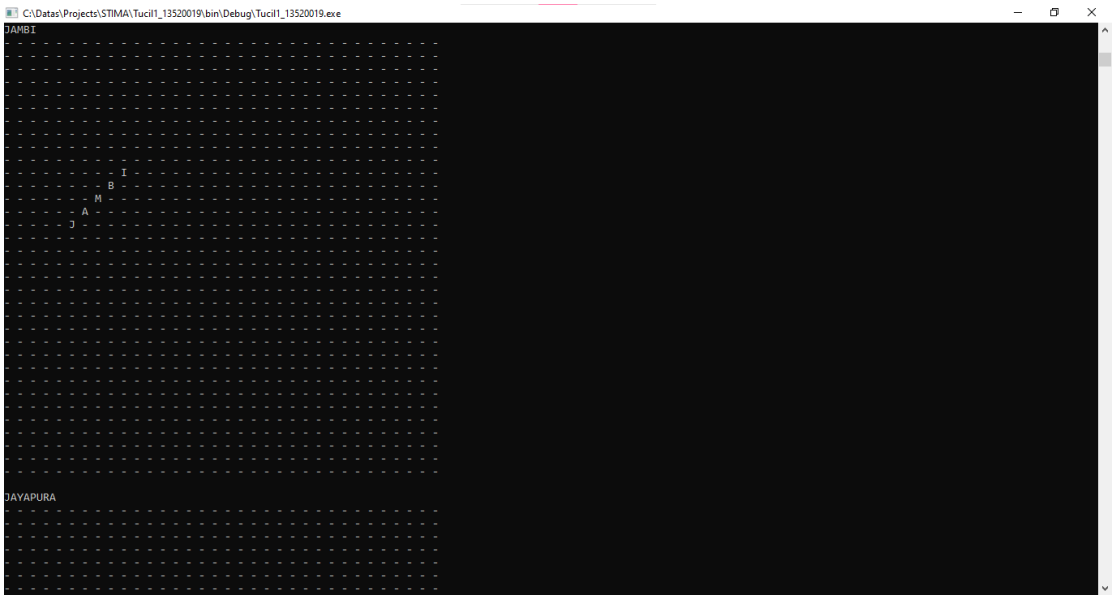
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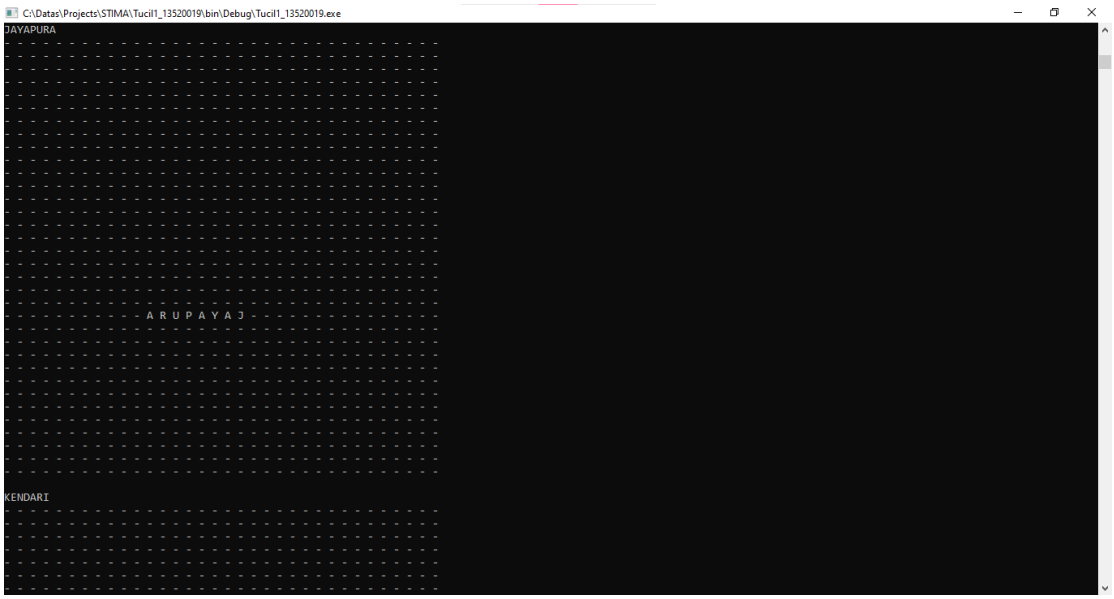
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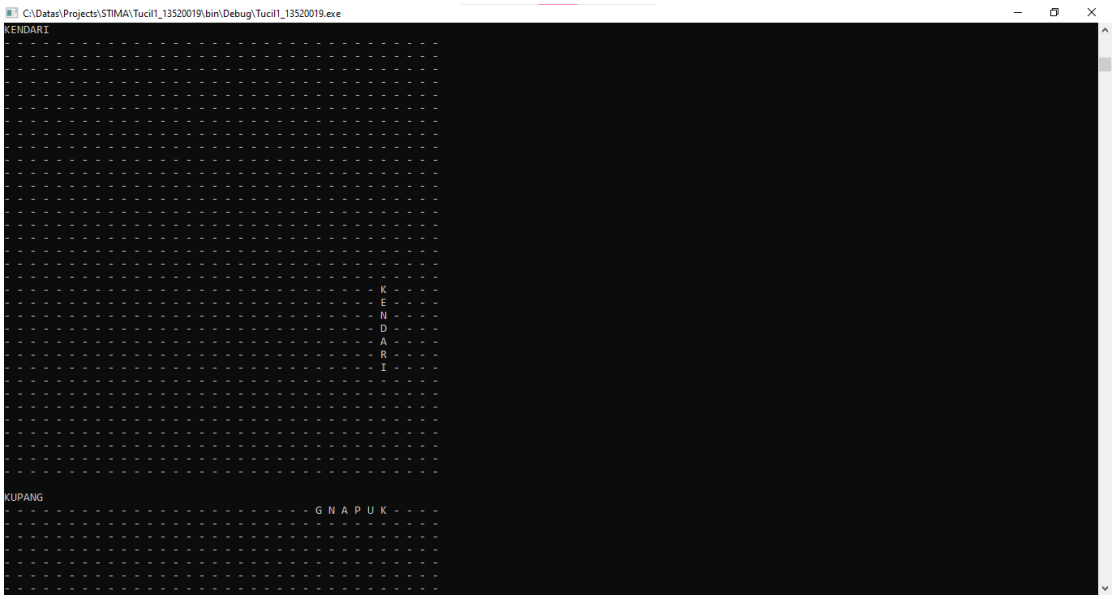
A R U P A Y A J
KENDARI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K
E
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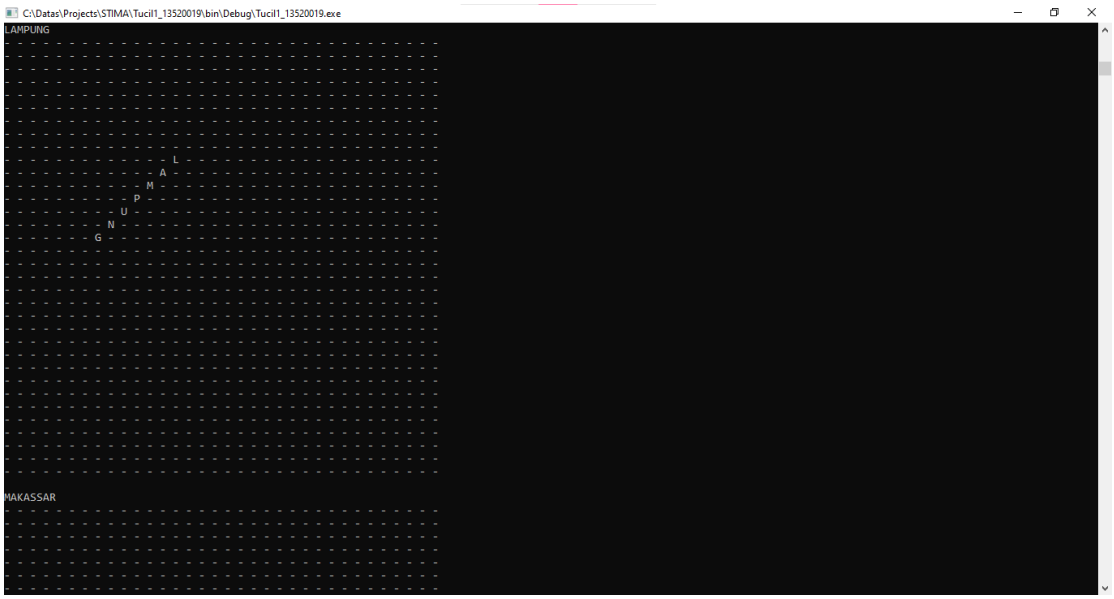
R
I
KUPANG
G N A P U K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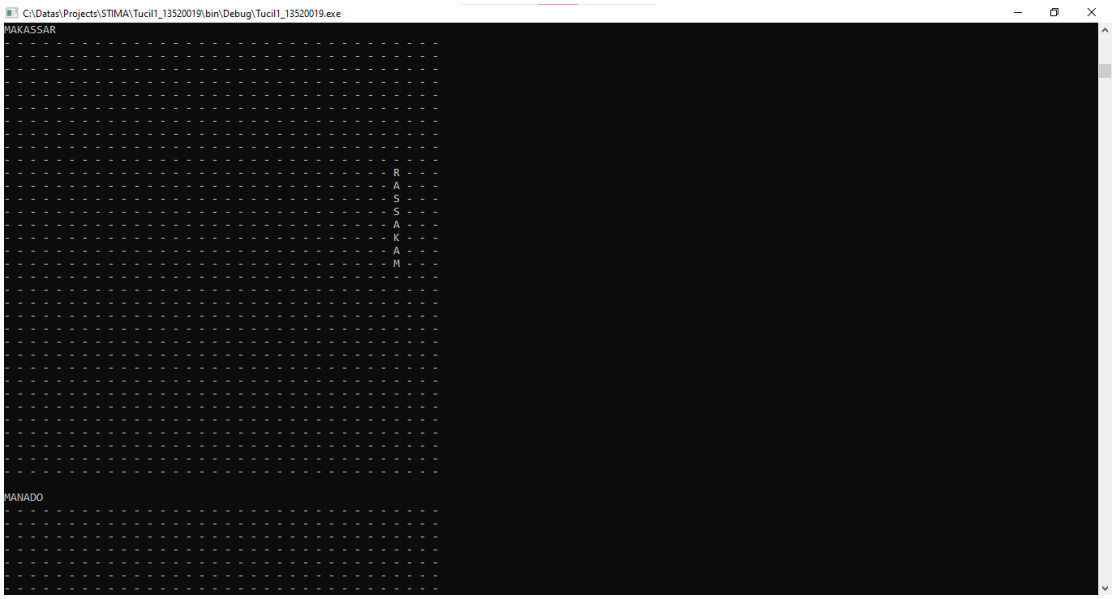
MAKASSAR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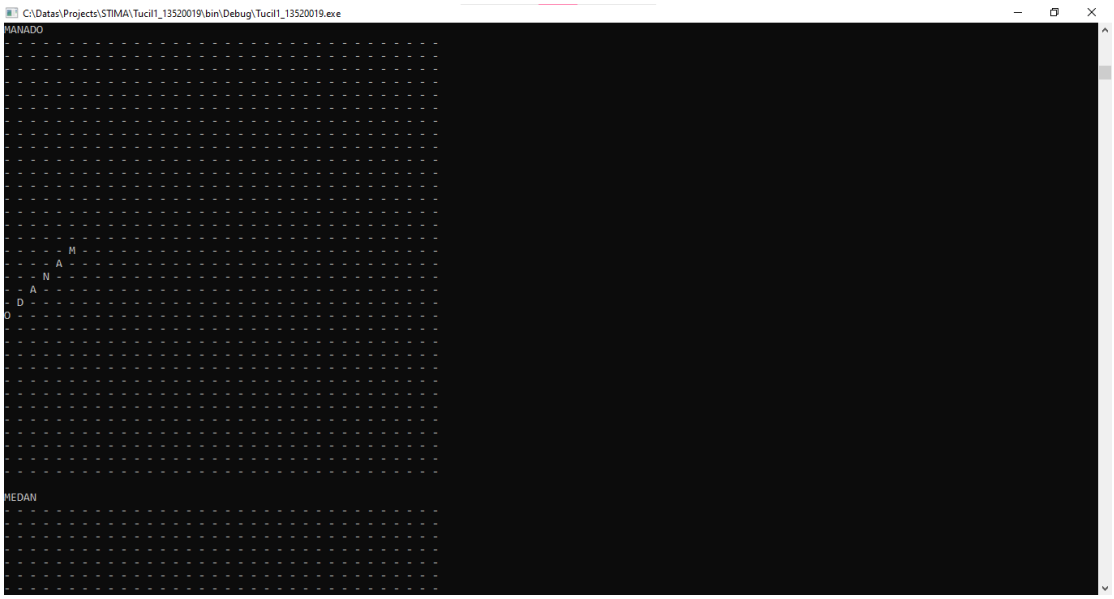
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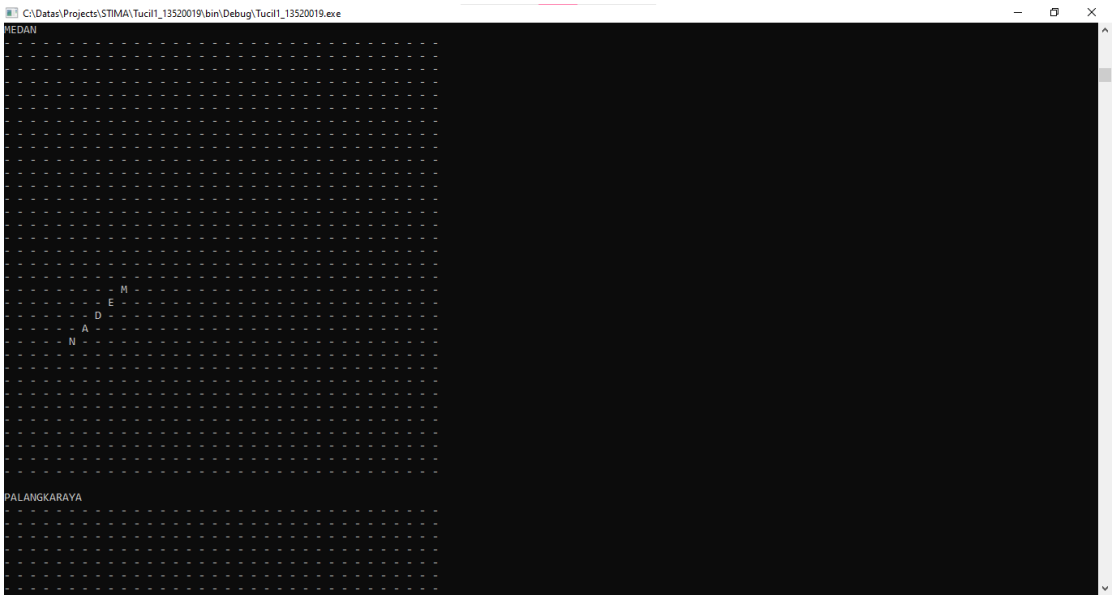
MANADO
MEDAN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M
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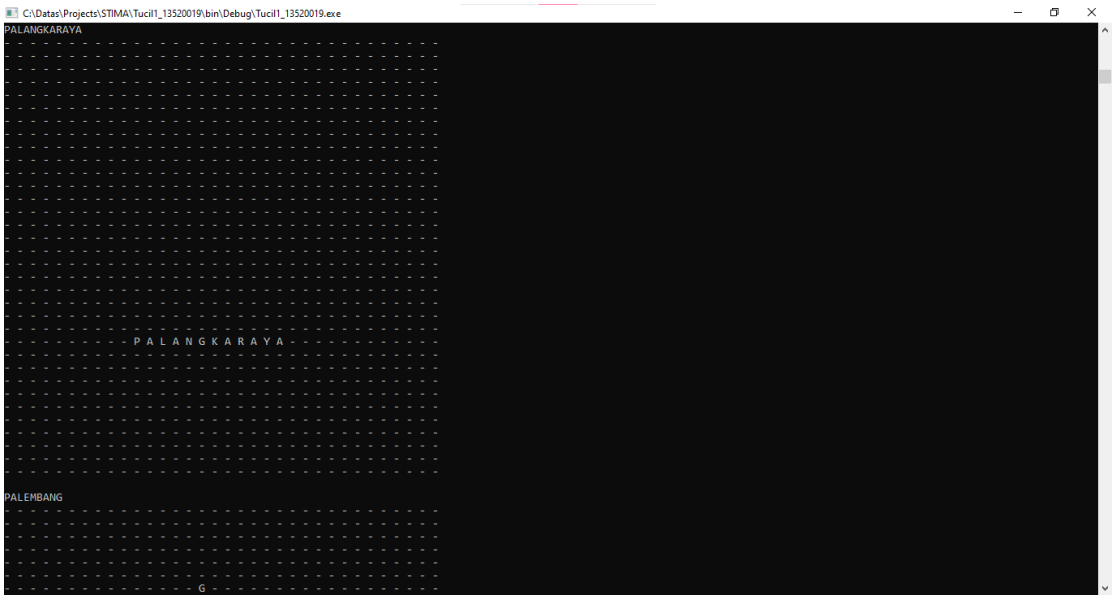
D
A
N
PALANGKARAYA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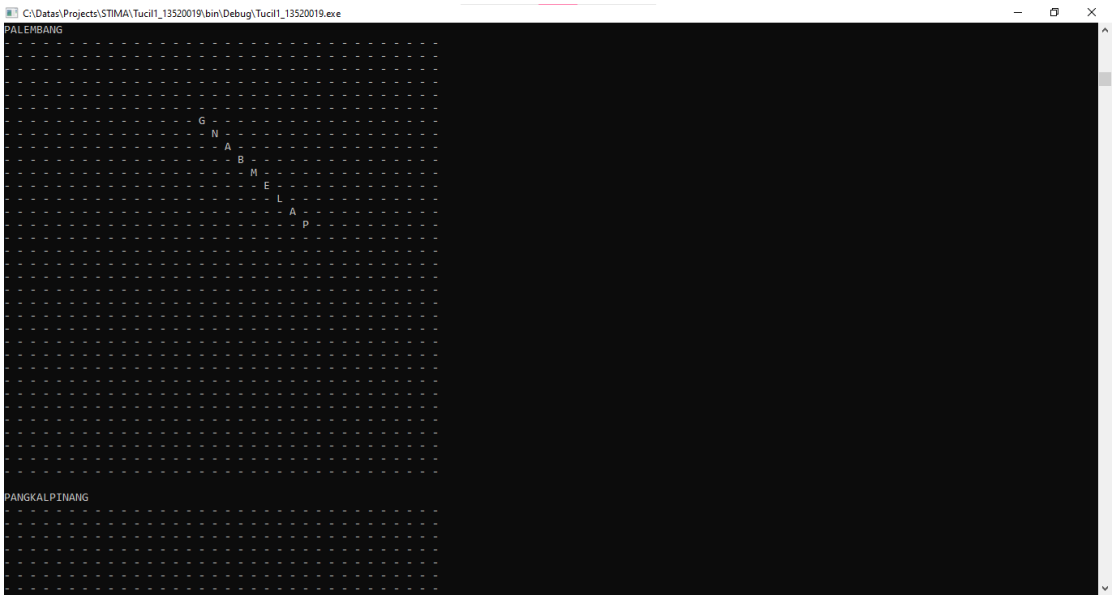
PALANGKARAYA
P A L A N G K A R A Y A
PALEMBANG
G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M
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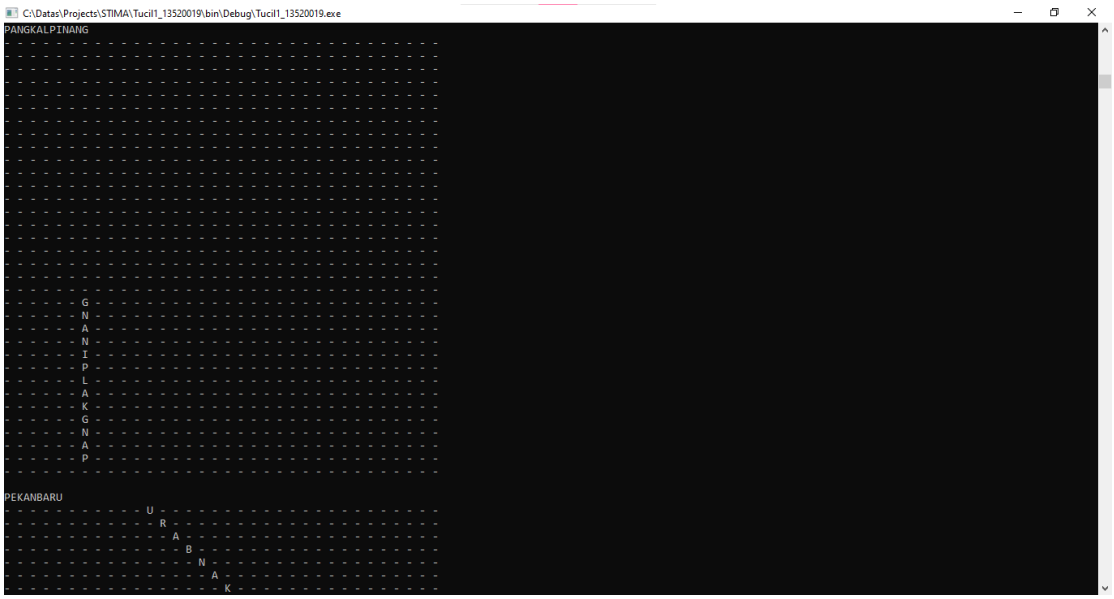
L
A
P
PANGKALPINANG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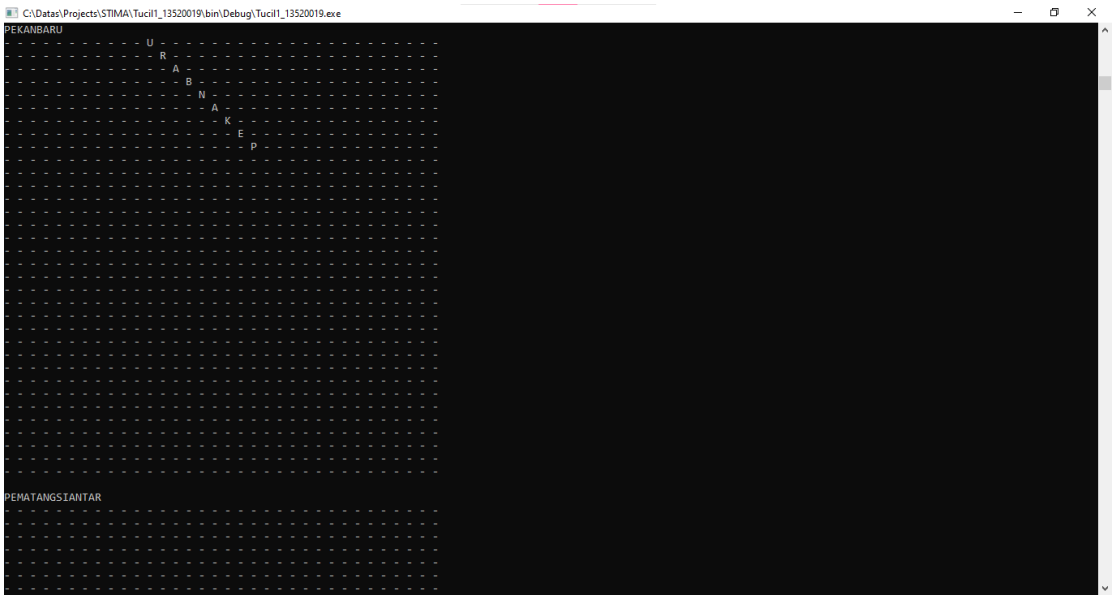
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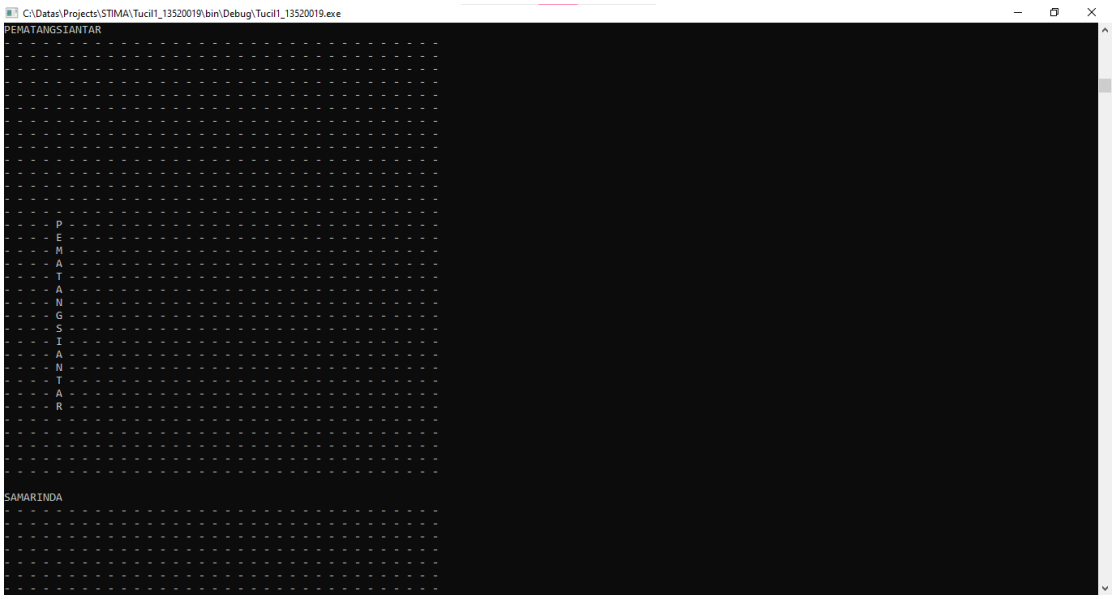
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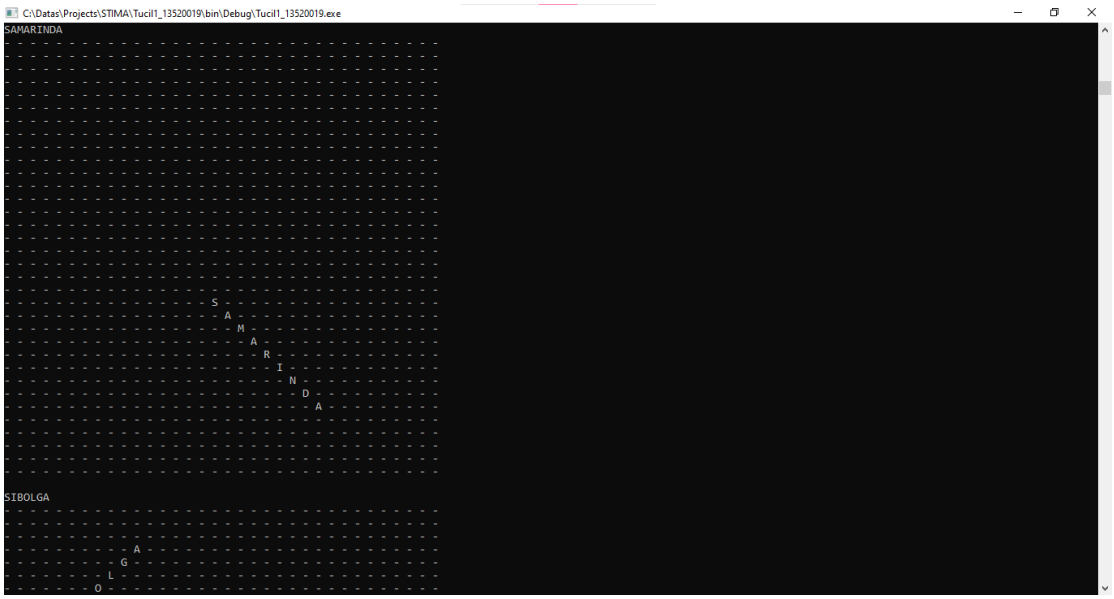
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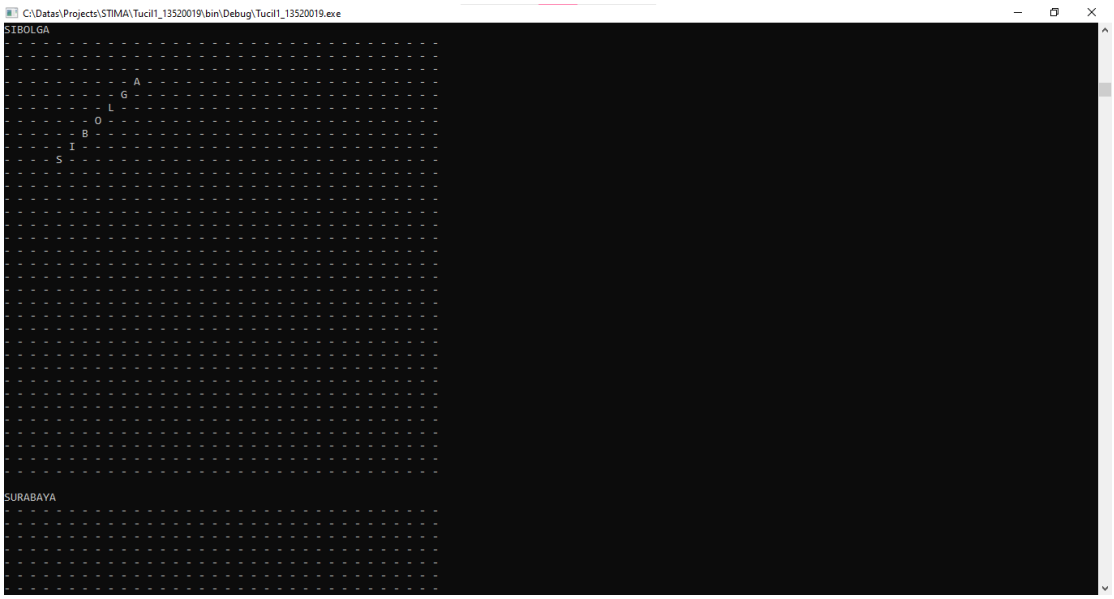
SAMARINDA
SIBOLGA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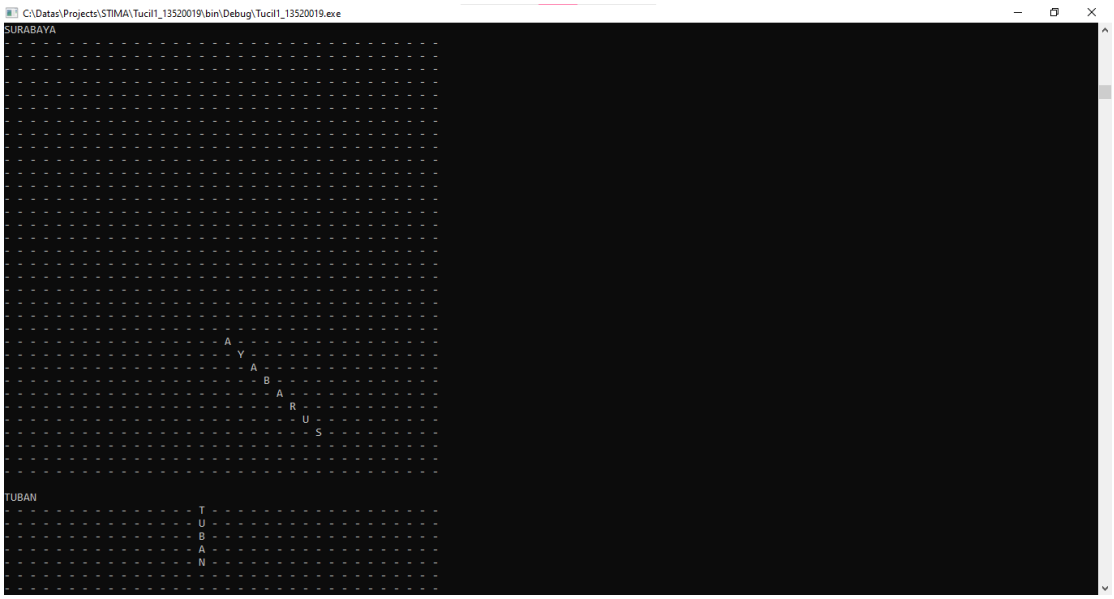
SIBOLGA
SURABAYA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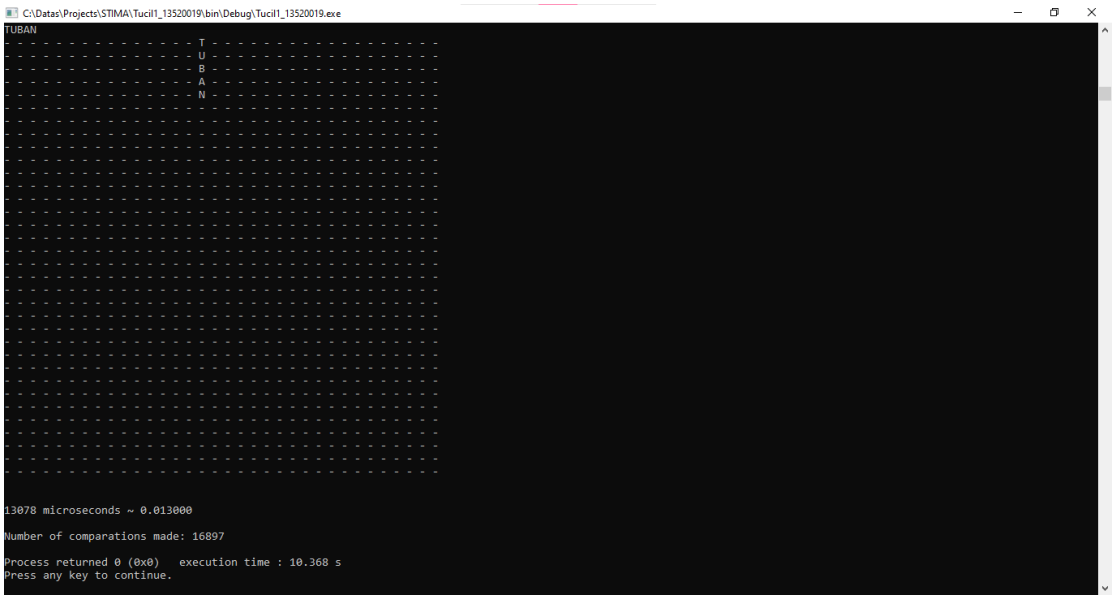
SURABAYA
TUBAN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TUBAN
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Number of comparations made: 16897
Process returned 0 (0x0)   execution time : 10.368 s
Press any key to continue.

L. Eksperimen 12 (Word puzzle berukuran 36 x 34)

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T W Z X I M E G E O J A G K O B B R T K G M J T Z L G Q Q E X N Z W K Q  AARDVARK
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Q Z H N P Y J J O W L G I D Y N N N M A C S V H E R O N F A A E O A V A  BAT
V D P G F P D T G N Y D G K X E G I R V Y A V Z O J I G W P H X W F K P  BLUE
A F A P P E M N J E B R J A Z A V X R K W I N E K O N J E D G S M Z B A  BONOBO
Y M S T Y N D N O A L F L G U O B O N O B B U E O R E V J N J U K E Q Q  CANARY
O B Q W K G M D G O R Q X N F Y J B D I L Z W W E O A T S A C O F Z K W  CHEETAH
D Q S Q D U D Q W K L G T C D L D H S D R K C J L T Z V C Y A F Y U V G  CRANE
L H M U N I P V L N D R V O T Y R O J A C K A L G R W F D O A I E Y Z B  CROW
K L K F I N Z B P N K U L A Z T E U Q K A W I X B B C S K R K A N N D N  DOVE
V I W B D T H T V F P C D J S F X C N V G Q Q O G C K I I F A T F A O N  DUCK
U D W D E H Y X M U J S R B T Z S L Z P V T C C P R P G A E W A E C V U  EAGLE
D T G I Z H J D D N W C Y O P H Z R C Y S Y D H T B S L Y E G O T U B J  EGRET
S Y G U H I N E O A S F Z C W P F K B W P H F M Q U C S L U K R Y O C Z  EMU
D V B U W V O F L X Q N K P A T P J C E U L P C E O W G B C H E E T A H  FALCON
H W W E T J D L I S S V S F L X N Z M R E Y R O N D A U W H K P N T I B  GIRAFFE
D I O T F P O V C G Y O R G W O E U H Y Q C J D V E G D T E Q I X C N S  GOOSE
R E Y J A W C X P O Z D X X O W B H A W K V O H K F Z K F J R S C E C F  GULL
E J Y Y K B J N I D W O A Y A A S P O L K S E I Q L T J C Y I T O C P L  HARTEBEEST
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F A L Y R A N A C B A W A O W U Q L O N D O N F I X C K R Z D T S P N P  HEDGEHOG
V L Y B V K P O N I U M O I F Z J U V A V X N G B P T O C N I S E T H M  HERON
P F F C J V Z A A T C N C F R M W A A S R H L T F T T Q W G O O S E C W  HYRAX
Q I P Z F K R O C E P R I H O R B Q O A K V T S I I Y N I C D E Y R T L  IBIS
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W D A Y K U A B P W A P D O E Y V W E V V I V Q U T E T B R H D X L D R  KINGFISHER
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R A J T B Z O S W R K U G L K P H B H U F L C C H C X S J R U M H G I E  LION
S X C W B W T E L O I R O Y X C Y I M X A A Q S O W Z L Q M K A C D P L  LOON
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                                                                      MANDRILL
                                                                      ORIOLE
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                                                                      PELICAN
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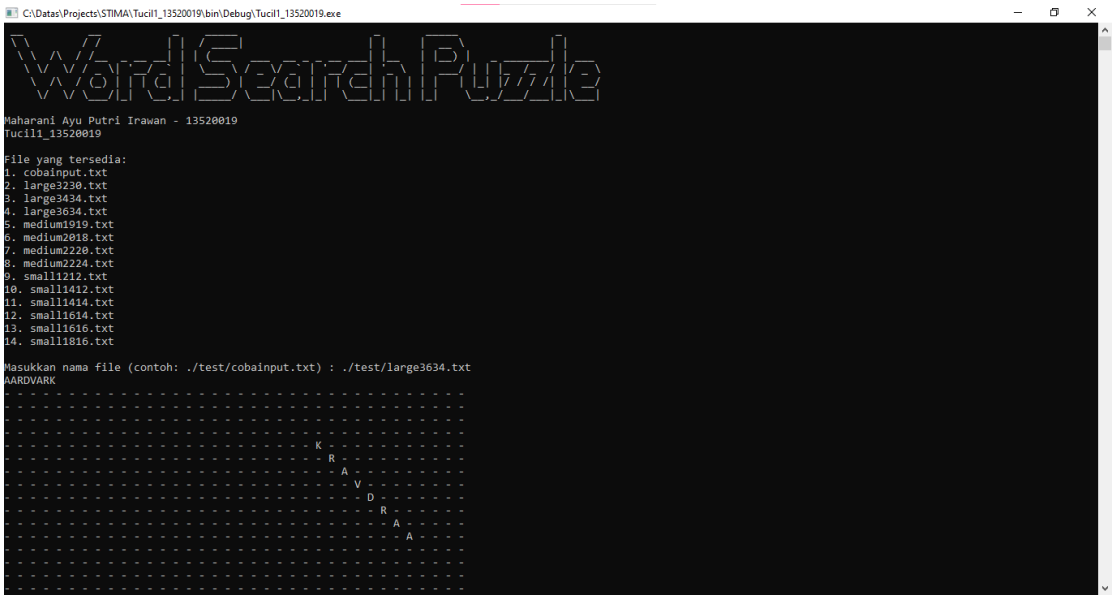

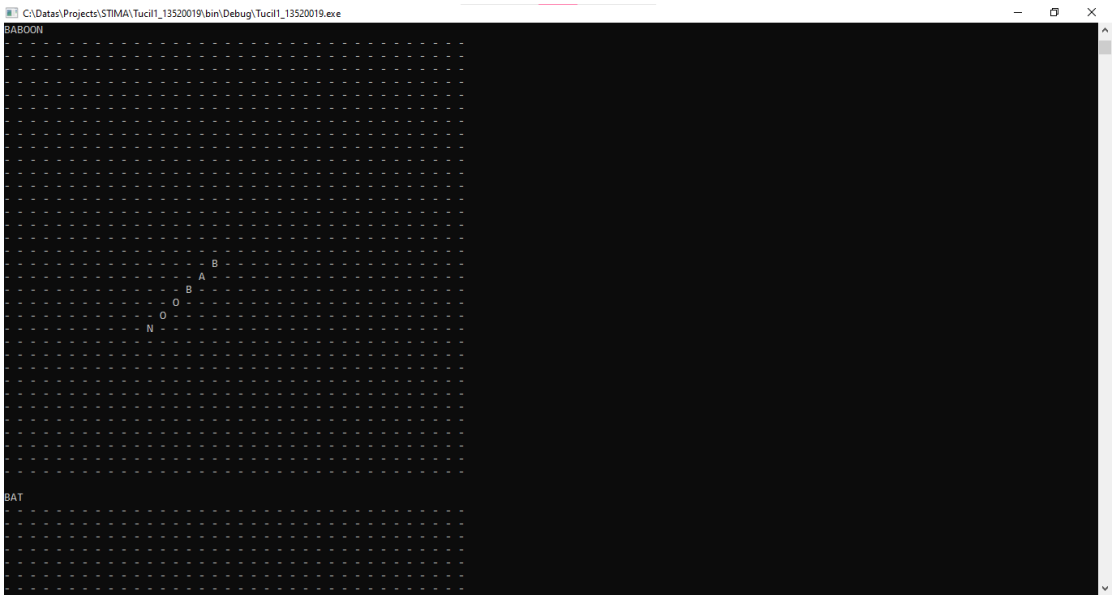
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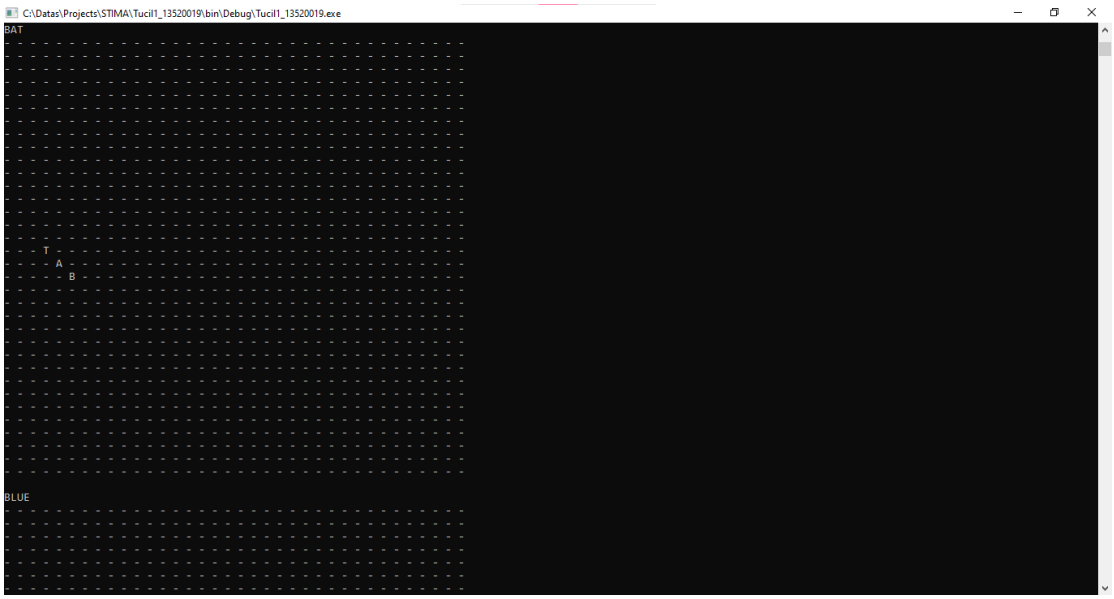
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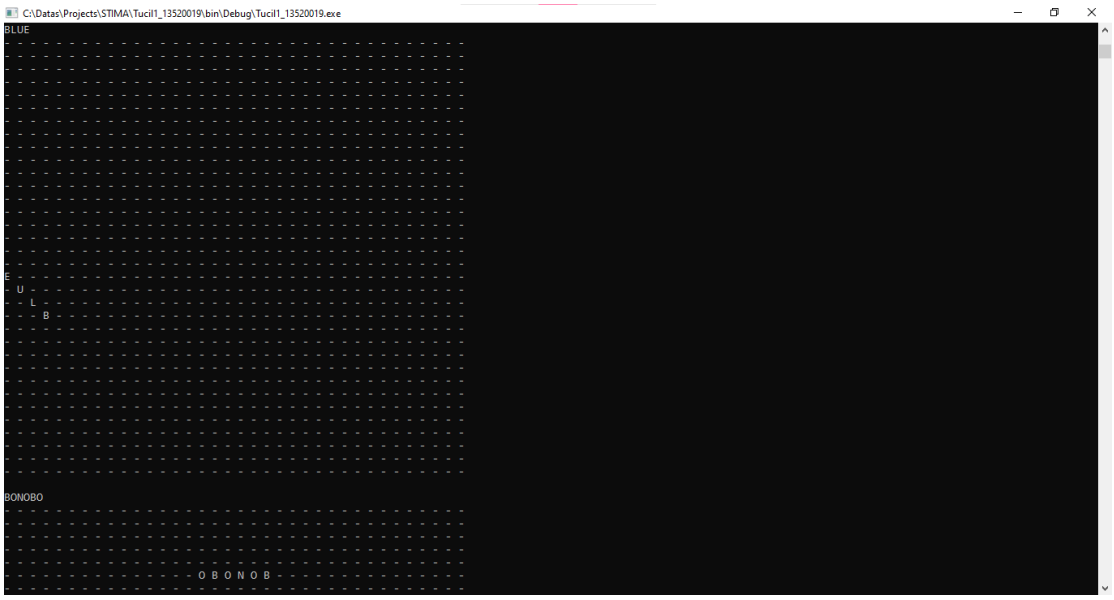
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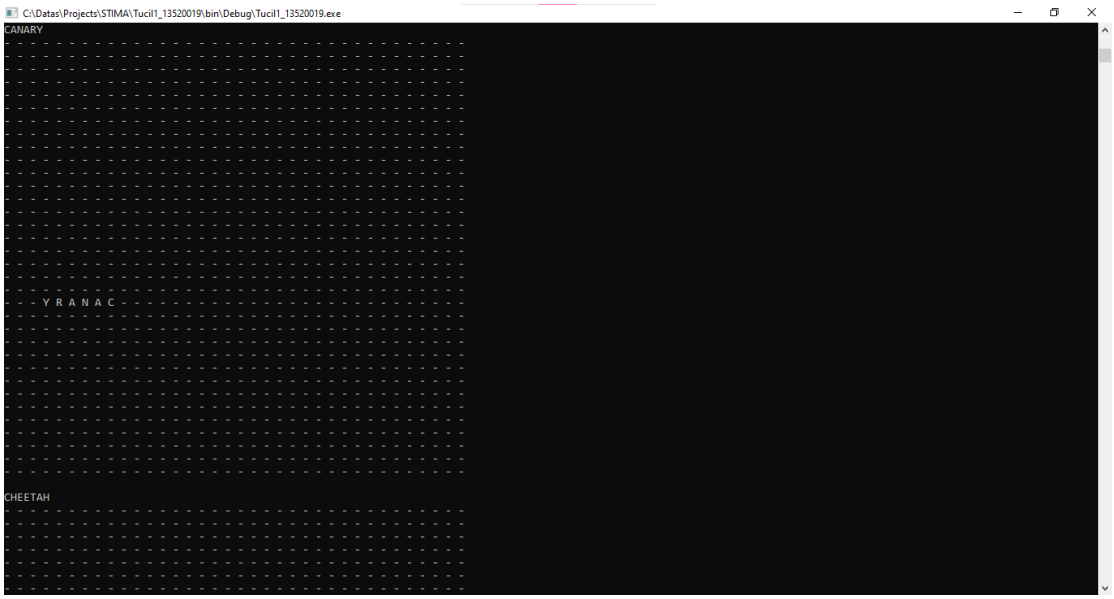
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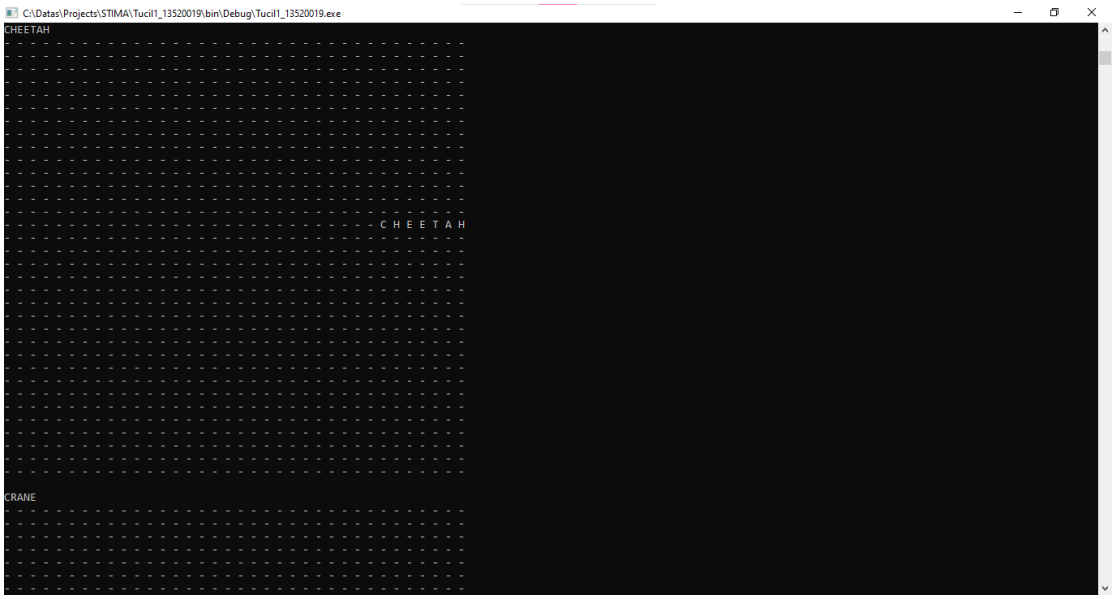
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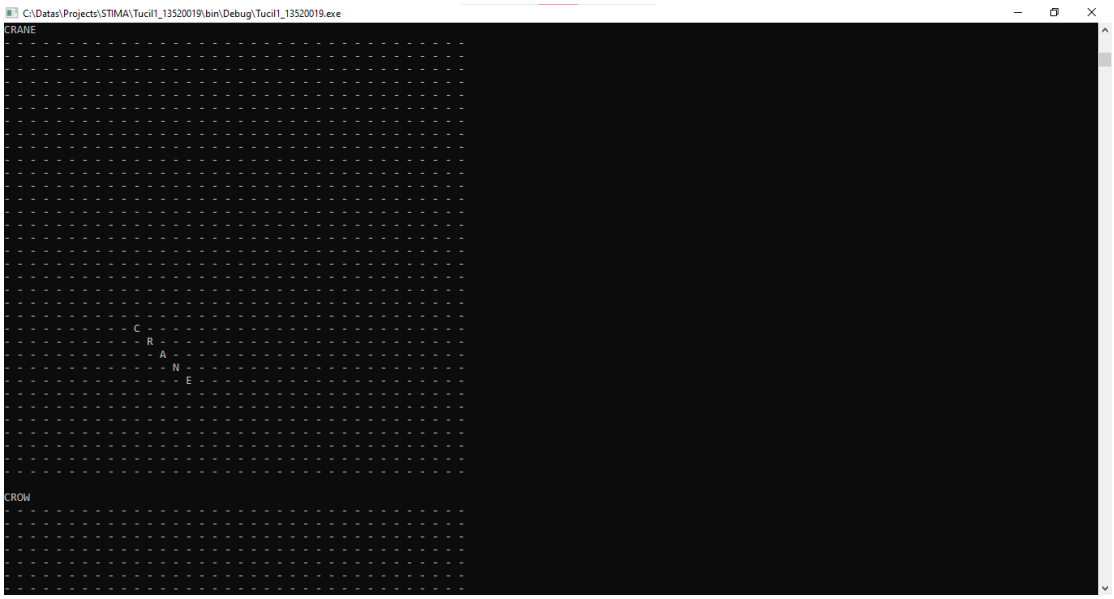
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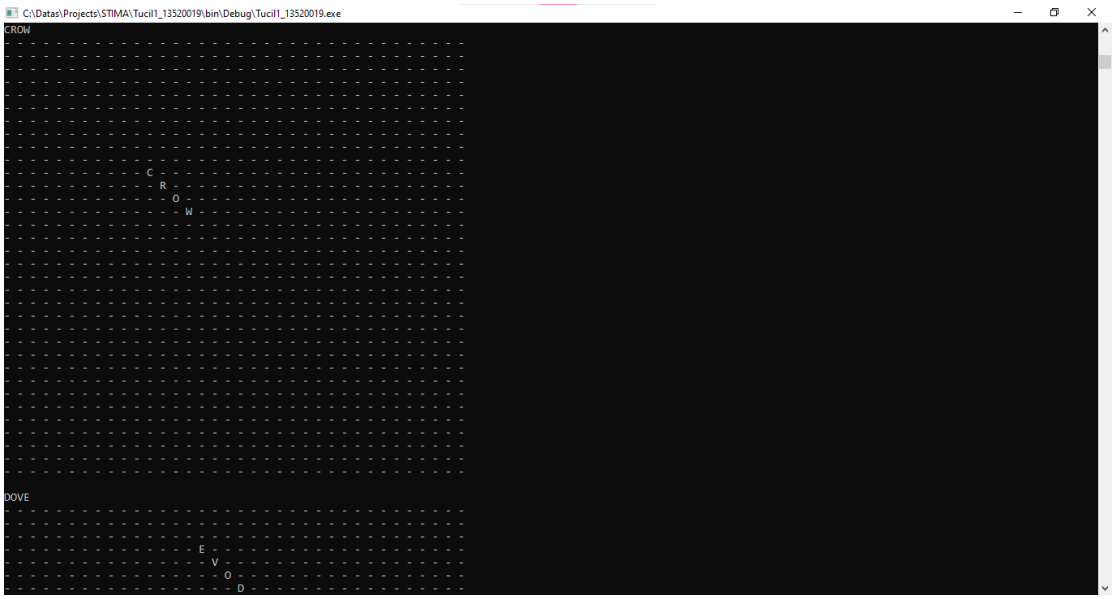
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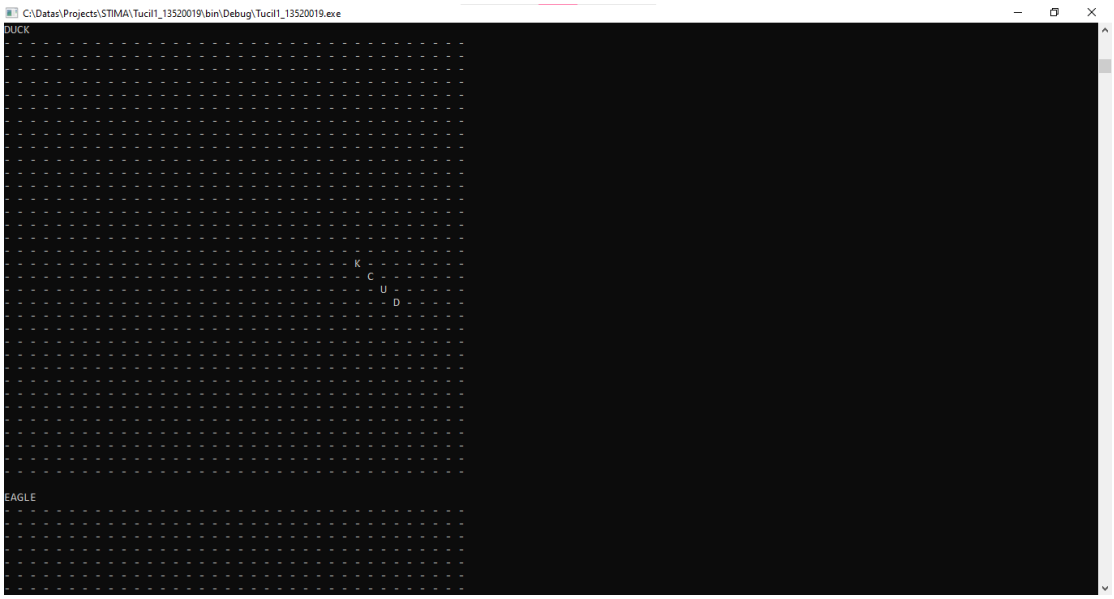
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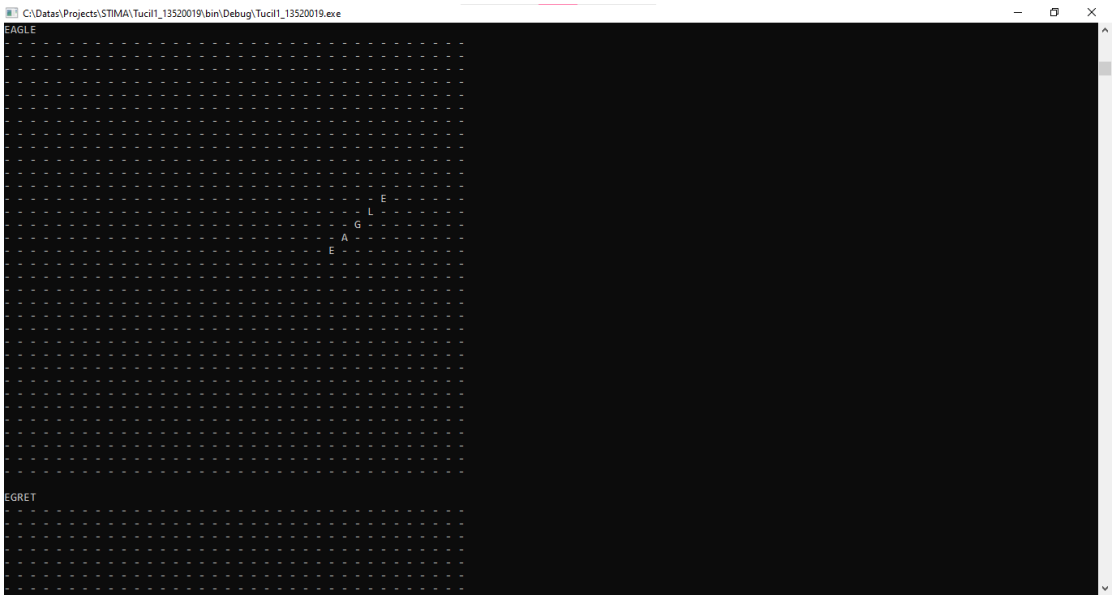
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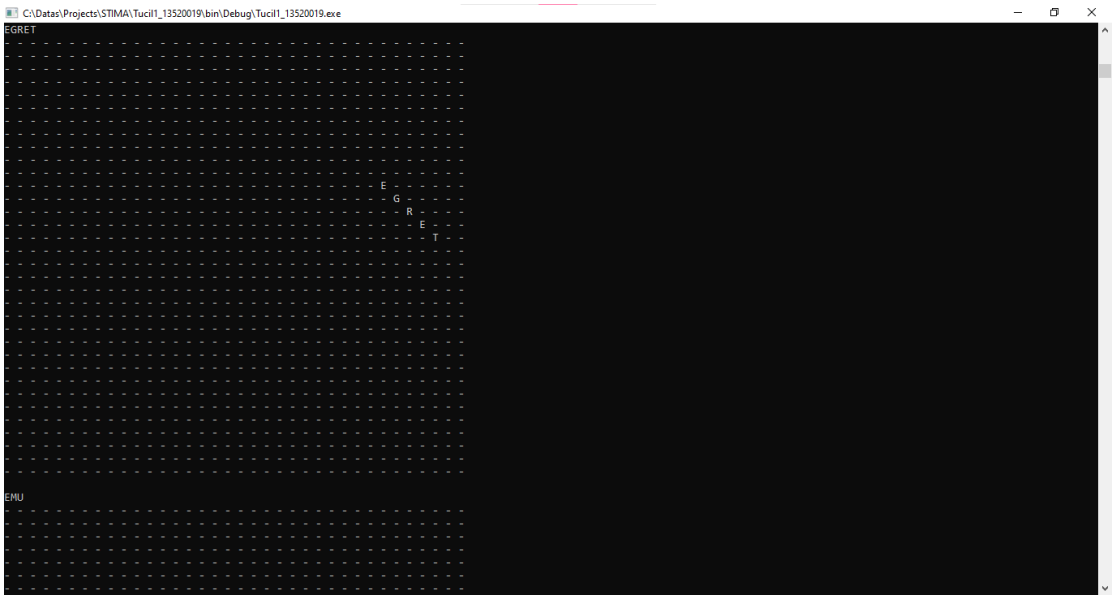
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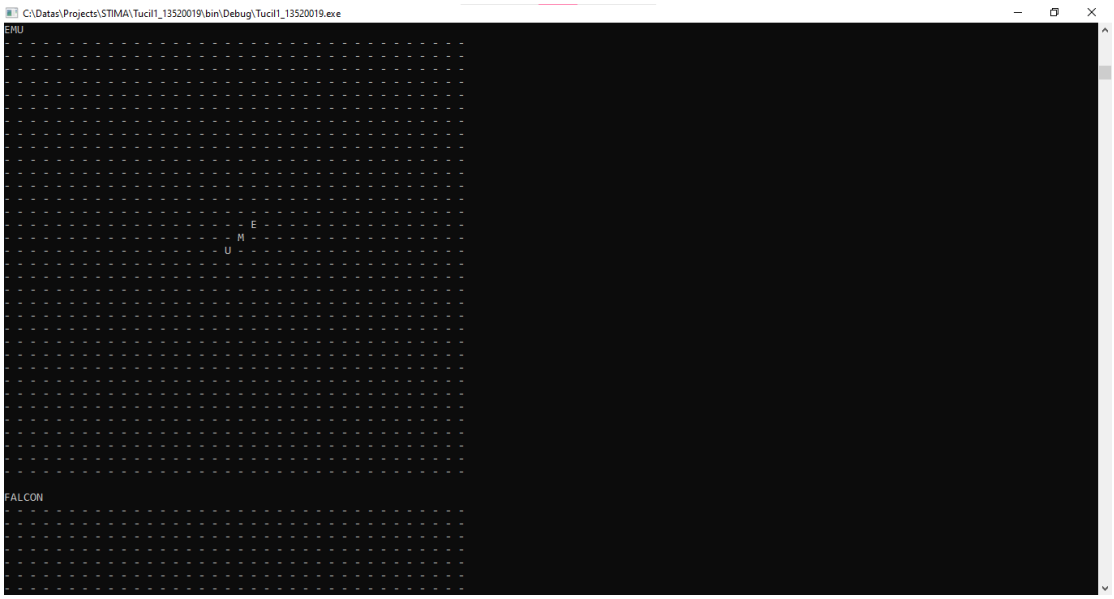
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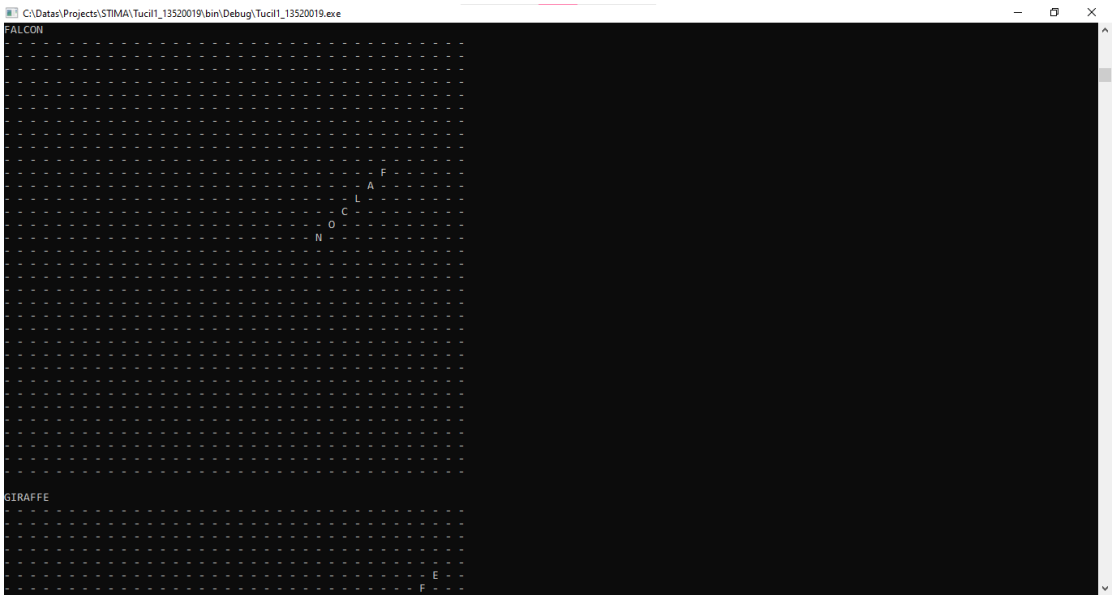
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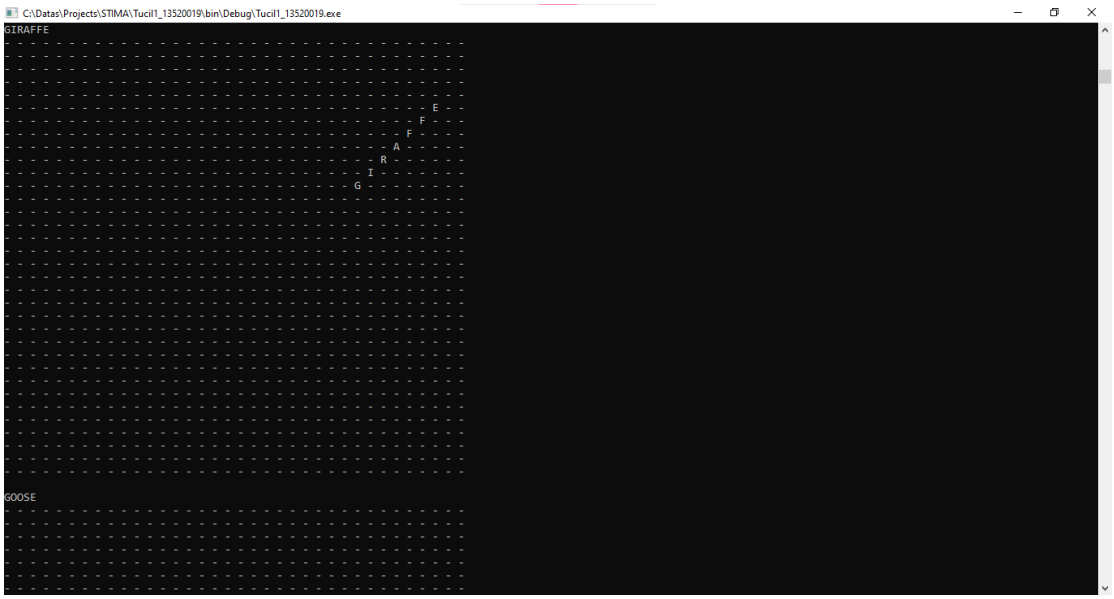
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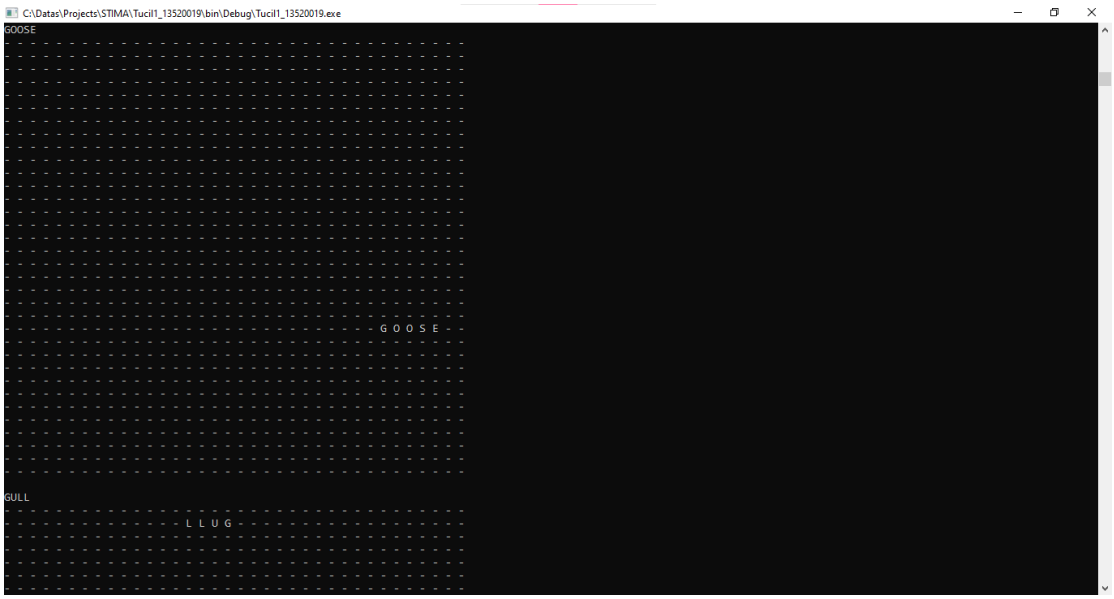
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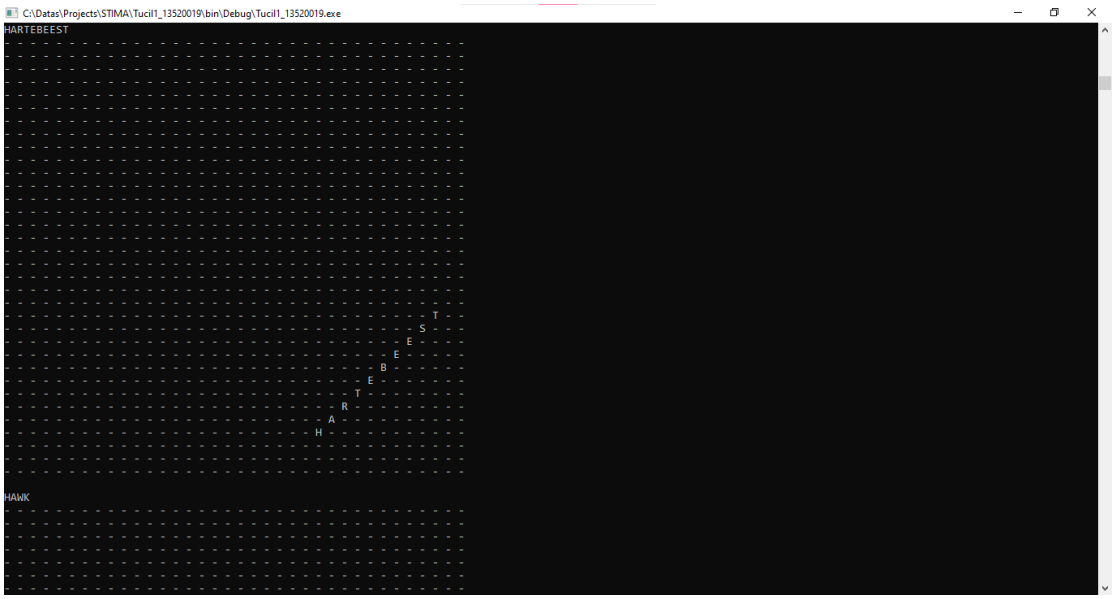
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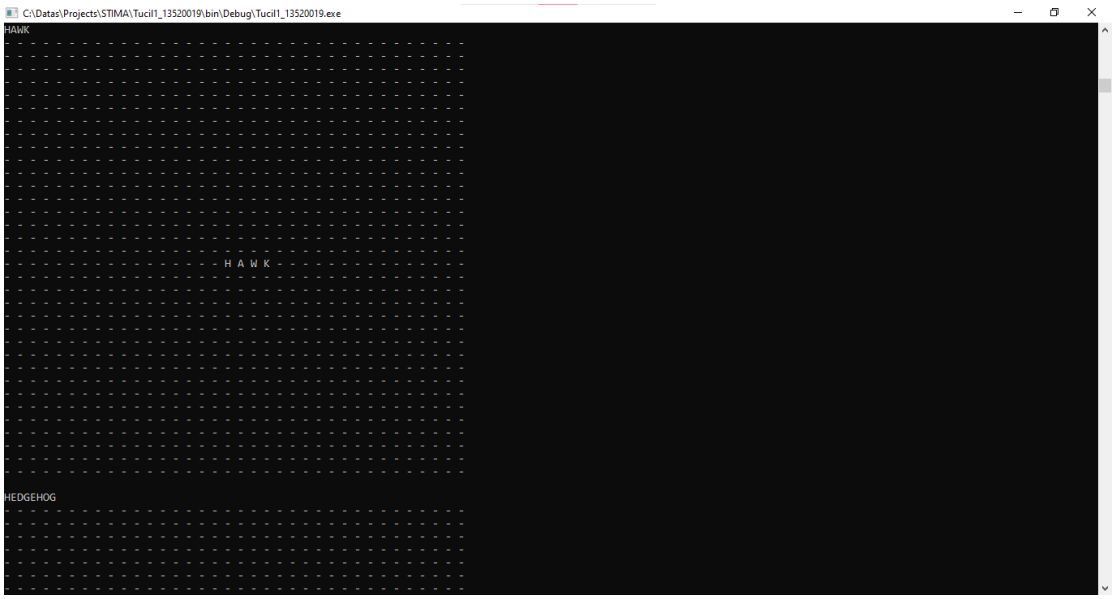
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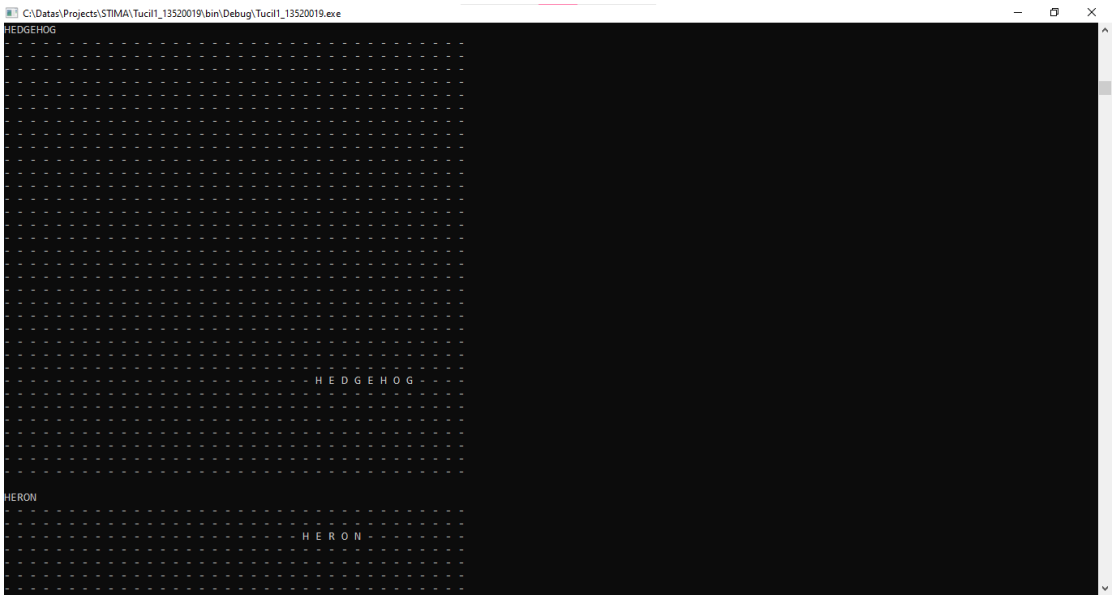
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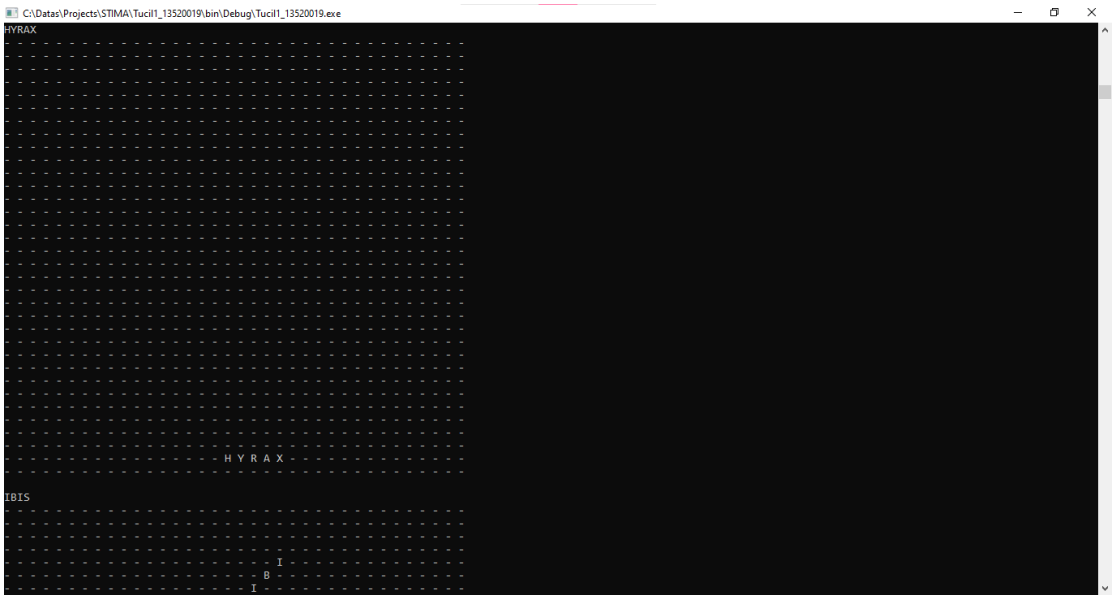
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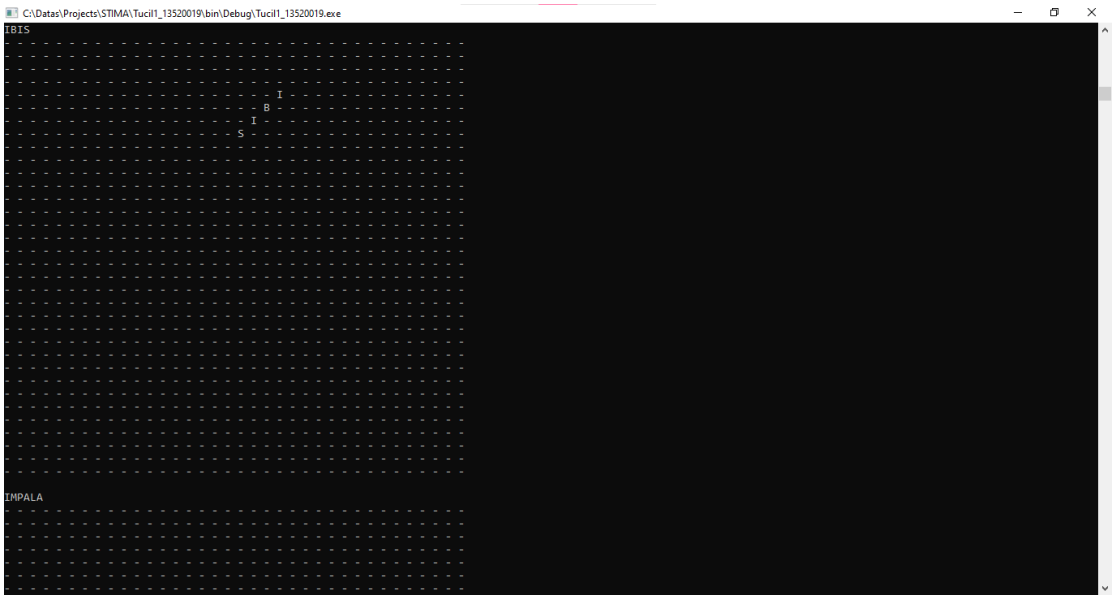
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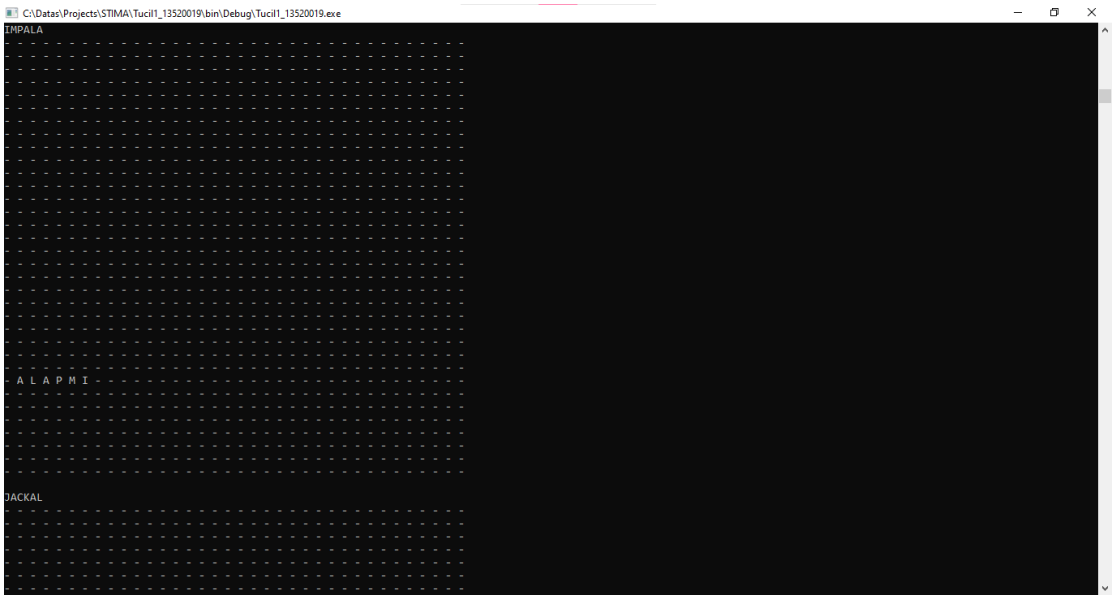
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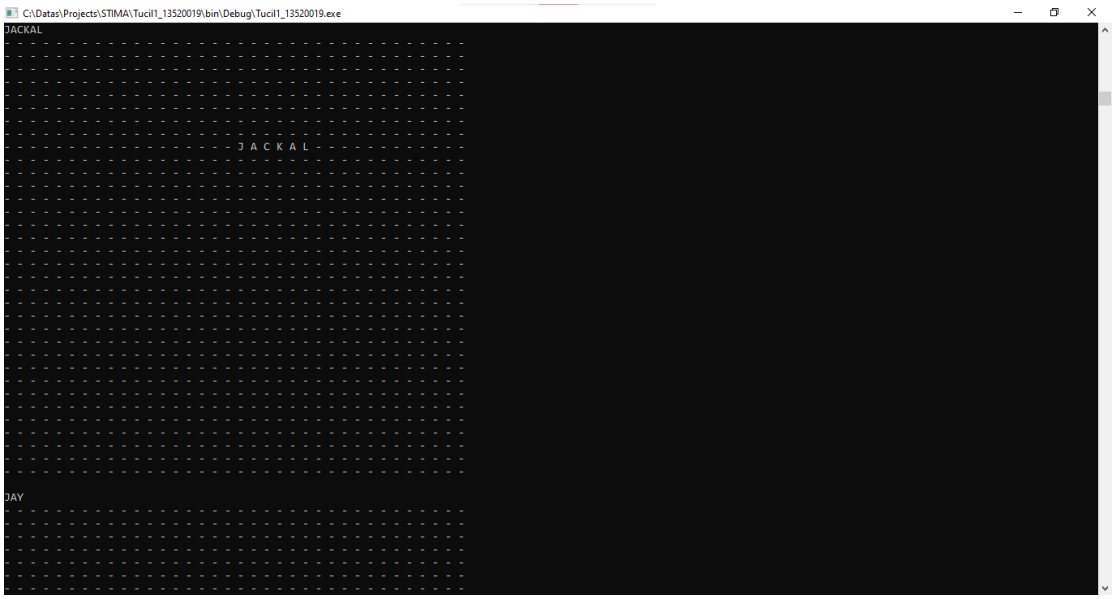
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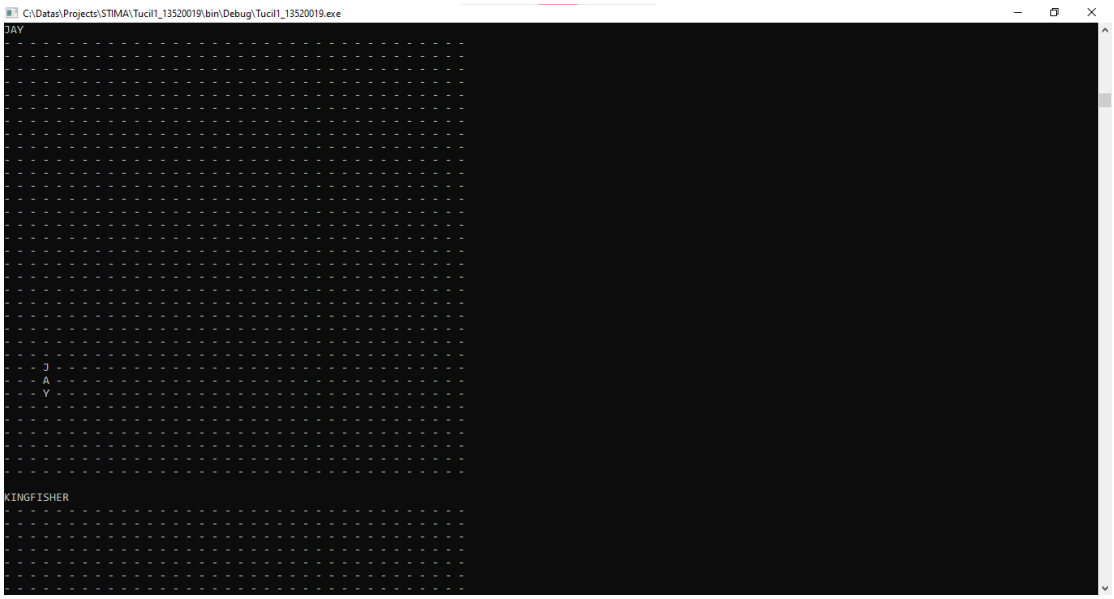
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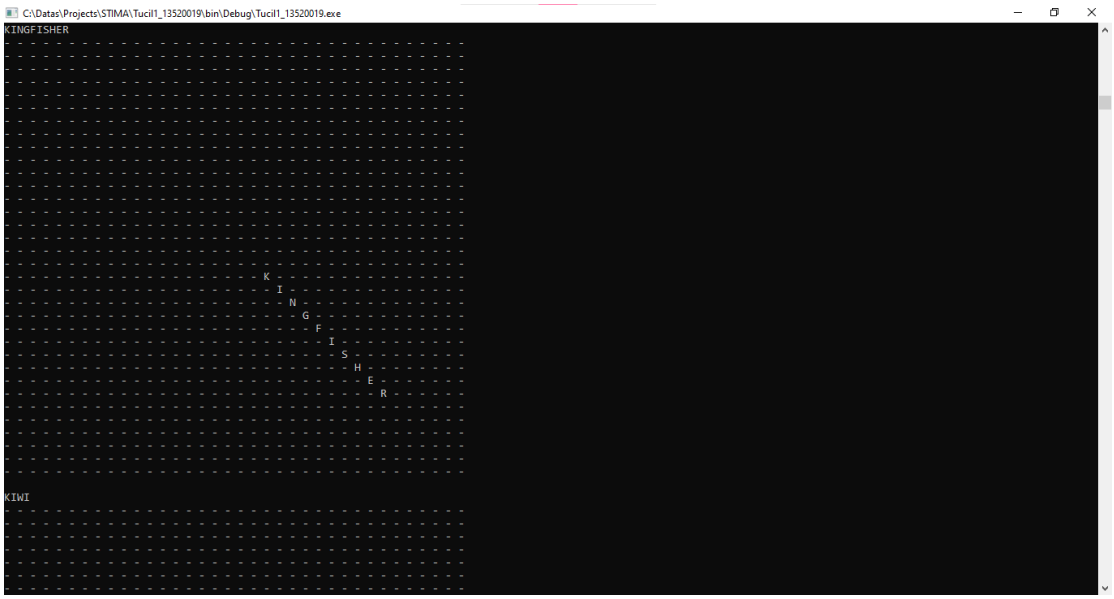
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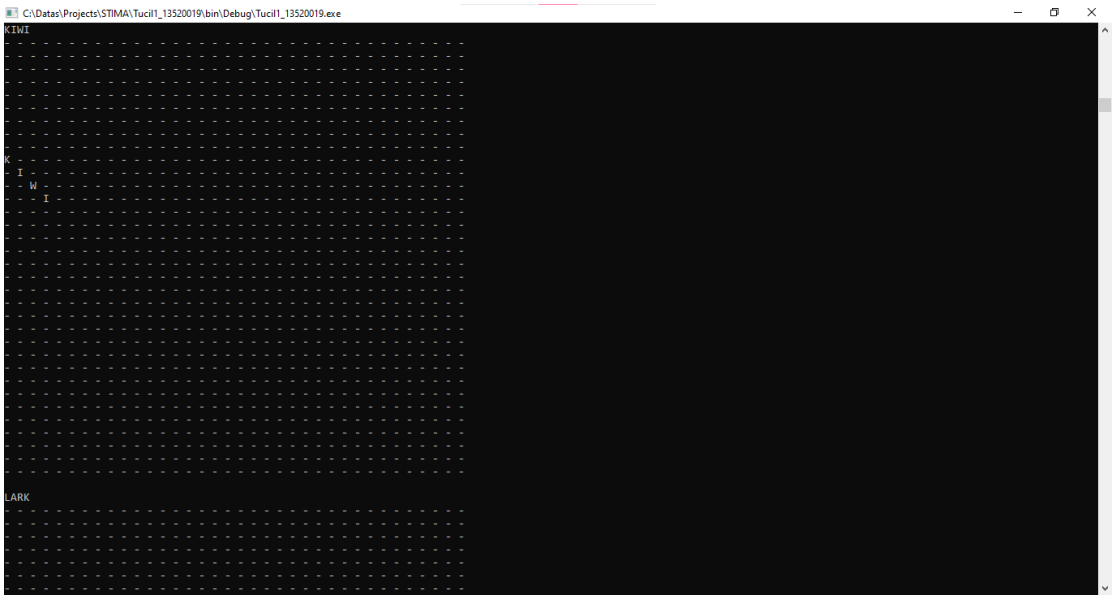
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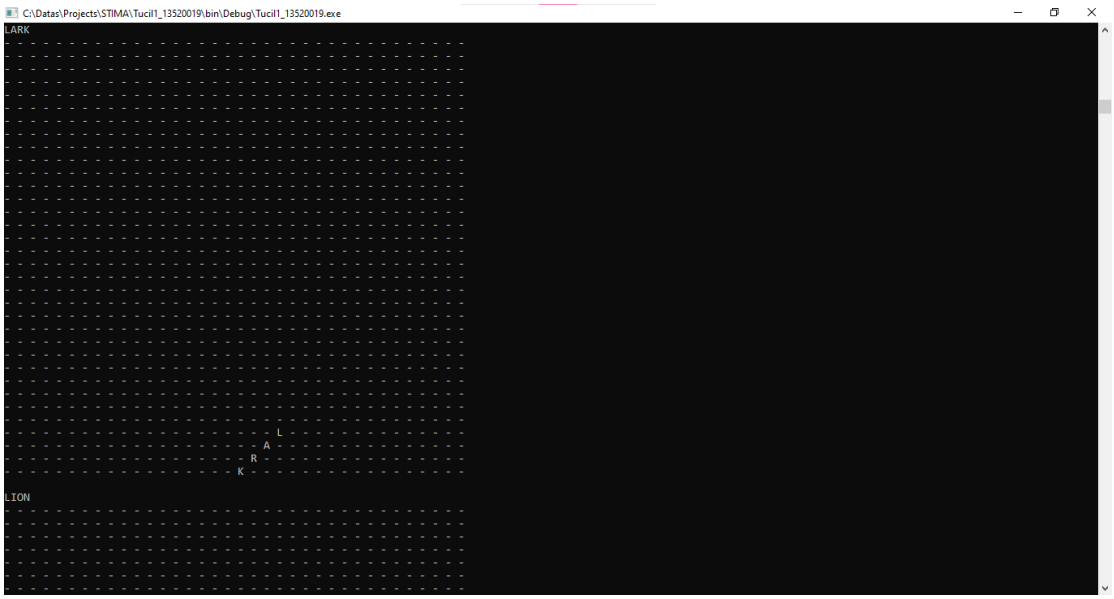
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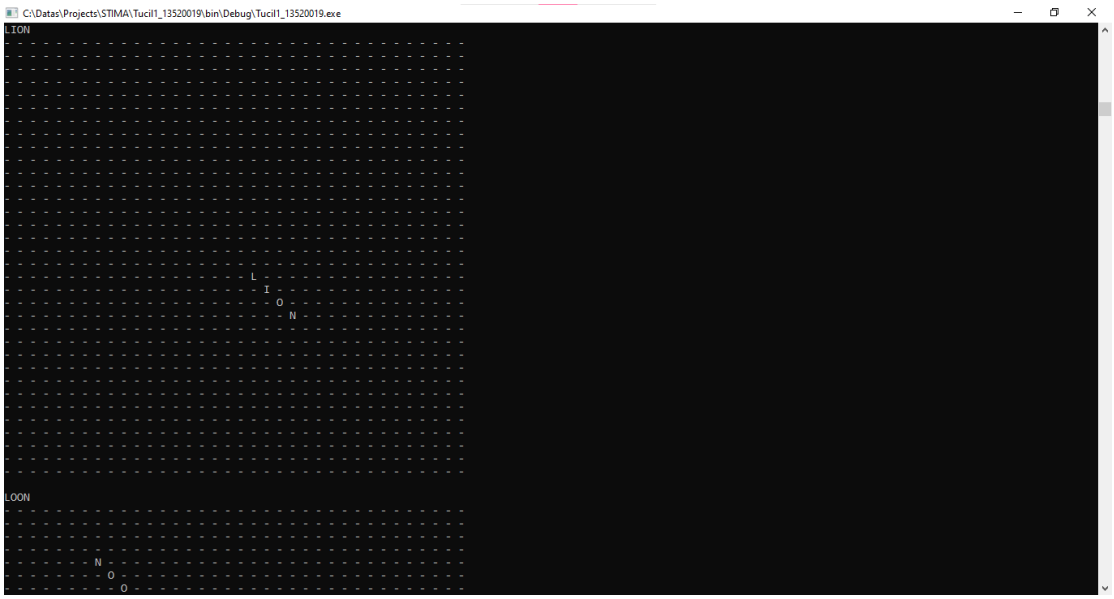
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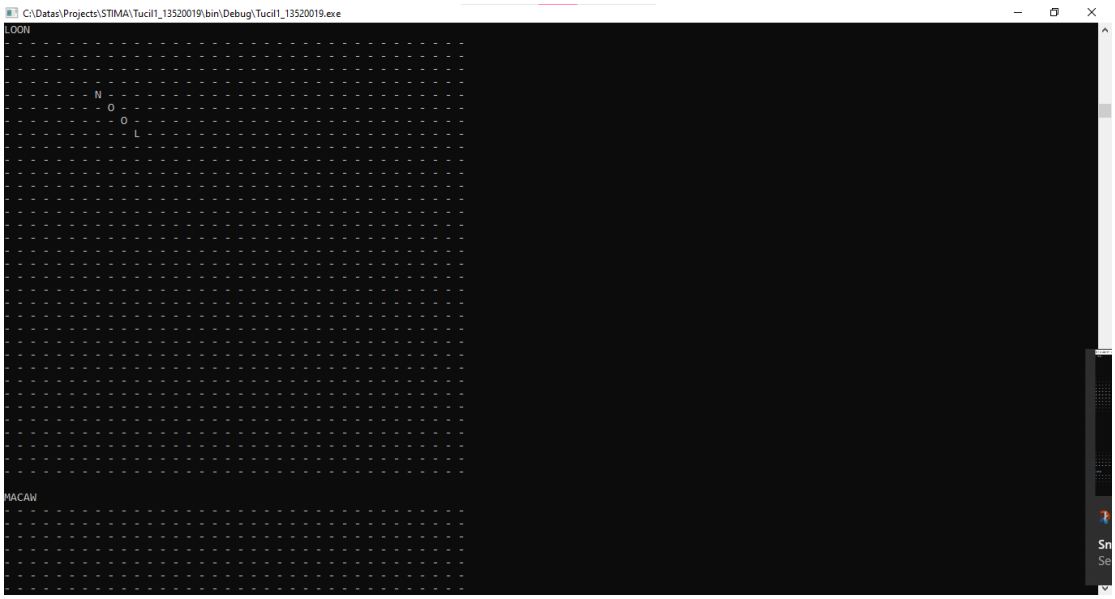
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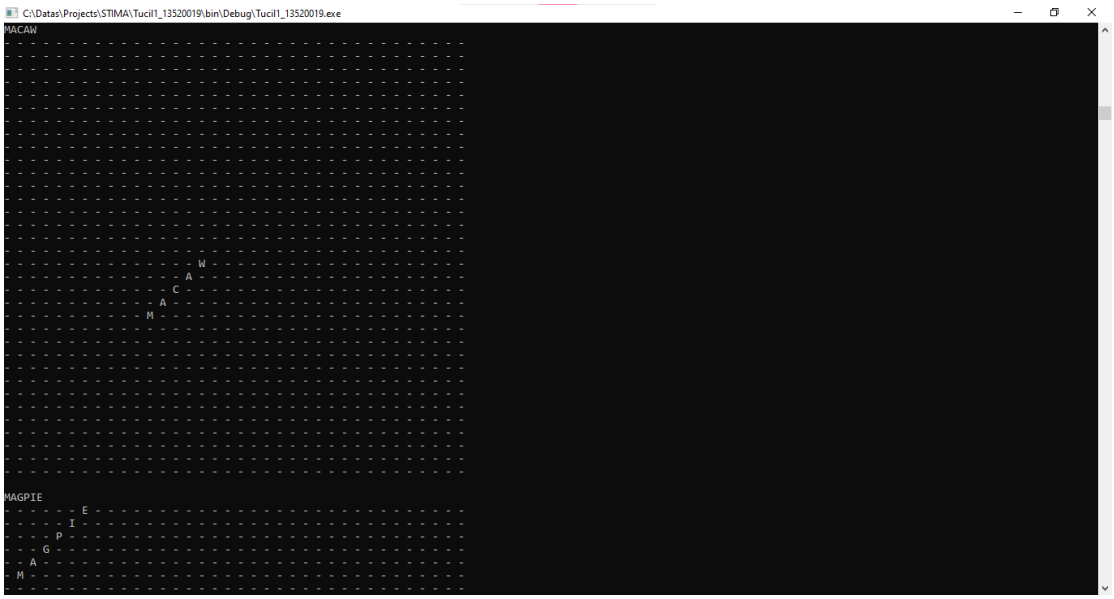
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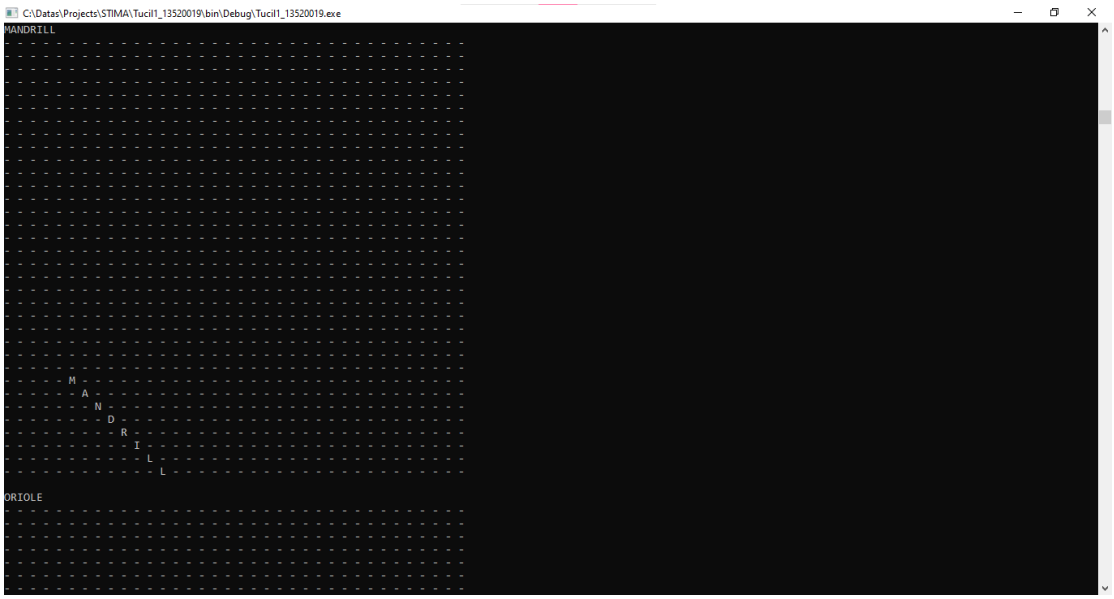
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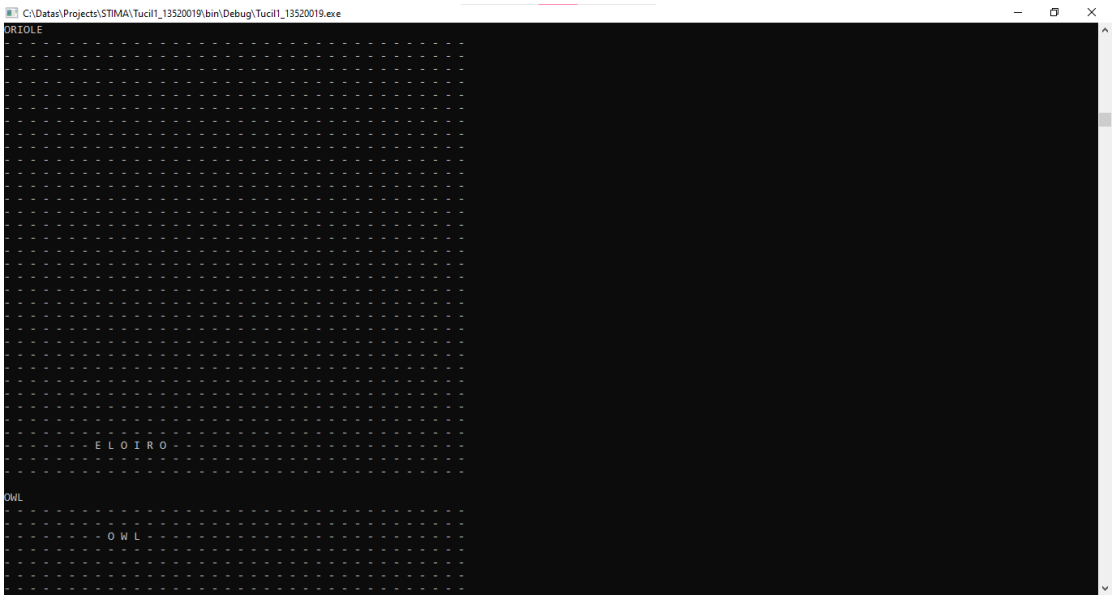
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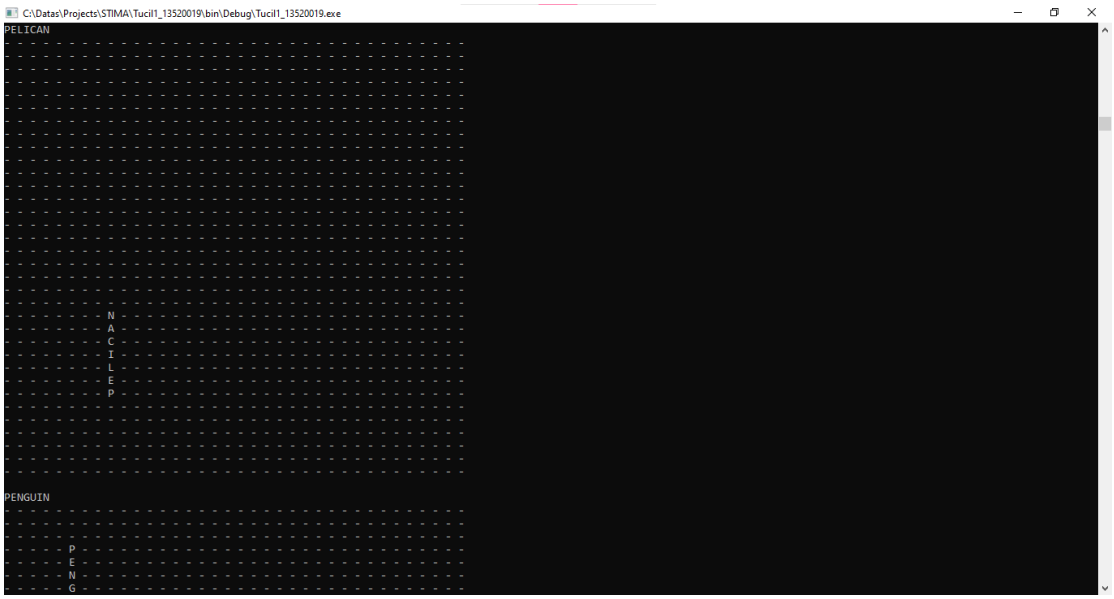
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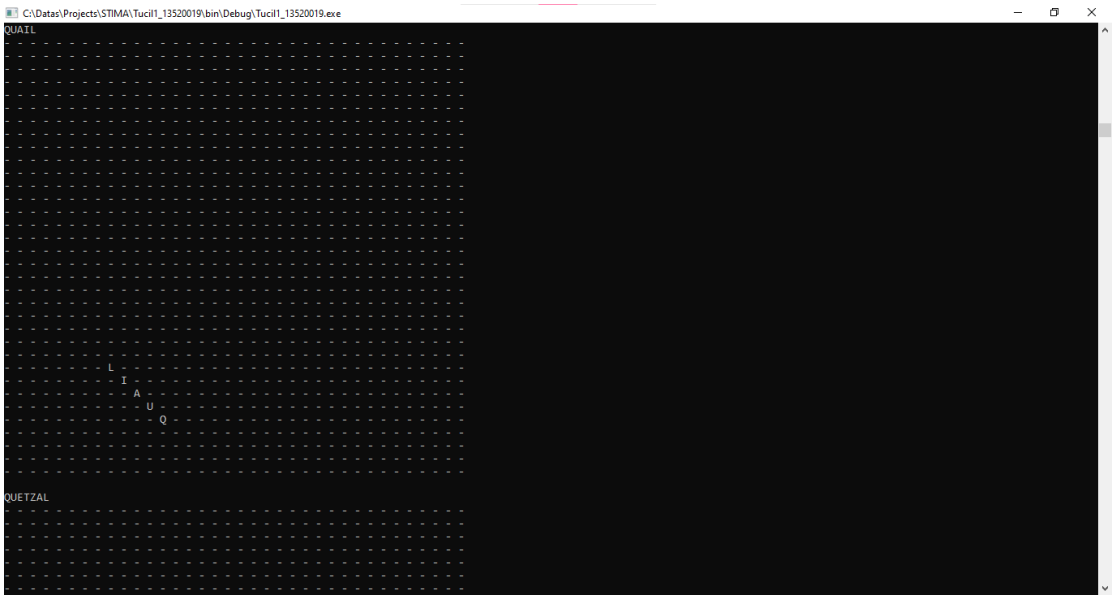
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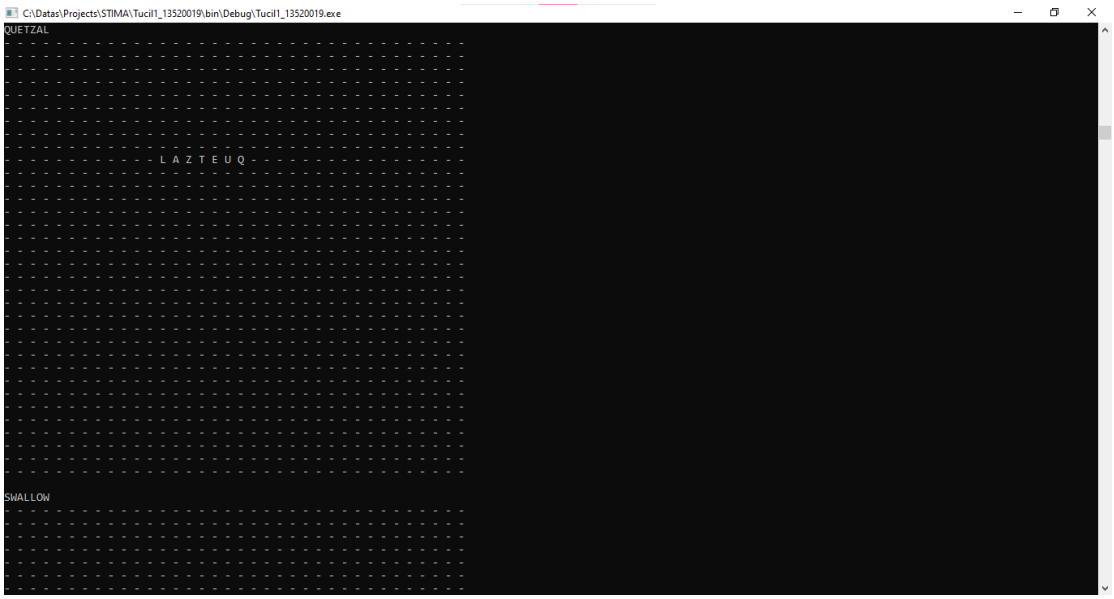
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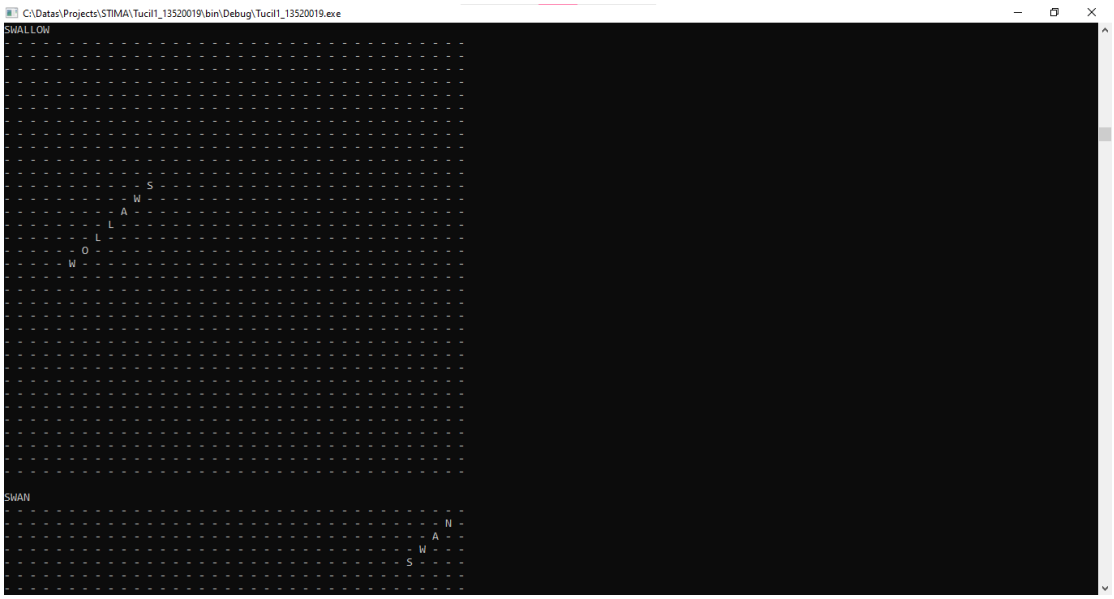
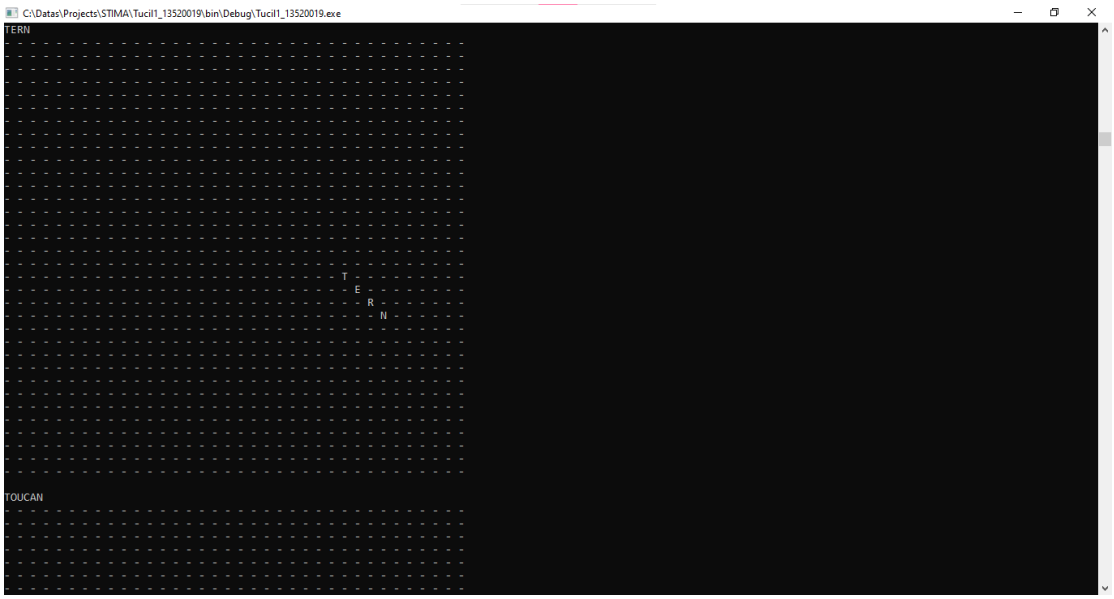
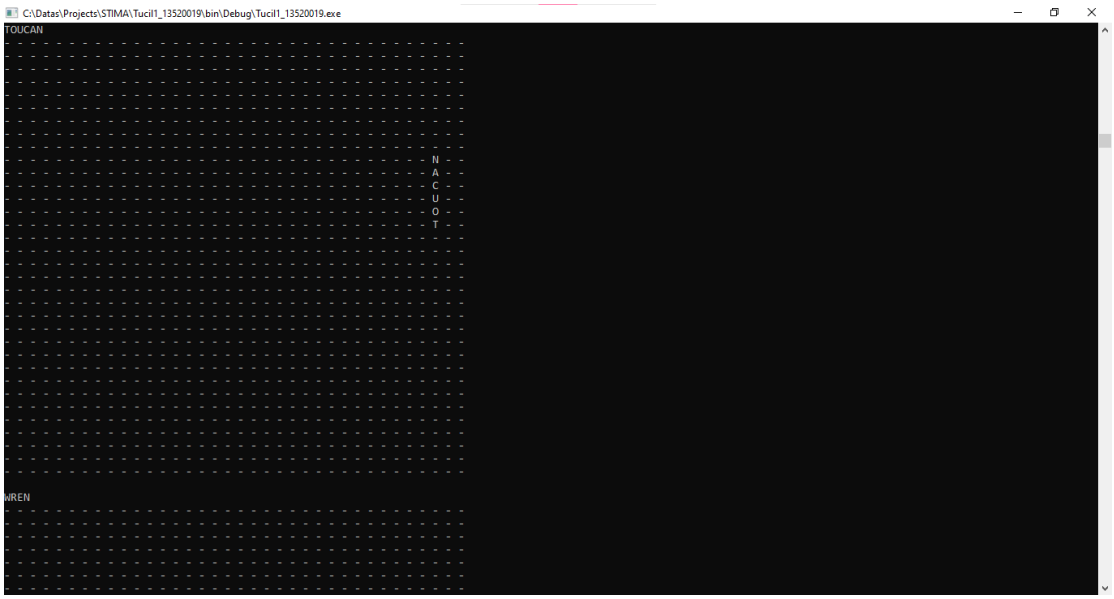
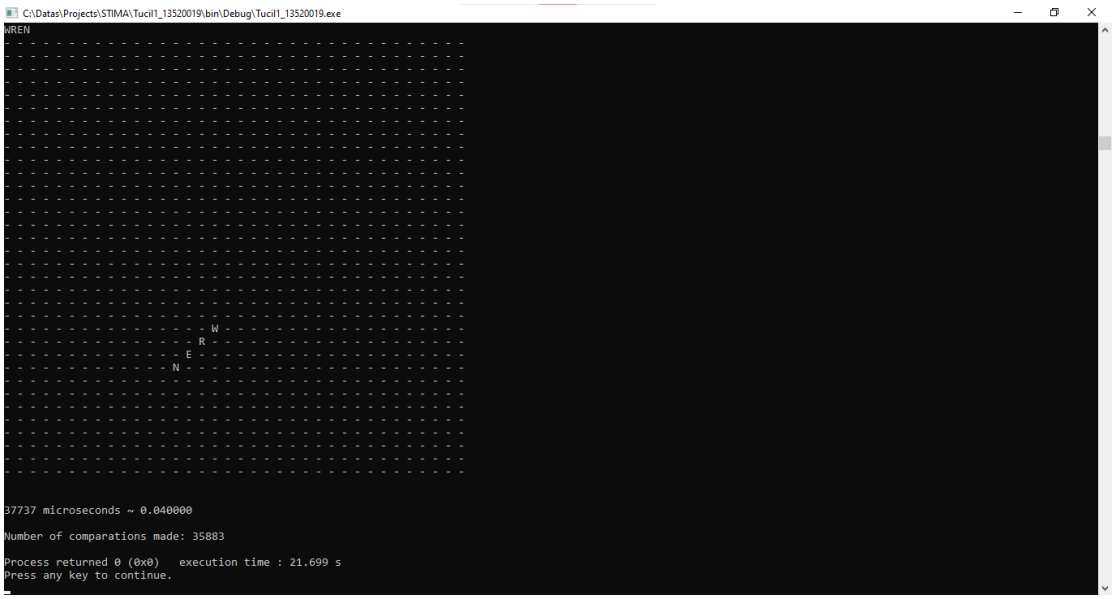
QUETZAL
L A Z T E U Q
SWALLOW


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
SWALLOW
S
W
A
L
L
O
W
SWAN
N
A
W
S


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
TERN
TOUCAN


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
TOUCAN
WREN


C:\Datas\Projects\STIMA\Tucil1_13520019\bin\Debug\Tucil1_13520019.exe
WREN
37737 microseconds ~ 0.040000
Number of comparations made: 35883
Process returned 0 (0x0) execution time : 21.699 s
Press any key to continue.

BAB IV

CHECKLIST

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.	✓	