

LAPORAN TUGAS KECIL
IF2211 STRATEGI ALGORITMA

PENYELESAIAN WORD SEARCH PUZZLE DENGAN
ALGORITMA BRUTE FORCE

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SEKOLAH TEKNIK ELEKTRO DAN INFORMATIKA
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Algoritma Brute Force – Deskripsi langkah

1. Mula-mula dilakukan pengecekan dari karakter baris pertama bagian kiri atas word puzzle satu per satu dengan karakter pertama pada string yang dicari.
2. Jika karakter pertama sesuai, maka akan dilakukan pengecekan terhadap 8 arah word puzzle secara berturut turut. Misalnya pengecekan arah pertama dilakukan dari kiri ke kanan, maka dilakukan perbandingan pattern dari kiri ke kanan antara karakter kedua dan seterusnya sampai ditemukan ketidakcocokan karakter atau semua karakter cocok.
3. Jika jumlah karakter yang bersesuaian sama dengan panjang string, maka string terdapat dalam word puzzle.
4. Jika jumlah karakter yang bersesuaian tidak sama dengan panjang string, ganti ke arah lain word puzzle. Jika semua arah telah dicek, maka string tidak ditemukan.
5. Lanjut mengecek string lain dimulai dari langkah 1.

Source code dengan bahasa pemrograman yang dipilih

Program ditulis dengan bahasa C++

```
#include<iostream>
#include<fstream>
#include<vector>
#include<sstream>
#include<chrono>

using namespace std;

// function to convert parsed string to character
char string2char(string s){

    if (s == "A"){
        return 'A';
    } else if (s == "B"){
        return 'B';
    } else if (s == "C"){
        return 'C';
    } else if (s == "D"){
        return 'D';
    } else if (s == "E"){
        return 'E';
    } else if (s == "F"){
        return 'F';
    } else if (s == "G"){
        return 'G';
    } else if (s == "H"){
        return 'H';
    } else if (s == "I"){
        return 'I';
    } else if (s == "J"){
        return 'J';
    } else if (s == "K"){
        return 'K';
    } else if (s == "L"){
        return 'L';
    } else if (s == "M"){
        return 'M';
    } else if (s == "N"){
        return 'N';
    } else if (s == "O"){
        return 'O';
    } else if (s == "P"){
```

```

        return 'P';
    } else if (s == "Q"){
        return 'Q';
    } else if (s == "R"){
        return 'R';
    } else if (s == "S"){
        return 'S';
    } else if (s == "T"){
        return 'T';
    } else if (s == "U"){
        return 'U';
    } else if (s == "V"){
        return 'V';
    } else if (s == "W"){
        return 'W';
    } else if (s == "X"){
        return 'X';
    } else if (s == "Y"){
        return 'Y';
    } else {
        return 'Z';
    }
}

// to find {i, j} exists in a 2d vector
// helper for printing
bool findpoint(vector<vector<int>> pointvector, int x, int y){
    int i = 0;
    bool found = false;

    while (i < pointvector.size() && (!found)){
        if ((pointvector[i][0] == x) && (pointvector[i][1] == y)){
            found = true;
        } else {
            i++;
        }
    }

    return found;
}

// to find {i, j} exists in which index in a 2d vector

```

```

// helper for printing
int findpointposition(vector<vector<int>> pointvector, int x, int y){
    int i = 0;
    bool found = false;

    while (i < pointvector.size() && (!found)){
        if ((pointvector[i][0] == x) && (pointvector[i][1] == y)){
            found = true;
        } else {
            i++;
        }
    }

    return i;
}

// function to return the coordinate of the string found in the puzzle
// { {x1, y1}, {x2, y2}, ...}
vector<vector<int>> returnpoint(vector<vector<char>> wordpuzzle,
vector<string> wordlist, int R, int C, int row, int col, int i){

    vector<vector<int>> stringcoordinate;
    vector<int> coordinate;

    int x[8] = {1, 1, 1, 0, 0, -1, -1, -1};
    int y[8] = {1, 0, -1, 1, -1, 1, 0, -1};

    // search wordlist in 8 directions
    for (int d = 0; d < 8; d++) {

        int newrow = row + x[d];
        int newcol = col + y[d];
        int n;

        // will reset the coordinate and vector of coordinates if it changes
        direction
        coordinate = {};
        stringcoordinate = {};
        coordinate.push_back(newrow);

```

```

        coordinate.push_back(newcol);
        stringcoordinate.push_back(coordinate);

        // match remaining characters
        for (n = 1; n < wordlist[i].size(); n++) {

            if (newrow >= R || newrow < 0 || newcol >= C || newcol < 0){ //
out of bound
                break;
            } else if (wordpuzzle[newrow][newcol] != wordlist[i][n]){ // stop
the string matching if a character does not match
                break;
            }

            // moving along
            newrow = newrow + x[d];
            newcol = newcol + y[d];

            // will reset the coordinate
            coordinate = {};
            coordinate.push_back(newrow);
            coordinate.push_back(newcol);
            stringcoordinate.push_back(coordinate);
        }

        // if matched
        if (n == wordlist[i].size()){
            return stringcoordinate;
        }

    }
    return {};
}

// helper function
bool searchpoint(vector<vector<char>> wordpuzzle, vector<string> wordlist,
int R, int C, int row, int col, int i){

    int x[8] = {1, 1, 1, 0, 0, -1, -1, -1};
    int y[8] = {1, 0, -1, 1, -1, 1, 0, -1};

```

```

// if the first character of wordlist doesn't match
if (wordlist[i][0] != wordpuzzle[row][col]){
    return false;
}

// search wordlist in 8 directions
for (int d = 0; d < 8; d++) {

    int newrow = row + x[d];
    int newcol = col + y[d];
    int n;
    // match remaining characters
    for (n = 1; n < wordlist[i].size(); n++) {

        if (newrow >= R || newrow < 0 || newcol >= C || newcol < 0){ //
out of bound
            break;
        } else if (wordpuzzle[newrow][newcol] != wordlist[i][n]){ // stop
the string matching if a character does not match
            break;
        }

        // moving along
        newrow = newrow + x[d];
        newcol = newcol + y[d];
    }

    // if matched
    if (n == wordlist[i].size()){
        return true;
    }

}
return false;
}

int main() {

```

```

string myText;
string fileName;
// read from the text file
cout << "Masukkan nama file yang ingin dibaca (beserta .txt): ";
cin >> fileName;

ifstream readFile(fileName);

vector<vector<char>> wordpuzzle;
vector<char> line;
vector<string> wordlist;
string parsed;
bool found = false;

// read the file line by line
while (getline (readFile, myText)) {

    if (myText != "" and not found){
        line = {};
        stringstream input_stringstream(myText);
        while (getline(input_stringstream, parsed, ' '))
        {
            line.push_back(string2char(parsed));
        }

        wordpuzzle.push_back(line);
    } else {
        found = true;
    }

    if (found){
        if (myText == ""){ // identifier between wordpuzzle and wordlist
            // do nothing
        } else {
            wordlist.push_back(myText);
        }
    }

}

```



```

// create output file
ofstream outputFile("output.txt");

// check all strings in wordlist
for (int i=0; i < wordlist.size(); i++){

    auto start = std::chrono::steady_clock::now();

    for (int row = 0; row < wordpuzzle.size(); row++){
        for (int col = 0; col < wordpuzzle[0].size(); col++){
            if (searchpoint(wordpuzzle, wordlist, wordpuzzle.size(),
wordpuzzle[0].size(), row, col, i)){

                vector<vector<int>> stringcoordinate =
returnpoint(wordpuzzle, wordlist, wordpuzzle.size(), wordpuzzle[0].size(),
row, col, i);

                cout << wordlist[i] << endl;
                for (int k=0; k < wordpuzzle.size(); k++){
                    for (int l=0; l < wordpuzzle[0].size(); l++){
                        if (k == row && l == col){
                            cout << wordlist[i][0];
                            outputFile << wordlist[i][0];
                            cout << " ";
                            outputFile << " ";
                        } else if (findpoint(stringcoordinate, k, l)){
                            int p = findpointposition(stringcoordinate,
k, l);

                            cout << wordlist[i][p+1];
                            outputFile << wordlist[i][p+1];
                            cout << " ";
                            outputFile << " ";
                        } else {
                            cout << "- ";
                            outputFile << "- ";
                        }
                    }
                }
                cout << endl;
                outputFile << endl;
            }
        }
    }

    auto stop = std::chrono::steady_clock::now();

```

```
std::chrono::duration<double> diff = stop - start;
std::cout << "Time taken: "<< diff.count() << " s" << endl;
cout << endl;
cout << endl;

outputFile << "Time taken: ";
outputFile << diff.count();
outputFile << " s";
outputFile << endl;
outputFile << endl;
}

// Close the file
readFile.close();
outputFile.close();

}
```

Screenshot input output

Small Test 1 (14x14)

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

BALI
BANDUNG
BEKASI
BOGOR
DEPOK
JAKARTA
MEDAN
PEKANBARU
SOLO
TANGERANG

```
Masukkan nama file yang ingin dibaca (beserta .txt): smalltest_1.txt
BALI
```

Time taken: 0.029996 s

BANDUNG

Time taken: 0.033999 s

BEKASI

Time taken: 0.031989 s

BOGOR

Time taken: 0.031996 s

DEPOK

```
- - - - -  
- - - - -  
- - - - -  
- - - - - K - - -  
- - - - - O - - -  
- - - - - P - - -  
- - - - - E - - -  
- - - - - D - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -
```

Time taken: 0.029997 s

JAKARTA

```
- - - - -  
- - - - - A - - - - -  
- - - - - T - - - - -  
- - - - - R - - - - -  
- - - - - A - - - - -  
- - K - - - - -  
- A - - - - -  
J - - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -
```

Time taken: 0.032132 s

MEDAN

```
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - M E D A N - - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -
```

Time taken: 0.030755 s

PEKANBARU

```
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - - P  
- - - - - E -  
- - - - - K -  
- - - - - A -  
- - - - - N -  
- - - - - B -  
- - - - - A -  
- - - - - R -  
- - - - - U -  
- - - - -
```

Time taken: 0.031001 s

SOLO

```
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
S - - - - -  
- O - - - - -  
- - L - - - - -  
- - - O - - - - -  
- - - - -
```

Time taken: 0.031 s

TANGERANG

```
- - - - -  
- - - - -  
- - - - -  
G N A R E G N A T - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -
```

Time taken: 0.031018 s

Small Test 2 (15x15)

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

PENGUIN
GOAT
PANDA
GIRAFFE
POLARBEAR
LION
TIGER
ELEPHANT
MEERKAT

Masukkan nama file yang ingin dibaca (berserta .txt): smalltest_2.txt

PENGUIN

Time taken: 0.034267 s

GOAT

-----A-----

Time taken: 0.033003 s

GIRAFFE

Time taken: 0.031997 s

POLARBEAR

```
Time taken: 0.032995 s
```

[illegible][illegible]

```
Time taken: 0.030995 s
```

A 15x15 grid of dots. The word "TIGER" is formed by the top row of dots. The word "R E G I T" is formed by the bottom row of dots, with each letter centered under a column of dots.

Time taken: 0.032003 s

Time taken: 0.030996 s

```
Time taken: 0.029999 s
```

Small Test 3 (15x15)

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

SATU

DUA

TIGA

EMPAT

LIMA

ENAM

TUJUH

DELAPAN

SEMBILAN

SEPULUH

Masukkan nama file yang ingin dibaca (berserta .txt): smallest_3.txt
SATU

Time taken: 0.030988 s

DUA

Time taken: 0.03379 s

TIGA

- - - - -
- - - - -
- - - - -
- - - - -
- - - - -
- - - - -
- - - - -
- - - - -

- - - A - - - - -
- - - - G - - - -
- - - - - I - - - - -
- - - - - T - - - - -

- - - - -
- - - - -
- - - - -
- - - - -

Time taken: 0.034999 s

EMPAT

- - - - -
- - - - -
- - - - -
- - - - -

- - - - - T - - - - -
- - - - - A - - - - -
- - - - - P - - - - -
- - - - - M - - - - -
- - - - - E - - - - -

- - - - -
- - - - -
- - - - -
- - - - -
- - - - -
- - - - -

Time taken: 0.034004 s

LIMA

Time taken: 0.032998 s

ENAM

Time taken: 0.03499 s

Time taken: 0.034003 s

Time taken: 0.032001 s

SEPULUH

Medium Test 1 (20x20)

ASIAAFRIKA
DAGO
PASKAL
TUBIS
BONBIN
FARMHOUSE
PVJ
CIWALK
FLOATINGMARKET
TANGKUBANPERAHU
KEBONBIBIT
TAMANSARI
KANAYAKAN
CIUMBULEUIT
BALTOS

DAGO

O G A D

Time taken: 0.062005 s

PASKAL

P

A

S

K

A

L

Time taken: 0.063608 s

TUBIS

Time taken: 0.062999 s

BONBIN

Time taken: 0.064996 s

FARMHOUSE

Time taken: 0.063 s

PVI

Time taken: 0.063005 s

T -
A -
M -
A -
N -
S -
A -
R -
I -

Time taken: 0.063985 s

K A N A Y A K A N - - - - -

Time taken: 0.062001 s

Time taken: 0.063003 s

Medium Test 2 (20x20)

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

PROFIT
GIRAFFE
INSIGHT
STORE
BURN
TERMINAL
CORRESPONDENCE
DULL
SIGH
PERSON

Masukkan nama file yang ingin dibaca (berserta .txt): mediumtest_2.txt

PROFIT

Time taken: 0.058992 s

GIRAFFE

Time taken: 0.062997 s

INSIGHT

Time taken: 0.060998 s

STORE

Time taken: 0.062004 s

BURN

Time taken: 0.062002 s

TERMINAL

CORRESPONDENCE

Time taken: 0.063 s

DULL

Time taken: 0.063003 s


```
PERSON  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
P E R S O N - - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
Time taken: 0.062 s
```

Medium Test 3 (20x20)

```
PERSON  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
P E R S O N - - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
Time taken: 0.062 s
```

Medium Test 3 (20x20)

```
PERSON  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
P E R S O N - - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
Time taken: 0.062 s
```

Medium Test 3 (20x20)

```
PERSON  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
P E R S O N - - - - -  
- - - - -  
- - - - -  
- - - - -  
- - - - -  
Time taken: 0.062 s
```

Medium Test 3 (20x20)

DIET
TEACH
STAND
ENGINE
REFER
DOUGH
FAVOR
EXPLOSION
CHILD
MYSTERY

TEACH

H
C
A
E
T

Time taken: 0.055004 s

STAND

D
N
A
T
S

Time taken: 0.054999 s

Time taken: 0.056002 s

[illegible]

DOUGH

Time taken: 0.057004 s

FAVOR

Time taken: 0.054003 s

CHILD

MYSTERY

- - Y - - - - -
- - - R - - - - -
- - - - E - - - - -
- - - - - T - - - - -
- - - - - S - - - - -
- - - - - Y - - - - -
- - - - - M - - - - -

Time taken: 0.059015 s

Large Test 1 (32x32)

YLRWMTMTJXS RWTVAQCZDJRZKJSFGEDTUO
MELONAHG IHEM IADKLWENU EUOBUGRAUVM
NLVZZSKCODMMDKASBRGLNEMMAUGMJFRG
PJJBJBXUREZRAANPUFUTKTDVDYOHCKOB
MFDQH XZUPQBVTNGKOYABBWAI XTBJUAYS
A I EONQMCPL IYQNGKSNLQXR UWYPWRCWLX
SDGRHAMBFZAJNCUKGZTSCEOR IUQVDEU I
MTERONGXFOV NQDRTAFLMTHFDBOCMBQCF
DIPTNBEBFVFU ISXFHLNQCWJCKWRQXAYS
AKDAGVGXRXENENGRTOUXQBXMAXVTESPB
OWQFQGOXCAPSDOOKTNTKTAEV SZYRPDUX
ZPAMNEMJJADTBSFQS OJOGYHOJSUI QWCC
FPGAPZ I PJTFVPNEZ IUFLRWNZOQUPGQUZ
ORSNJWMPGOLFQNDNWF XONHUDGTSRKNBD
BI XDYKKFDAGXEGAH IAST I HXKPWEATCSDB
PKPXMWHZTONJQB JOKBATXCGPGZJCWFJB
YMGDGT HUGBQACMDUOFWDWVSBNHNCNYWT
RGGKGWASEKVFNTLNQR IUDRWGK I SHSSEA
CAMVLTQRONCAVXTKMOOB I PLJFTPMUWNO
KVXJHLNUM ITSZN I I CVYMCBB I GZMJLDCB
BAUVXCQKQN JQ IUWNNWVBDWCANOMELEEC
NQNBAAETTPGYHALSKQGJDKPLDPGLZAOPD
LTBGMWETRQM QJZNXOBKTC PFNPYPPEVCKA
LRXRKVWRKH I DFEDNL I MJZPRNOEAOKRPU
KXPCNUOZMFKYTGAKO I BYXGAV I BPY I LRP
W I XCAANXNHFOFJ I WHTGNXOV I UQMA I ZZE
YOVM PBMGSDAQJCUKXWXXDMHDXADSYHQY
RKZJARCLXTOHTJHLM I MANAWLWCXCNAQE
QDVPPQDUSNBHGNUTHMPXNNX I BGV I CHPD
PRQRHOYXGWBZHHVALZARSGRMRC SNESJR
I OZBAFMSEAWNBUWGGXBSSGVSZSXTSJGH
XQCTUZRL I ZBH FJEVCQRRPA AHSJCRH I SV

PEPAYA	
MANGGA	
JERUK	
LEMON	
APEL	
PIR	
PISANG	
MELON	
SEMANGKA	
ANGGUR	
GUAVA	
TIMUN	
ALPUKAT	
KIWI	
TOMAT	
TERONG	
KANGKUNG	
SAWI	
KENTANG	
BOKCHOY	

```
Masukkan nama file yang ingin dibaca (beserta .txt): targettest_1.txt
PEPAYA
```

Time taken: 0.156987 s

MANGGA

Time taken: 0.160971 s

JERUK

- - - - - J - - - - -
- - - - - E - - - - -
- - - - - R - - - - -
- - - - - U - - - - -
- - - - - K - - - - -

Time taken: 0.160007 s

LEMON

N O M E L - - -

Time taken: 0.160995 s

APEL

Time taken: 0.16601 s

PIR

R
I
P

Time taken: 0.158987 s

PISANG

Time taken: 0.158991 s

MELON

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M E L O N - - - - -

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Time taken: 0.158016 s

SEMANGKA

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- - - - - E - - - - -
- - - - - M - - - - -
- - - - - A - - - - -
- - - - - N - - - - -
- - - - - G - - - - -
- - - - - K - - - - -
- - - - - A - - - - -

Time taken: 0.163989 s

ANGGUR

A
N
G
G
U
R

Time taken: 0.162012 s

GUAVA

G

U

A

V

A

Time taken: 0.160005 s

TIMUN

Time taken: 0.161012 s

Time taken: 0.162388 s

TOMAT

T
A
M
O
T

Time taken: 0.158004 s

TERONG

- T E R O N G -

Time taken: 0.161992 s

KANGKUNG

K
- A
- N
- G
- K
- U
- N
- G

Time taken: 0.162017 s

[illegible][illegible]

KENTANG

- - - - - K - - - - -
- - - - - E - - - - -
- - - - - N - - - - -
- - - - - T - - - - -
- - - - - A - - - - -
- - - - - N - - - - -
- - - - - G - - - - -

Time taken: 0.161982 s

ВКЧОУ

У О Н С К О В

Time taken: 0.158997 s

Large Test 2 (32x32)

OLUOGQYMCBELTMWKKWOKMMRUDABBLVNKP
UPEDOGQFAJB X Y ZUPAASMDKSAGATGOHC
IEEEZUFHMBRUANHIEWVDQLZSVRYCFIYD
GZERIMLHPVXZIFEKWWXUVDKDRIICMTLN
LDTVAKWTAPSEKVMFN YDLJNOEDWEMQAME
WFOJATQQITGCXWEMJFRUHUFAXJNQWDOC
VVKEYUIRGNSPMCTQG LEEEREQUIREMENTQ
LSIQTOMONDCJCBGDLUMARAYDBFLIBUKM
JYBTXRZENFQNV POMYRYQKHADOHDFTOVW
VDXGOVBLBAPHYCSIUJANESJTWLMJQFXJ
NJEQBVLKGJLFDGZHSRXMQYFJRSJUTYRD
AUBIDGCIYETDTFOSKODZFOHGMHPRXMGP
BNGOKKZNP GSV CJRM YVOHCTPDJNEZTBKY
KIYAZVFEUGMFZNWDZHMQLUVOUYROVIUQ
PUSVKCNEYFHMKR TCOSBCLUNPFNWKUBVV
XBXUVBCTFOYYOCMZDHVBMENJYIDCGY LX
RQGZZBYDIYNCDIYDSSYFSBECJDKMCKRW
RPTHTWMRHF MF RFPXKV VYCOXHODGYMUTS
AXDKVIWDVMGCTPYVUZGXQZZKWWZZXYHX
PAFEAOCNRUKDOWEQOKTLCPIACLEIHMSL
NWAETPNMQGFNRLTIMZYAMJPQOBBLPQSA
QYDRUGCGCQNGYLFNFFYDMAHNNCUCFXYN
ZAE LNSGDUOKTBRSSBTSASVDRSWMJWGVO
BANVUJQDTMICDTAQXQJLDDSRKLI ZJR YU
THTSPFCLMADSZWGHCOGIKAXAXWJOSSI
UKRKXGXSYQSUPXUGRHFMI PMPJBIVEQQ
DXUPDMXAEZRTSJ JYCUHQSSQDAFIDTQPSU
RPTAJZ OCTNWN GUYRZWR YRJKA VEWQTEAT
RAVNKCGNWEAFKF MUOGLJMCNZDQSSEIQN
QSEJUFYZDIEAJGIUYGPMZHCXGCEWUFAT
ROTZGQUBKGQJBSWUJXOBEDWVSFZEJGOU
VDBTIOMFIEGSDLJGRZKIGRMWDYSHWSV I

REFERRAL
REQUIREMENT
OPERATIONAL
CAMPAIGN
TREAT
IVORY
WHEEL
FOUNDATION
PIG
BELT

[illegible]

Time taken: 0.156914 s

REQUIREMENT

REQUIREMENT

Time taken: 0.163517 s

Time taken: 0.157579 s

CAMPAIGN

- - - - - C - - - - -
- - - - - A - - - - -
- - - - - M - - - - -
- - - - - P - - - - -
- - - - - A - - - - -
- - - - - I - - - - -
- - - - - G - - - - -
- - - - - N - - - - -

Time taken: 0.159017 s

IVORY

- - Y R O V I - -

Time taken: 0.157004 s

WHEEL

Time taken: 0.159149 s

FOUNDATION

N
O
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D
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F

Time taken: 0.161003 s

[illegible]

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Time taken: 0.160005 s
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Time taken: 0.160005 s
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BELT

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Time taken: 0.158979 s

Large Test 3 (32x32)

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

WAIT
TRAIT
RESTRICT
FAITH
FORMULA
NOMINATION
WRECK
RANDOM
MAP
RUBBISH

[illegible]

TRAIT

Time taken: 0.154039 s

RESTRICT

Time taken: 0.149012 s

FAITH

Time taken: 0.152 s

FORMULA

FORMULA

Time taken: 0.15 s

NOMINATION

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N

Time taken: 0.146992 s

WRECK

- - - - - W - - - - -
- - - - - R - - - - -
- - - - - E - - - - -
- - - - - C - - - - -
- - - - - K - - - - -
- - - - - - - - - -

Time taken: 0.150012 s

RANDOM

- - - - - R - - - - -
- - - - - A - - - - -
- - - - - N - - - - -
- - - - - D - - - - -
- - - - - O - - - - -
- M - - - - -

Time taken: 0.153502 s

MAP



Time taken: 0.151993 s

RUBBISH

 H
 S
 I
 B
 B
 U
 R

Time taken: 0.147001 s

Alamat drive berisi kode program

<https://drive.google.com/drive/folders/1fNW5HIFjj186oVOI24Gf93IHft1ml9lA?usp=sharing>

Poin Pengecekan

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