

TUGAS KECIL 1
IF2211 STRATEGI ALGORITMA
PENYELESAIAN WORD SEARCH PUZZLE DENGAN
ALGORITMA BRUTE FORCE

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Algoritma Brute Force

Program untuk menyelesaikan *word search puzzle* ini dituliskan dalam bahasa C++ dan menerapkan algoritma *brute-force* yang dijabarkan pada langkah-langkah berikut.

1. Program memuat grid kata dan jawaban dari puzzle dalam bentuk vector.
2. Vector jawaban diiterasi dari jawaban pertama.
3. Huruf pertama suatu jawaban dicocokkan pada grid kata. Grid kata diiterasi secara kolom dari kiri atas hingga terakhir di kanan bawah.
4. Jika ditemukan huruf yang cocok, akan dicek huruf yang bertetangga dengan huruf tersebut mulai dari arah kanan, kanan bawah, bawah, kiri bawah, dst. Huruf tersebut dicocokkan dengan jawaban.
5. Jika huruf yang cocok pada grid kata ada sebanyak panjang kata (*word length*) pada jawaban, indeks huruf pertama dan arahnya ditandai. Jawaban pada grid kata diberi warna.
6. Kata yang tidak terdapat pada grid kata akan ditampilkan bahwa kata tersebut tidak ada.
7. Dilanjutkan dengan kata berikutnya dan diulangi dari langkah ke-3, hingga semua jawaban dievaluasi.

Kode Sumber Program

main.cpp

```
#include <chrono>
#include <iostream>
#include <string>

#include "lib/file_loader/file_loader.h"
#include "lib/puzzle_matcher/puzzle_matcher.h"

FileLoader loader;
PuzzleMatcher matcher;

int main() {
    loader.load();

    // Record start time
    auto start = chrono::high_resolution_clock::now();

    matcher.load(loader.getPuzzleData(), loader.getAnswer());
    matcher.calculate();

    // Record end time
    auto finish = chrono::high_resolution_clock::now();
    matcher.printResult();

    // Calculate duration
    chrono::duration<double> elapsed = finish - start;
    cout << "Waktu eksekusi: " << elapsed.count() * 1000 << " ms\n";
}
```

lib/file_loader.h

```
#ifndef _FILE_LOADER_H
#define _FILE_LOADER_H

#include <fstream>
#include <iostream>
#include <string>
#include <vector>
using namespace std;

typedef vector<char> row;

class FileLoader {
public:
```

```

    FileLoader();
    void load();
    vector<row> getPuzzleData();
    vector<string> getAnswer();
private:
    string filename;
    vector<row> puzzleData;
    vector<string> answer;
};

#endif

```

lib/file_loader.cpp

```

#include "file_loader.h"

FileLoader::FileLoader() {
    filename = "";
    puzzleData = vector<row>();
    answer = vector<string>();
}

void FileLoader::load() {
    int status = 0;
    bool isAnswer = false;
    string line;
    string filename;

    cout << "Word-Search Puzzle Solver" << endl;
    cout << "Masukkan nama file: ";
    cin >> filename;

    ifstream file(filename);
    if (!file.is_open()) {
        cout << "File dengan nama " << filename << " tidak ada atau tidak dapat dibuka" << endl;
        exit(-1);
    } else {
        cout << "\nBerhasil membuka file " << filename << endl;
    }

    int idx = 0;
    char buf;
    while (getline(file, line)) {
        if (!line.empty() && line[line.size() - 1] == '\r')
            line.erase(line.size() - 1);
        if (line.size() < 2) {
            isAnswer = true;

```

```

        continue;
    };
    if (!isAnswer) {
        puzzleData.push_back(row());
        for (int i = 0; i < line.size(); i++) {
            buf = line[i];
            // jika spasi ditemukan, tidak dimasukkan ke dalam
vector
            if (buf == ' ' || buf == '\r' || buf == '\t')
continue;

            puzzleData[idx].push_back(buf);
        }
    } else {
        answer.push_back(line);
    }
    idx++;
}
file.close();
}

vector<row> FileLoader::getPuzzleData() {
    return puzzleData;
}

vector<string> FileLoader::getAnswer() {
    return answer;
}

```

lib/puzzle_matcher.h

```

#ifndef _PUZZLE_MATCHER_H
#define _PUZZLE_MATCHER_H

#include <iostream>
#include <string>
#include <vector>
using namespace std;

#define RESET "\033[0m"
#define RED "\033[31m" /* Red */
#define GREEN "\033[32m" /* Green */
#define YELLOW "\033[33m" /* Yellow */
#define BLUE "\033[34m" /* Blue */
#define MAGENTA "\033[35m" /* Magenta */
#define CYAN "\033[36m" /* Cyan */
#define RED_BOLD "\e[1m\033[31m" /* Red Bold */
#define GREEN_BOLD "\e[1m\033[32m" /* Green Bold */
#define YELLOW_BOLD "\e[1m\033[33m" /* Yellow Bold */

```

```

#define BLUE_BOLD "\e[1m\033[34m"    /* Blue Bold */
#define MAGENTA_BOLD "\e[1m\033[35m" /* Magenta Bold */
#define CYAN_BOLD "\e[1m\033[36m"    /* Cyan Bold */

typedef vector<char> row;
enum direction { Right,
                 DownRight,
                 Down,
                 DownLeft,
                 Left,
                 UpLeft,
                 Up,
                 UpRight };
enum colorNames { Red,
                 Green,
                 Blue,
                 Yellow,
                 Magenta,
                 Cyan,
                 RedBold,
                 GreenBold,
                 BlueBold,
                 YellowBold,
                 MagentaBold,
                 CyanBold };

class PuzzleMatcher {
public:
    PuzzleMatcher();
    void load(vector<row> puzzleData, vector<string> answer);
    void calculate();
    void match(vector<row> puzzleData, string word);
    void printResult();

private:
    vector<row> puzzleData;
    vector<string> answer;
    vector<vector<int>> colorCodesMatrix;
    vector<int> individualComparison;
    int currentColor;
    string colorCycle[12] = {RED, GREEN, YELLOW, BLUE, MAGENTA, CYAN,
RED_BOLD, GREEN_BOLD, YELLOW_BOLD, BLUE_BOLD, MAGENTA_BOLD,
CYAN_BOLD};
    int rowDirs[8] = {0, 1, 1, 1, 0, -1, -1, -1}; // right, down-
right, down, down-left, left, up-left, up, up-right
    int colDirs[8] = {1, 1, 0, -1, -1, -1, 0, 1};
};

```

```
#endif
```

lib/puzzle_matcher.cpp

```
#include "puzzle_matcher.h"

PuzzleMatcher::PuzzleMatcher() {
    puzzleData = vector<row>();
    answer = vector<string>();
    currentColor = 0;
    individualComparison = vector<int>();
}

void PuzzleMatcher::load(vector<row> puzzleData, vector<string>
answer) {
    this->puzzleData = puzzleData;
    this->answer = answer;

    for (int i = 0; i < puzzleData.size(); i++) {
        colorCodesMatrix.push_back(vector<int>());
        for (int j = 0; j < puzzleData[i].size(); j++) {
            colorCodesMatrix[i].push_back(-1);
        }
    }
}

void PuzzleMatcher::calculate() {
    for (int i = 0; i < answer.size(); i++) {
        match(puzzleData, answer[i]);
    }
}

void PuzzleMatcher::match(vector<row> puzzleData, string word) {
    int wordLength = word.length();
    bool isFound = false;
    int rowIdx = 0;
    int colIdx = 0;
    int comparisonCount = 0;
    direction dir;

    // Pencarian ke 8 arah jika huruf pertama dari vector tersebut
    // adalah huruf yang sama dengan variable word
    int rowCount = puzzleData.size();
    int colCount;
    for (int i = 0; i < rowCount; i++) {
        colCount = puzzleData[i].size();
        for (int j = 0; j < colCount; j++) {
            comparisonCount++;
        }
    }
}
```

```

        if (puzzleData[i][j] != word[0]) continue;

        for (int dirNum = 0; dirNum < 8; dirNum++) {
            int tmpRow = i;
            int tmpCol = j;
            // bandingkan pada 8 arah
            for (int k = 1; k < wordLength; k++) {
                tmpRow += rowDirs[dirNum];
                tmpCol += colDirs[dirNum];
                if (tmpRow < 0 || tmpRow >= rowCount || tmpCol <
0 || tmpCol >= colCount) break;

                comparisonCount++;
                if (puzzleData[tmpRow][tmpCol] != word[k]) break;

                if (k == wordLength - 1) {
                    isFound = true;
                    rowIdx = i;
                    colIdx = j;
                    dir = (direction)dirNum;

                    individualComparison.push_back(comparisonCou
nt);

                    break;
                }
            }
            if (isFound) break;
        }
        if (isFound) break;
    }

    if (isFound) {
        int colorCycle = currentColor % 12;
        // set the word to the result
        for (int i = 0; i < wordLength; i++) {
            colorCodesMatrix[rowIdx][colIdx] = colorCycle;

            rowIdx += rowDirs[dir];
            colIdx += colDirs[dir];
        }

        currentColor++;
    } else {
        cout << word << " tidak ditemukan pada puzzle.\n";
    }
}

```



```

void PuzzleMatcher::printResult() {
    cout << endl << "Solusi:" << endl;
    for (int i = 0; i < puzzleData.size(); i++) {
        for (int j = 0; j < puzzleData[i].size(); j++) {
            if (colorCodesMatrix[i][j] == -1) {
                cout << puzzleData[i][j] << " ";
            } else {
                cout << colorCycle[colorCodesMatrix[i][j]] <<
puzzleData[i][j] << RESET << " ";
            }
        }
        cout << endl;
    }

    cout << "\nJumlah perbandingan (comparison) per jawaban:\n";
    int N = 0;
    for (int i = 0; i < individualComparison.size(); i++) {
        cout << answer[i] << ": " << individualComparison[i] <<
endl;
        N += individualComparison[i];
    }

    cout << "\nTotal perbandingan: " << N << endl;
}

```

Hasil Eksekusi Program

Test case 1 (small: 7 baris x 8 kolom)

```
Word-Search Puzzle Solver
Masukkan nama file: test/small-1.txt

Berhasil membuka file test/small-1.txt

Solusi:
J S O L U T I S
S U N A R U U A
N E P T U N E T
S O N I E I S U
R C E V T R E R
A H T R A E S N
M M E R C U R Y

Jumlah perbandingan (comparison) per jawaban:
EARTH: 94
JUPITER: 8
MARS: 53
MERCURY: 59
NEPTUNE: 32
SATURN: 18
URANUS: 37
VENUS: 48

Total perbandingan: 349
Waktu eksekusi: 0 ms
```

Test case 2 (small: 12 x 18)

Word-Search Puzzle Solver
Masukkan nama file: test/small-2.txt

Berhasil membuka file test/small-2.txt

Solusi:

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

Jumlah perbandingan (comparison) per jawaban:

AMBER: 175

AYAKA: 371

BARBARA: 11

BEIDOU: 39

DIONA: 127

EULA: 107

EULA: 107

FISCHL: 206

GANYU: 144

HUTAO: 52

JEAN: 235

KEQING: 119

KLEE: 179

KOKOMI: 276

LISA: 74

NINGGUANG: 57

NOELLE: 17

QIQI: 179

BAAL: 205

SAYU: 175

ROSARIA: 43

```
SHENHE: 91
SUCROSE: 72
XIANGLING: 71
YANFEI: 94
YOIMIYA: 54
YUNJIN: 122

Total perbandingan: 3295
Waktu eksekusi: 0 ms
```

Test case 3 (small: 12 x 12)

```
Word-Search Puzzle Solver
Masukkan nama file: test/small-3.txt

Berhasil membuka file test/small-3.txt

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

```
Jumlah perbandingan (comparison) per jawaban:
ADA: 160
FORTRAN: 17
PHP: 104
ALGOL: 100
MATLAB: 171
JAVA: 84
PYTHON: 162
ASSEMBLY: 240
LABVIEW: 219
SMALLTALK: 147
BASIC: 84
LOGO: 213
VISUALC: 63
COBOL: 41
PASCAL: 41
DELPHI: 75
PERL: 55

Total perbandingan: 1976
Waktu eksekusi: 0 ms
```

Test case 4 (medium: 22 x 22)

```
Word-Search Puzzle Solver
Masukkan nama file: test/medium-1.txt

Berhasil membuka file test/medium-1.txt
```

Solusi:

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

Jumlah perbandingan (comparison) per jawaban:

```
ALBANIA: 515
GERMANY: 494
NORWAY: 321
ANDORRA: 919
GREECE: 42
POLAND: 28
ARMENIA: 864
HUNGARY: 333
PORTUGAL: 364
AUSTRIA: 353
ICELAND: 526
ROMANIA: 293
AZERBAIJAN: 934
IRELAND: 446
RUSSIA: 111
BELARUS: 63
ITALY: 79
SANMARINO: 220
BELGIUM: 439
KAZAKHSTAN: 334
SERBIA: 57
BOSNIAHERZEGOVINA: 273
```

LATVIA: 612
SLOVAKIA: 35
BULGARIA: 153
LIECHTENSTEIN: 651
SLOVENIA: 453
CROATIA: 395
LITHUANIA: 57
SPAIN: 209
CYPRUS: 233
LUXEMBOURG: 364
SWEDEN: 71
CZECHIA: 545
MACEDONIA: 89
SWITZERLAND: 378
DENMARK: 269
MALTA: 426
TURKEY: 338
ESTONIA: 586
MOLDOVA: 199

UKRAINE: 506
FINLAND: 522
MONACO: 27
UNITEDKINGDOM: 249
FRANCE: 80
MONTENEGRO: 363
VATICANCITY: 247
GEORGIA: 264
NETHERLANDS: 32

Total perbandingan: 16361
Waktu eksekusi: 0.398812 ms

Test case 5 (medium: 24 x 24)

Masukkan nama file: test/medium-2.txt

Berhasil membuka file test/medium-2.txt

Solusi:

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

Jumlah perbandingan (comparison) per jawaban:
ALBANY: 155
DOVER: 597
OKLAHOMACITY: 598
ANNAPOLIS: 927
FRANKFORT: 67
OLYMPIA: 683
ATLANTA: 613
HARRISBURG: 704
PHOENIX: 516
AUGUSTA: 805
HARTFORD: 38
PIERRE: 236
AUSTIN: 665
HELENA: 227
PROVIDENCE: 685
BATONROUGE: 199
HONOLULU: 222
RALEIGH: 58
BISMARCK: 670
INDIANAPOLIS: 428
RICHMOND: 550
BOISE: 154
JACKSON: 571
SACRAMENTO: 330
BOSTON: 29
JEFFERSONCITY: 186

SAINTPAUL: 660
CARSONCITY: 671
JUNEAU: 358
SALEM: 775
CHARLESTON: 145
LANSING: 71
SALTLAKECITY: 526
CHEYENNE: 511
LINCOLN: 64
SANTAFE: 762
COLUMBIA: 564
LITTLEROCK: 533
SPRINGFIELD: 629
COLUMBUS: 293
MADISON: 276
TALLAHASSEE: 25
CONCORD: 112
MONTGOMERY: 617
TOPEKA: 808
DENVER: 674
MONTPELIER: 523
TRENTON: 615
DESMOINES: 476
NASHVILLE: 714

Total perbandingan: 22315
Waktu eksekusi: 0.437606 ms

Test case 6 (medium: 20 x 25)

Berhasil membuka file test/medium-3.txt

Solusi:

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

Jumlah perbandingan (comparison) per jawaban:

```
ANDROMEDA: 317
ANTLIA: 430
AQUARIUS: 48
ARIES: 791
CANCER: 284
CAPRICORNUS: 153
CARINA: 296
CASSIOPEIA: 192
CETUS: 432
CONSTELLATIONS: 253
DRACO: 236
GEMINI: 354
HERCULES: 383
HYDRA: 97
LEO: 487
LEPUS: 137
LIBRA: 143
LYNX: 144
LYRA: 370
NORMA: 163
ORION: 330
```

```

PAVO: 408
PEGASUS: 56
PHOENIX: 54
PISCES: 408
SAGITTARIUS: 851
SCORPIUS: 853
SCULPTOR: 17
SERPENS: 202
STARS: 434
TAURUS: 564
VIRGO: 354

Total perbandingan: 10241
Waktu eksekusi: 0.286458 ms

```

Test case 7 (large: 30 x 30)

```

Word-Search Puzzle Solver
Masukkan nama file: test/large-1.txt

Berhasil membuka file test/large-1.txt

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

```

Jumlah perbandingan (comparison) per jawaban:
ACRUX: 25
ADHARA: 1128
ALDEBARAN: 838
ALNAIR: 1077
ALNILAM: 33
ALTAIR: 940
ANTARES: 606
ARCTURUS: 816
BELLATRIX: 498
BETELGEUSE: 335
CANOPUS: 290
ELNATH: 577
FOMALHAUT: 399
HADAR: 767
MIAPLACIDUS: 103
MIMOSA: 465
POLLUX: 796
PROCYON: 279

REGULUS: 615
RIGEL: 648
RIGILKENT: 88
SHAULA: 888
SIRIUS: 936
SPICA: 875
VEGA: 564

Total perbandingan: 14586
Waktu eksekusi: 0.309571 ms

Test case 8 (large: 34 x 34)

Berhasil membuka file test/large-2.txt

Solusi:

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

Jumlah perbandingan (comparison) per jawaban:

AGNESDIGITAL: 138

AGNESTACHYON: 885

AIRGROOVE: 1845

BIWAHAYAHIDE: 1032

CURRENCHAN: 985

DAIWASCARLET: 1141

EISHINFLASH: 1725

ELCONDORPASA: 33

FINEMOTION: 350

FUJIKISEKI: 428

GOLDCITY: 1349

GOLDSHIP: 313

GRASSWONDER: 916

HARUURARA: 418

HISHIAKEBONO: 187

HISHIAMAZON: 352

INESFUJIN: 678

KAWAKAMIPRINCESS: 397

KINGHALO: 298
MANHATTANCAFE: 1095
MARUZENSKY: 972
MATIKANETANNHAUSER: 732
MATIKANEFUKUKITARU: 1074
MAYANOTOPGUN: 15
MEISHODOTO: 87
MEJIRODOBER: 743
MEJIROMCQUEEN: 1140
MEJIRORYAN: 392
MIHONOBURBON: 549
NARITABRIAN: 1671
NARITATAISHIN: 1194
NICENATURE: 570
OGURICAP: 158
RICESHOWER: 332
SAKURABAKUSHINO: 1336
SAKURACHIYONOO: 750
SETUNSKY: 620
SILENCESUZUKA: 1478
SMARTFALCON: 1334
SPECIALWEEK: 1029
SUPERCREEK: 272
SYMBOLIRUDOLF: 1200
TMOPERA0: 306
TAIKISHUTTLE: 703
TAMAMOCROSS: 452
TOKAITEIO: 1317
VODKA: 759
WINNINGTICKET: 516
YUKINOBIJIN: 84
ZENNOROBROY: 1222

Total perbandingan: 37572
Waktu eksekusi: 0.771113 ms

Test case 9 (large: 34 x 34)

Berhasil membuka file test/large-3.txt

Solusi:

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

Jumlah perbandingan (comparison) per jawaban:

ANTMAN: 42

BEAST: 355

BLACKKNIGHT: 193

BLACKPANTHER: 46

BLACKWIDOW: 705

CAPTAINAMERICA: 675

CAPTAINMARVEL: 231

DOCTORSTRANGE: 1166

HAWKEYE: 467

HELLCAT: 48

HERCULES: 31

HULLK: 195

IRONMAN: 1098

MANTIS: 268

MISTERFANTASTIC: 981

MOONDRAGON: 577

QUICKSILVER: 394

SANDMAN: 417

SCARLETWITCH: 117

SPIDERMAN: 616

SWORDSMAN: 1315

THOR: 1037

VISION: 965

WARMACHINE: 55

Total perbandingan: 11994

Waktu eksekusi: 0.304782 ms

Link Projek Tupil 1

<https://github.com/VanillaMacchiato/tupil1-stima>

Daftar Periksa Program

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