Laporan Tugas Kecil I Strategi Algoritma

Penyelesaian Word Search Puzzle dengan Algoritma Brute Force

Semester II Tahun 2021/2022

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I. Check List Status 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		

II. Langkah-langkah Algoritma Brute Force

1. Algoritma pembacaan file

- Pada pembacaan file ini, terdapat 2 state / mode program, yang pertama mode untuk membaca word puzzle dan yang kedua ialah mode membaca kata-kata yang akan dicari.
- Data word puzzle disimpan pada vektor 2 dimensi berisi pasangan karakter untuk karakter word puzzle dan integer untuk kode warna huruf ketika ditampilkan. Sedangkan data kata-kata yang akan dicari disimpan pada vektor string.
- Buka file dengan alamat berdasarkan masukan pengguna, jika file tidak ditemukan, akan ditampilkan pesan "File not found" dan program berhenti.
- Lakukan iterasi setiap baris pada file, jika baris tersebut panjangnya kurang dari atau sama dengan 1, maka ganti ke state / mode 2
- Jika baris panjangnya lebih dari 1 dan sedang di state / mode 1, maka kita lakukan pembacaan karakter yang bukan whitespace dan simpan pada vektor pasangan karakter dan integer. Setelah selesai pembacaan satu baris, maka simpan pada vektor 2 dimensi sebelumnya.
- Jika baris panjangnya lebih dari 1 dan sedang di state / mode 2, maka kita langsung masukan string baris pembacaan ke vektor string sebelumnya.

2. Algoritma pemrosesan word search puzzle

- Iterasi setiap kata yang akan dicari pada word puzzle
- Untuk setiap iterasi, kita cari kata tersebut pada word puzzle secara delapan arah secara berurutan. Delapan arah tersebut ialah horizontal ke kanan, horizontal ke kiri, vertical ke bawah, vertical ke atas, diagonal utama ke kanan bawah, diagonal utama ke kiri atas, diagonal samping ke kiri bawah dan diagonal samping ke kanan atas.
- Pencarian tersebut dengan cara mencari kata yang dicari saat itu pada setiap baris (jika horizontal), setiap kolom (jika vertical), atau setiap diagonal (jika diagonal) word puzzle.
- Pencarian pada setiap baris / kolom / diagonal tersebut diawali dengan menghitung berapa banyak kata dengan panjang sama dengan kata yang dicari, yang muat pada baris /

kolom / diagonal tersebut. Untuk setiap nilai tersebut, maka dilakukan komparasi string dengan membandingkan karakter satu per satu.
- Jika sudah berbeda karakter, maka hentikan komparasi dan lanjut ke iterasi berikutnya
- Jika benar, maka ganti kode warna huruf-huruf pada word puzzle yang bersesuaian dengan kata yang dicari dan hentikan pencarian kata tersebut. Kode warna didapatkan dari indeks / urutan kata yang dicari.
- Jika sudah ditemukan di salah satu arah (horizontal / vertical / diagonal), maka tidak dilakukan pencarian kata yang sama pada arah yang berbeda.
- Jika sudah semua kata yang dicari ditemukan, maka akan ditampilkan ke layar huruf-huruf word puzzle dengan warna yang bersesuaian dengan kata-kata yang dicari, jika ada yang bersesuaian.

3. **Algoritma output hasil**
   - Iterasi setiap baris dari data word puzzle (berupa vektor 2 dimensi dari pasangan karakter dan integer)
   - Iterasi setiap kolom pada baris, dan tampilkan huruf ke layar berdasarkan kode warna huruf tersebut.
   - Program ini hanya memiliki 13 kombinasi warna, 12 untuk hasil kata yang dicari dan 1 untuk huruf-huruf yang tidak memiliki kata yang bersesuaian. Oleh karena itu, jika terdapat lebih dari 12 kata yang dicari, maka akan terdapat warna yang sama pada hasil pencarian karena dilakukan modulo berdasarkan kode warna dan jumlah warna yang tersedia (12).

III. Source program

Program ini dibagi menjadi 4 bagian, yaitu: main program, file reader program, word puzzle solver program, serta utils program. Dengan semua program kecuali main program, memiliki header file-nya masing-masing. Pada program ini, diterapkan konsep pemrograman berbasis objek untuk mengisolasi method dan atribut, terutama atribut untuk data global objek tersebut yang tidak seharusnya diakses oleh program lain sehingga membuat pengembangan program menjadi lebih aman.

1. Main Program

```cpp
#include "file_reader/file_reader.hpp"
#include "utils/utils.hpp"
#include "word_puzzle_solver/word_puzzle_solver.hpp"
#include <array>
#include <chrono>
#include <ctime>
#include <iostream>
#include <string>
#include <utility>
#include <vector>

int main(int argc, char **argv) {
  std::vector<std::vector<std::pair<char, int>>> word_puzzle;
  std::vector<std::string> words_searched;

  if (argc < 2) {
    std::cout << "Please add arguments for file name" << std::endl;
    return 0;
  }

  FileReader fileReader = FileReader();
  if (!fileReader.readFile(std::string("./test/") + argv[1], word_puzzle,
                           words_searched)) {
    return 0;
  }

  std::chrono::time_point<std::chrono::system_clock> start, end;

  start = std::chrono::system_clock::now();

  WordPuzzleSolver wps = WordPuzzleSolver();
  wps.solve(word_puzzle, words_searched);

  end = std::chrono::system_clock::now();

  Utils utils = Utils();
  utils.showOutput(word_puzzle);          malikrafsan, 3 days ago • save refactor

  std::cout << "COMPARISONS: " << wps.getComparisons() << std::endl;

  std::chrono::nanoseconds elapsed_seconds = end - start;
  std::time_t end_time = std::chrono::system_clock::to_time_t(end);

  std::cout << "elapsed time: " << elapsed_seconds.count() << " nanoseconds\n";

  return 0;
}
```

2. File reader program
- **Header file**

```cpp
#pragma once
#include <fstream>
#include <string>
#include <vector>

// malikrafsan, 3 days ago | 1 author (malikrafsan)
class FileReader {
private:
  std::ifstream fin;

public:
  bool readFile(std::string fileName,
                std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
                std::vector<std::string> &words_searched);
};
//        malikrafsan, 3 days ago • save refactor
```

- **C++ file**

```cpp
#include "file_reader.hpp"
#include <fstream>
#include <iostream>
#include <string>
#include <vector>

bool FileReader::readFile(
    std::string fileName,
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
    std::vector<std::string> &words_searched) {
  bool isMode1 = true;
  std::string line;

  fin.open(fileName);
  if (!fin.is_open()) {
    std::cout << "File not found" << std::endl;
    return false;
  }

  while (fin) {
    getline(fin, line);

    if (line.length() > 1) {
      if (isMode1) {
        std::vector<std::pair<char, int>> line_vector;
        for (int i = 0; i < line.length(); i++) {
          if (line[i] != ' ') {
            line_vector.push_back({line[i], -1});
          }
        }
        word_puzzle.push_back(line_vector);
      } else {
        words_searched.push_back(line);
      }
    } else {
      if (isMode1) {
        isMode1 = false;
      } else {
        break;
      }
    }
  }
  fin.close();
  return true;
}
```

3. Word Puzzle Solver program
- **Header file**

```cpp
#pragma once    #pragma once in main file [-Wpragma-once-outside-header]
#include <iostream>
#include <string>
#include <vector>

class WordPuzzleSolver {
private:
  int idxWord;
  long long comparisons = 0;

  bool solvePerWord(std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
                    std::string &word_searched);
  int inline calcIndexWord(bool isReversed, int idx, int word_length) {
    return isReversed ? word_length - idx - 1 : idx;
  }
  bool
  solveHorizontal(std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
                  std::string &word_searched, bool isReversed);
  bool
  solveVertical(std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
                std::string &word_searched, bool isReversed);
  bool
  solveMainDiagonal(std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
                    std::string &word_searched);
  bool solveCrossDiagonal(
      std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
      std::string &word_searched);
  bool
  checkMainDiagonal(std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
                    std::string &word_searched, int rowStart, int colStart,
                    bool isReversed);
  bool checkCrossDiagonal(
      std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
      std::string &word_searched, int rowStart, int colStart, bool isReversed);
  void addColor(std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
                const int row, const int col, const int len, const char mode);

public:
  void solve(std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
             std::vector<std::string> &words_searched);
  long long inline getComparisons() { return comparisons; }
};
```

- **C++ file**

```cpp
#include "word_puzzle_solver.hpp"
#include <exception>

void WordPuzzleSolver::solve(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
    std::vector<std::string> &words_searched) {
  for (int i = 0; i < words_searched.size(); i++) {
    std::string word_searched = words_searched[i];
    idxWord = i;
    solvePerWord(word_puzzle, word_searched);
  }
}

bool WordPuzzleSolver::solvePerWord(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
    std::string &word_searched) {
  return solveHorizontal(word_puzzle, word_searched, false) ||
         solveHorizontal(word_puzzle, word_searched, true) ||
         solveVertical(word_puzzle, word_searched, false) ||
         solveVertical(word_puzzle, word_searched, true) ||
         solveMainDiagonal(word_puzzle, word_searched) ||
         solveCrossDiagonal(word_puzzle, word_searched);
}

bool WordPuzzleSolver::solveHorizontal(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
    std::string &word_searched, bool isReversed) {
  bool found = false;
  int col = word_puzzle[0].size() - word_searched.length() + 1;

  for (int i = 0; i < word_puzzle.size(); i++) {
    for (int j = 0; j < col; j++) {
      found = true;
      for (int k = 0; k < (word_searched.length()); k++) {
        comparisons++;
        if (word_searched[calcIndexWord(isReversed, k,
                          word_searched.length())] !=
            word_puzzle[i][j + k].first) {
          found = false;
          break;
        }
      }
      if (found) {
        addColor(word_puzzle, i, j, word_searched.length(), 'H');
        break;
      }
    }
    if (found) {
      break;
    }
  }
  return found;
}
```

```cpp
bool WordPuzzleSolver::solveVertical(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
    std::string &word_searched, bool isReversed) {
  bool found = false;
  int row = word_puzzle.size() - word_searched.length() + 1;

  for (int i = 0; i < word_puzzle[0].size(); i++) {
    for (int j = 0; j < row; j++) {
      found = true;
      for (int k = 0; k < (word_searched.length()); k++) {
        comparisons++;
        if (word_searched[calcIndexWord(isReversed, k,
                          word_searched.length())] !=
            word_puzzle[j + k][i].first) {
          found = false;
          break;
        }
      }
      if (found) {
        addColor(word_puzzle, j, i, word_searched.length(), 'V');
        break;
      }
    }
    if (found) {
      break;
    }
  }
  return found;
}

bool WordPuzzleSolver::solveMainDiagonal(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
    std::string &word_searched) {
  for (int i = 0; i < word_puzzle.size(); i++) {
    if (checkMainDiagonal(word_puzzle, word_searched, i, 0, false) ||
        checkMainDiagonal(word_puzzle, word_searched, i, 0, true)) {
      return true;
    }
  }
  if (word_puzzle[0].size() > 1) {
    for (int i = 1; i < word_puzzle[0].size(); i++) {
      if (checkMainDiagonal(word_puzzle, word_searched, 0, i, false) ||
          checkMainDiagonal(word_puzzle, word_searched, 0, i, true)) {
        return true;
      }
    }
  }
  return false;
}
```

```cpp
bool WordPuzzleSolver::solveCrossDiagonal(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
    std::string &word_searched) {
  for (int i = 0; i < word_puzzle.size(); i++) {
    if (checkCrossDiagonal(word_puzzle, word_searched, i, 0, false) ||
        checkCrossDiagonal(word_puzzle, word_searched, i, 0, true)) {
      return true;
    }
  }
  if (word_puzzle[0].size() > 1) {
    for (int i = 1; i < word_puzzle[0].size(); i++) {
      if (checkCrossDiagonal(word_puzzle, word_searched, word_puzzle.size() - 1,
                             i, false) ||
          checkCrossDiagonal(word_puzzle, word_searched, word_puzzle.size() - 1,
                             i, true)) {
        return true;
      }
    }
  }
  return false;
}

bool WordPuzzleSolver::checkMainDiagonal(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
    std::string &word_searched, int rowStart, int colStart, bool isReversed) {
  bool found = false;

  for (int i = 0;
       (i + rowStart + word_searched.length() - 1) < word_puzzle.size() &&
       (i + colStart + word_searched.length() - 1) < word_puzzle[0].size();
       i++) {
    found = true;
    for (int j = 0; j < (word_searched.length()); j++) {
      comparisons++;
      if (word_puzzle[i + j + rowStart][i + j + colStart].first !=
          word_searched[calcIndexWord(isReversed, j, word_searched.length())]) {
        found = false;
        break;
      }
    }
    if (found) {
      addColor(word_puzzle, i + rowStart, i + colStart, word_searched.length(),
               'M');
      break;
    }
  }
  return found;
}
```

```cpp
bool WordPuzzleSolver::checkCrossDiagonal(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle,
    std::string &word_searched, int rowStart, int colStart, bool isReversed) {
  bool found = false;

  for (int i = 0;
       (int(rowStart - word_searched.length() + 1 - i) >= 0 &&
        colStart + word_searched.length() - 1 + i < word_puzzle[0].size());
       i++) {
    found = true;
    for (int j = 0; j < (word_searched.length()); j++) {
      comparisons++;
      if (word_puzzle[rowStart - i - j][colStart + i + j].first !=
          word_searched[calcIndexWord(isReversed, j, word_searched.length())]) {
        found = false;
        break;
      }
    }
    if (found) {
      addColor(word_puzzle, rowStart - i, colStart + i, word_searched.length(),
               'C');
      break;
    }
  }
  return found;
}

void WordPuzzleSolver::addColor(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle, const int row,
    const int col, const int len, const char mode) {
  switch (mode) {
  case 'H':
    for (int i = 0; i < len; i++) {
      word_puzzle[row][col + i].second = idxWord;
    }
    break;
  case 'V':
    for (int i = 0; i < len; i++) {
      word_puzzle[row + i][col].second = idxWord;
    }
    break;
  case 'M':
    for (int i = 0; i < len; i++) {
      word_puzzle[row + i][col + i].second = idxWord;
    }
    break;
  case 'C':
    for (int i = 0; i < len; i++) {
      word_puzzle[row - i][col + i].second = idxWord;
    }
    break;
  }
}
```

4. Utils program
- **Header file**

```cpp
#pragma once
#include <iostream>
#include <string>
#include <vector>

#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 BOLDRED "\033[1m\033[31m"          /* Bold Red */
#define BOLDGREEN "\033[1m\033[32m"        /* Bold Green */
#define BOLDYELLOW "\033[1m\033[33m"       /* Bold Yellow */
#define BOLDBLUE "\033[1m\033[34m"         /* Bold Blue */
#define BOLDMAGENTA "\033[1m\033[35m"      /* Bold Magenta */
#define BOLDCYAN "\033[1m\033[36m"         /* Bold Cyan */
```

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```cpp
class Utils {
private:
  const int codeAmount = 12;
  const std::string colorCode[12] = {
      RED,      GREEN,      YELLOW,      BLUE,      MAGENTA,      CYAN,
      BOLDRED, BOLDGREEN, BOLDYELLOW, BOLDBLUE, BOLDMAGENTA, BOLDCYAN,
  };
  std::string inline getColor(int code) {
    return code == -1 ? RESET : colorCode[code % codeAmount];
  }

public:
  void showOutput(std::vector<std::vector<std::pair<char, int>>> &word_puzzle);
  void
  showCodeColor(std::vector<std::vector<std::pair<char, int>>> &word_puzzle);
};
```

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- **C++ file**

```cpp
#include "utils.hpp"

void Utils::showOutput(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle) {
  for (int i = 0; i < word_puzzle.size(); i++) {
    for (int j = 0; j < word_puzzle[i].size(); j++) {
      std::cout << getColor(word_puzzle[i][j].second) << word_puzzle[i][j].first
                << " ";
    }
    std::cout << std::endl;
  }
  std::cout << RESET;
}

void Utils::showCodeColor(
    std::vector<std::vector<std::pair<char, int>>> &word_puzzle) {
  for (int i = 0; i < word_puzzle.size(); i++) {
    for (int j = 0; j < word_puzzle[i].size(); j++) {
      std::cout << word_puzzle[i][j].second << " ";
    }
    std::cout << std::endl;
  }
}
```

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IV. Skrinshut Input dan Output

Kategori ukuran kecil

Small 1

```
tests >  small_1.txt
   1    D B H L D T Y Q R Z A H Z J
   2    M L V T T N J Q E B V S H P
   3    D E R G D I W A S M R J X T
   4    E T T O D R K T V E I P O D
   5    C N D H W P R O T A L I P K
   6    O E U P O A Q N R O L L E H
   7    R M S L C D I P V S C O D E
   8    A E P T R O O N M G L R X B
   9    T R Y F P O E L B A I R A V
  10    O C T Y L C L A S S P U K Y
  11    R N H G D T Q G Q X G R O M
  12    S I O I J T S K I F F H T Q
  13    U R N L V I S C V Z V U K E
  14    O Z R Z W N E O E J M E O Q
  15    W L B D W Z V V O X S Y D O
  16
  17    ABSTRACT
  18    CLASS
  19    DECORATORS
  20    HELLO
  21    INCREMENT
  22    JAVA
  23    LOOP
  24    METHOD
  25    POINTERS
  26    PRINT
  27    PYTHON
  28    VARIABLE
  29    VSCODE
  30    WORLD
```

```
D:\KULIAH-AKBAR\SEMESTER-4\STIMA\tu
D B H L D T Y Q R Z A H Z J
M L V T T N J Q E B V S H P
D E R G D I W A S M R J X T
E T T O D R K T V E I P O D
C N D H W P R O T A L I P K
O E U P O A Q N R O L L E H
R M S L C D I P V S C O D E
A E P T R O O N M G L R X B
T R Y F P O E L B A I R A V
O C T Y L C L A S S P U K Y
R N H G D T Q G Q X G R O M
S I O I J T S K I F F H T Q
U R N L V I S C V Z V U K E
O Z R Z W N E O E J M E O Q
W L B D W Z V V O X S Y D O
COMPARISONS: 6440
elapsed time: 534000 nanoseconds
```

Small 2

```
 1    C S H R U K A T G N W Q E O V
 2    M G H Y E R G N I L G N A I X
 3    J B A E A B I C F Z B W E W F
 4    I S X B N Q M I K L E E Q N D
 5    Z Q R Z E H S A B E I D O U L
 6    E A I K H C E I L B S E O N I
 7    B I W Q H P N H A U I M I S S
 8    G E E L J I K V A N U N V U A
 9    X U K F J W B O B L G V O C Y
10    L L O N N W W A K G O V C R I
11    S A U A H A R K U O D C Z O M
12    Z Y V N T S Y A N W M I X S I
13    B I B Y B U N Y A H N I O E O
14    U Y N A G G H A E L L E O N Y
15    R O S A R I A D J Z B J L V A
16
17    AMBER
18    AYAKA
19    BARBARA
20    BEIDOU
21    DIONA
22    EULA
23    FISCHL
24    GANYU
25    HUTAO
26    JEAN
27    KEQING
28    KLEE
29    KOKOMI
30    LISA
31    NINGGUANG
32    NOELLE
33    QIQI
34    BAAL
35    SAYU
36    ROSARIA
37    SHENHE
38    SUCROSE
39    XIANGLING
40    YANFEI
41    YOIMIYA
42    YUNJIN
```



```
D:\KULIAH-AKBAR\SEMESTER-4\STIMA\
C S H R U K A T G N W Q E O V
M G H Y E R G N I L G N A I X
J B A E A B I C F Z B W E W F
I S X B N Q M I K L E E Q N D
Z Q R Z E H S A B E I D O U L
E A I K H C E I L B S E O N I
B I W Q H P N H A U I M I S S
G E E L J I K V A N U N V U A
X U K F J W B O B L G V O C Y
L L O N N W W A K G O V C R I
S A U A H A R K U O D C Z O M
Z Y V N T S Y A N W M I X S I
B I B Y B U N Y A H N I O E O
U Y N A G G H A E L L E O N Y
R O S A R I A D J Z B J L V A
COMPARISONS: 15567
elapsed time: 0 nanoseconds
```

Small 3

tests > 📄 small_3.txt

```
1    Y L H Z E T B J N E P V N L A
2    Z G C R E M R A F E H F O I S
3    U I X N W E Z N J S W M I T B
4    B X N S F A O W T D A S T E U
5    L I U I I I G H W H A A A R M
6    S G W J T S T E D C C D N A T
7    C V Y I G B Y A O I D V I T E
8    O I B F A M I L Y I T E G U H
9    Q M W W Z V L T A M H R A R Q
10   A O L C T E I H R N Q T M E E
11   D U T M G O U Y E S A I I A I
12   U X K E K U S V G X X S R I L
13   A R T I C L E F N U X I B V G
14   C A N K B N H I I P M N R Y Z
15   G N B Q T F J O S E D G R K O
16
17   HEALTH
18   TENNIS
19   FARMER
20   ANALYSIS
21   SINGER
22   AMBITION
23   FAMILY
24   NEWS
25   ADVERTISING
26   COLLEGE
27   IMAGINATION
28   WIFE
29   ARTICLE
30   LITERATURE
31   EVENT
```

```
D:\KULIAH-AKBAR\SEMESTER-4\STIMA\
Y L H Z E T B J N E P V N L A
Z G C R E M R A F E H F O I S
U I X N W E Z N J S W M I T B
B X N S F A O W T D A S T E U
L I U I I I G H W H A A A R M
S G W J T S T E D C C D N A T
C V Y I G B Y A O I D V I T E
O I B F A M I L Y I T E G U H
Q M W W Z V L T A M H R A R Q
A O L C T E I H R N Q T M E E
D U T M G O U Y E S A I I A I
U X K E K U S V G X X S R I L
A R T I C L E F N U X I B V G
C A N K B N H I I P M N R Y Z
G N B Q T F J O S E D G R K O
COMPARISONS: 8357
elapsed time: 0 nanoseconds
```

Kategori Ukuran Sedang

Medium 1

tests > ≡ medium_1.txt
```
 1    O F B S A G O L Y Z R D E K T A D Y E I B L
 2    A M N N T A A A S Q B W H C I G T N Z M A S
 3    M B I P Q G M Q V R S D R S J U Q O X P A G
 4    B H W P U A G S J V N E E T E A P D C Y Z F
 5    C D Z T N W S O A D N N P G B T U P M J M Q
 6    F L R J G N A E E A O U R F M E Y R W A F W
 7    A O K I D C I X T D R D A V F M H U E H Z U
 8    P I E H W X S O N K I P N Z G A A E Y P F I
 9    F G G A S A U I Y E S Y C X O L N A E R O K
10    M H M L I P R X D Y E X I O B A I A U Y H U
11    W U S H E E A P B Y M T S E H W T I Y U U W
12    Z F O T E B I N T A H I L A H F N L A N V C
13    M A L A Y S I A Y O N A N U M W E O A A R F
14    B U L G A R I A N O N G V A A E G G Q N Y L
15    W D F R S Q J D O D L W L E T M R N L I G Y
16    G D Z W A W U J A A X Q C A N A A O Z D U Q
17    F S G C Z R Q Z J M Z A G D D E L M H B Y L
18    J U Y B A I K R U T J H X X P E Z E F C Z Z
19    E G R S I R U S J G M R I W G D S U S R F U
20    E G A U P T C U U A A K R H W B L H E S I Z
21    C Z F C G M G B Y N E B G D D R J W C L F D
22    A I L A R T S U A S I N G A P U R A K O A E
23
24    ARGENTINA
25    INDONESIA
26    MALAYSIA
27    SPANYOL
28    PRANCIS
29    BELANDA
30    AUSTRALIA
31    BELGIA
32    RUSIA
33    CHINA
34    BULGARIA
35    BANGLADESH
36    GUATEMALA
37    HONDURAS
38    MONGOLIA
39    PORTUGAL
40    SINGAPURA
41    VENEZUELA
42    YUNANI
43    YAMAN
44    TURKI
45    PERU
46    MESIR
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Medium 2

```
 1    A T I M P I G N I G N I R B P U W M K V B T
 2    Q G B E W H I M S I C A L L E X V G X R G G
 3    H I J G F W X V V L Z D E U G R E Z O D N U
 4    H E A O S A Y Y H S I U G N A C C T X I L L
 5    N N F B I M U N U D S M W E Z Z H A H Y K I
 6    F I Y D L K T Q J N X R Y P I E Y D S Y V V
 7    X V K E I N R D E J Q L Y P R J L V A S K R
 8    R I G U Q E C N A H C R E P V L T N L R A T
 9    A D R G R D Y W U Y Q J B X W B N N B K N M
10    C F C O R D L C S R A A D U Q Q I Y N Q P S
11    M E X L T Q E U Q A T Y A Z W C A G V P T X
12    I B Q A S C M R L I Z X F I U B U H G D G D
13    G R U T R S O E W N V V U B Z P Q S T J O T
14    F K Q A W U H D I U R O T A L U M I T S S W
15    P Q Q C R N Q E B C D S T P F O P P D M Q E
16    T P U X F B O J I E X K I X I L N R P C K W
17    N D E T C E J E R P E Y E T P L Y N V M I V
18    T X Z D Z A Y A A B K Q C O N F A F I I B Y
19    G N I C A M I R G W B E E L Y M P H O M A D
20    X T C B V I J O H F O L D G C T O T E C A F
21
22    ANGUISH
23    BROTHER
24    CATALOGUED
25    CURED
26    DARNS
27    DECEIT
28    DIVINE
29    FACET
30    GRIMACING
31    HOMELY
32    LYMPHOMA
33    MASSACRE
34    PECUNIARY
35    PERCHANCE
36    QUAINTLY
37    REJECTED
38    STIMULATOR
39    SUNBEAM
40    UPBRINGING
41    WHIMSICAL
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D:\KULIAH-AKBAR\SEMESTER-4\STIMA\tucil-1>bin
A T I M P I G N I G N I R B P U W M K V B T
Q G B E W H I M S I C A L L E X V G X R G G
H I J G F W X V V L Z D E U G R E Z O D N U
H E A O S A Y Y H S I U G N A C C T X I L L
N N F B I M U N U D S M W E Z Z H A H Y K I
F I Y D L K T Q J N X R Y P I E Y D S Y V V
X V K E I N R D E J Q L Y P R J L V A S K R
R I G U Q E C N A H C R E P V L T N L R A T
A D R G R D Y W U Y Q J B X W B N N B K N M
C F C O R D L C S R A A D U Q Q I Y N Q P S
M E X L T Q E U Q A T Y A Z W C A G V P T X
I B Q A S C M R L I Z X F I U B U H G D G D
G R U T R S O E W N V V U B Z P Q S T J O T
F K Q A W U H D I U R O T A L U M I T S S W
P Q Q C R N Q E B C D S T P F O P P D M Q E
T P U X F B O J I E X K I X I L N R P C K W
N D E T C E J E R P E Y E T P L Y N V M I V
T X Z D Z A Y A A B K Q C O N F A F I I B Y
G N I C A M I R G W B E E L Y M P H O M A D
X T C B V I J O H F O L D G C T O T E C A F
COMPARISONS: 17635
elapsed time: 0 nanoseconds
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Medium 3

```
tests >  medium_3.txt
    1   S B B E A A F X R M R P Z T A B H P W G
    2   W U M T D Q Z G Y W L P K R R N K X B P
    3   Y Y G K I S T Z K M R X I A S X Q L K V
    4   Z E D D S L Q W I X H W N O D D H P C S
    5   X R Q E N I N R U P L U D X F B H A R H
    6   H Z V O Z Z W V A U O T D E X C N R R N
    7   T I X B X X Q Y N R I R H U P I K P U B
    8   C E L L H I I X A V K P C G G T W X L J
    9   B R P U T R T N R A X T C H I R H Z C A
   10   P Q G U T R G E W I A F T K B L C U R S
   11   O W P G O E Y T A O R H T L S Y F I R A
   12   W Z B F N A B R D R D E Q F D U S M X M
   13   L I F K L I J W K O L M O D E D O O W P
   14   A E W P S C K X G V L R Y H X S Z C L L
   15   E U Y C Q A F L Y N W E A I T U L J O E
   16   M L W N U W L C U X D N N N A S A Q H J
   17   E P T J Y A W A O T J N C D G C B I C I
   18   U P R H D M C U D C I I A X R U J N E C
   19   U B U F O N K Q I T Q W T V R J E M I M
   20   W J X K D S L Q F V K Z S R K G N T U O
   21
   22   FLIGHT
   23   ART
   24   EFFORT
   25   MODE
   26   DEPTH
   27   SAMPLE
   28   NIGHT
   29   WOOD
   30   PIZZA
   31   WINNER
   32   PLAYER
   33   CELL
   34   SALAD
   35   BUYER
   36   ORANGE
   37   THROAT
   38   KING
   39   MEAL
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D:\KULIAH-AKBAR\SEMESTER-4\STIMA\tucil-1>
S B B E A A F X R M R P Z T A B H P W G
W U M T D Q Z G Y W L P K R R N K X B P
Y Y G K I S T Z K M R X I A S X Q L K V
Z E D D S L Q W I X H W N O D D H P C S
X R Q E N I N R U P L U D X F B H A R H
H Z V O Z Z W V A U O T D E X C N R R N
T I X B X X Q Y N R I R H U P I K P U B
C E L L H I I X A V K P C G G T W X L J
B R P U T R T N R A X T C H I R H Z C A
P Q G U T R G E W I A F T K B L C U R S
O W P G O E Y T A O R H T L S Y F I R A
W Z B F N A B R D R D E Q F D U S M X M
L I F K L I J W K O L M O D E D O O W P
A E W P S C K X G V L R Y H X S Z C L L
E U Y C Q A F L Y N W E A I T U L J O E
M L W N U W L C U X D N N N A S A Q H J
E P T J Y A W A O T J N C D G C B I C I
U P R H D M C U D C I I A X R U J N E C
U B U F O N K Q I T Q W T V R J E M I M
W J X K D S L Q F V K Z S R K G N T U O
COMPARISONS: 22907
elapsed time: 0 nanoseconds
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Kategori ukuran besar

Large 1

tests > 📄 large_1.txt

```
 1   C V L U X G E L L B Z Z R D S W E N D T I E M Z G Z Q X I U Y X
 2   P E Q G Y N L I O A Y V X K R I H M Z W N T N H V B M R A Y I E
 3   X M I S T A C Q L C A L L I M J V Z A I Z K D U Z A O S T S D Z
 4   C D H S T U K A G L O I R U S T A M E T S L S G N Y B O O P M E
 5   S E J Y F I A O K C O A L P Y U L R D I A H K U O H C Y C S Y N
 6   U B G I F I K Z M I Y U L K B F L S Y G D W L K L O R W N C Z Q
 7   B K T U H X D U K K E X B F E I A P Y N S P W O B R Z E E S Y G
 8   J Y G O E K A S T I F C H M M V U F A R I Q X O N H B S E D T F
 9   W C F E B B E X L O D K F F S M U E A L I B R O I C W W S Y X P
10   W V K I X U F J J Q P A A E W B J N U A A X E A L N J M Y Y S G
11   D N S E M Y A K Y B D E C M U T U O O M M L N X F B H A Q M T U
12   L O Y M F R V Y Z H E A T K A N X R R E A M K J H N M Z I R S X
13   A X K U O C K V A I M H I Z R R Q O F P H K N O A M Y V P E Y A
14   G S Q K R W R L S M D O C P O S I K H Z C M C K N G U H U F X N
15   T Z E A R I X E N D E R J C J B K N B X A G H T E Z D M L N X A
16   E P I W Z S R O A Z R I P N X N N B E H A V N I N A S X E Z E S
17   Y S Q O W E T Z K I L U A F X Y M O G U H Q F C E N I D V I Q H
18   O S O T C K R O N I I L A R J A G J Y X L F P W Z P V E W R Y F
19   Y R C R O J M Z M S G J G J O N O Z K O S Q O G F U K I V P S L
20   Y D A H I M E A R A I K L I W S K W R Z A H K M S I S H K U P A
21   R N K Y V K L J X C P K C T H M E V Z H A U N E F P A J B A Z R
22   A T A N A K A L U I O X V Y W Q V A H A R O I Y L U B A W G U E
23   L L B E B Y S H I O N S D C Z E D O J R J L N Q C A R A K L O P
24   M Q Z D W L A V A Q Z F P Q I O S U I S E I U J H U M M T M L O
25   G T L V M U P B G A K Z Z X X F F R T U Y M Z S O W Y Y O R P T
26   Q A T I Q E U R B K J N L E G S I H I O T V G X C U R O D D A G
27   S Z P A Q I U C X H F F C O C O C N G U L Y I U O K N B V Q M S
28   M R N C L G X X F B O A M U R N B H K T G N G U R A C O N M D H
29   B I E X Q I Z Z P G W R J F R I I X L P A G O N W A K Y U K V A
30   B S A Z J D A V V O R U S H I A B R Q O B I L H C B O A D Y C Y
31   A U L M B K E A K K H J X H O O K S R G E H P O O F M I E F D N
32   E W B K E N X C C I T K U P T N O I M P D V X M F D U E A F I A
33   L L D J C X C K Y M E V N A G J U B G N X V L H R Z I F O I D T
34   Z I M A Z J E T J Q C I N S H I A K A P C I F O D K I C S T M Z
35
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36	AKIROSE
37	AME
38	ANYA
39	AQUA
40	AYAME
41	AZKI
42	BAELS
43	BOTAN
44	CALLI
45	CERES
46	CHLOE
47	CHOCO
48	COCO
49	FLARE
50	FUBUKI
51	GURA
52	HAACHAMA
53	INA
54	IOFI
55	IROHA
56	IRYS
57	KANATA
58	KIARA
59	KORONE
60	KOYORI
61	KRONII
62	LAMY
63	LAPLUS
64	LUI
65	LUNA
66	MARINE
67	MATSURI
68	MEL
69	MIKO
70	MIO
71	MOONA
72	MUMEI
73	NENE
74	NOEL
75	OKAYU
76	OLLIE
77	PEKORA
78	POLKA
79	REINE
80	RISU
81	ROBOCO
82	RUSHIA
83	SANA
84	SHION
85	SORA
86	SUBARU
87	SUISEI
88	TOWA
89	WATAME

D:\KULIAH-AKBAR\SEMESTER-4\STIMA\tucil-1>bin\main.exe large_1.txt

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C V L U X G E L L B Z Z R D S W E N D T I E M Z G Z Q X I U Y X
P E Q G Y N L I O A Y V X K R I H M Z W N T N H V B M R A Y I E
X M I S T A C Q L C A L L I M J V Z A I Z K D U Z A O S T S D Z
C D H S T U K A G L O I R U S T A M E T S L S G N Y B O O P M E
S E J Y F I A O K C O A L P Y U L R D I A H K U O H C Y C S Y N
U B G I F I K Z M I Y U L K B F L S Y G D W L K L O R W N C Z Q
B K T U H X D U K K E X B F E I A P Y N S P W O B R Z E E S Y G
J Y G O E K A S T I F C H M M V U F A R I Q X O N H B S E D T F
W C F E B B E X L O D K F F S M U E A L I B R O I C W W S Y X P
W V K I X U F J J Q P A A E W B J N U A A X E A L N J M Y Y S G
D N S E M Y A K Y B D E C M U T U O O M M L N X F B H A Q M T U
L O Y M F R V Y Z H E A T K A N X R R E A M K J H N M Z I R S X
A X K U O C K V A I M H I Z R R Q O F P H K N O A M Y V P E Y A
G S Q K R W R L S M D O C P O S I K H Z C M C K N G U H U F X N
T Z E A R I X E N D E R J C J B K N B X A G H T E Z D M L N X A
E P I W Z S R O A Z R I P N X N N B E H A V N I N A S X E Z E S
Y S Q O W E T Z K I L U A F X Y M O G U H Q F C E N I D V I Q H
O S O T C K R O N I I L A R J A G J Y X L F P W Z P V E W R Y F
Y R C R O J M Z M S G J G J O N O Z K O S Q O G F U K I V P S L
Y D A H I M E A R A I K L I W S K W R Z A H K M S I S H K U P A
R N K Y V K L J X C P K C T H M E V Z H A U N E F P A J B A Z R
A T A N A K A L U I O X V Y W Q V A H A R O I Y L U B A W G U E
L L B E B Y S H I O N S D C Z E D O J R J L N Q C A R A K L O P
M Q Z D W L A V A Q Z F P Q I O S U I S E I U J H U M M T M L O
G T L V M U P B G A K Z Z X X F F R T U Y M Z S O W Y Y O R P T
Q A T I Q E U R B K J N L E G S I H I O T V G X C U R O D D A G
S Z P A Q I U C X H F F C O C O C N G U L Y I U O K N B V Q M S
M R N C L G X X F B O A M U R N B H K T G N G U R A C O N M D H
B I E X Q I Z Z P G W R J F R I I X L P A G O N W A K Y U K V A
B S A Z J D A V V O R U S H I A B R Q O B I L H C B O A D Y C Y
A U L M B K E A K K H J X H O O K S R G E H P O O F M I E F D N
E W B K E N X C C I T K U P T N O I M P D V X M F D U E A F I A
L L D J C X C K Y M E V N A G J U B G N X V L H R Z I F O I D T
Z I M A Z J E T J Q C I N S H I A K A P C I F O D K I C S T M Z
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COMPARISONS: 198295
elapsed time: 1999000 nanoseconds

Large 2

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 1   X O T B J Q A L B R F K C C Z E F T U P E K O Y F E H E L I W Y D A
 2   I P P O L X X C V X A M H T K G N I T O O K Y Y X R I B Q K T D Z B
 3   Y T S U E B V P G L B U F D U A T O X C K L I V V G Y K X G J A G T
 4   L R E M N V T Q F B O E N G R E E R H M V X B X G U G I Z Q A P C V
 5   R K Y A A C O U T T Z G R O Y A L C W P R P F B E M C M N Y J N R G
 6   I F C Q R E I L P U I L D D U J E Z D U D A K C D G F X U G C C Y K
 7   M U G G S G V R T G M O I N P W V D J T R N S P E G A D E B P I E Q
 8   V M P P T R F W P N E I N Q M F I R C X S N A U O K P Q D H W A J N
 9   L W O B O U S C C D T B R G F I S H O H A X I H V M F Y Y O P Z N B
10   E Y P Q V X T L D C Z S G J T S I A H E A W M D A Y J Q Z U O R K B
11   L A A E E N O T R T L R E T S L O B J R G I L L U G D C C K O B K V
12   R V P F Q C H H L C E O I H J Z N B K W I J R V I W D Y E E N B Y X
13   F U E L K V G N M F K O A A J P V K S S B G C C V E O S O V A R W Q
14   J I R D D W X S R O P V L G D Q L H K C M T C D H E U H A M O S A H
15   M F U P Q O V I D D L R M O L V O N F D N R K J H I B Y H T R T R W
16   X B N J P N G S E H T O L C T V L R T L V I S E T I X B I Z O N D O
17   D Q I C Z E G I K P O R K N Q O C U F S Q H V C T D Y N X E K A R D
18   F K Y C R E T T R D V P X O B R B U A O L S A H W A O A X Z D P O N
19   E I S A Y M M H J I Y A T C S C Z F C B L S K M D M L T A B L E B I
20   L H T S O C D U A A M F S V V O L H Z Z E K K S K L W P O N V M E W
21   C O L B A B L Z F R G I A O M B G K D R Z Q C G V D O N Q U M K E A
22   R B A Z R L I E F R O E J E S Z E O J Y V U L Y U R Q V X C L D T R
23   R G S U E H G M J S A R O U T E R D O W Y J S Z N K P W T B X O O A
24   W O M O T T T E D U E P S B N R M D S W Q O F F U X F V S K J K Y M
25   L L O U U C B W I Z K O C G R F N U P B E C O F F S R Z M R R Z A R
26   O R C D P S L E O M R R Z A Y T T V X Y A Z F A P X U L J H B H K Q
27   J C A D M K C R A W A Y G S V O T E A Q L T B U N I M M B A J C R U
28   V O R A O P I L L O W A Q B D X Y R O F N K Z L A A W W R O Y J S N
29   L D F Z C L V V A M M S B K S A O A W W P P N L B N P B U U O W W F
30   O L E P X Y A X E Z Z K F B K I V V X X L I M J Y D E N S S P K J N
31   W U E M H G N S S G G D D F R L D Z H I H L N X D L F Q H N B R O O
32   C O B C G M I I B P U E W H T Y E L D G X M N I J V F C E P L O C K
33   Z Q G U L K O K U N U F K L F U A M W L V Q F O L T B S L I P H R A
34   M F O O H V F Y H V U N T F X B D I H G P A H T R N K V F S N O L L
35
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36 TABLE
37 CHAIR
38 WARDROBE
39 REFRIGERATOR
40 DOOR
41 WINDOW
42 LAMP
43 BROOM
44 BICYCLE
45 STOVE
46 CLOCK
47 BOLSTER
48 HANDPHONE
49 COMPUTER
50 MONITOR
51 PILLOW
52 BOOK
53 TELEVISION
54 BAG
55 CLOTHES
56 PARFUME
57 SHIRT
58 JEANS
59 ROUTER
60 BOTOL
61 PAPER
62 SUITCASE
63 BOWL
64 PLATE
65 MUG
66 DEODORANT
67 PORK
68 FRYINGPAN
69 SHELF
70 BARBEL
71 BED
72 GLASS
73 PANTS
74 SPOON

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D:\KULIAH-AKBAR\SEMESTER-4\STIMA\tucil-1>bin\main.exe large_2.txt
X O T B J Q A L B R F K C C Z E F T U P E K O Y F E H E L I W Y D A
I P P O L X X C V X A M H T K G N I T O O K Y Y X R I B Q K T D Z B
Y T S U E B V P G L B U F D U A T O X C K L I V V G Y K X G J A G T
L R E M N V T Q F B O E N G R E E R H M V X B X G U G I Z Q A P C V
R K Y A A C O U T T Z G R O Y A L C W P R P F B E M C M N Y J N R G
I F C Q R E I L P U I L D D U J E Z D U D A K C D G F X U G C C Y K
M U G G S G V R T G M O I N P W V D J T R N S P E G A D E B P I E Q
V M P P T R F W P N E I N Q M F I R C X S N A U O K P Q D H W A J N
L W O B O U S C C D T B R G F I S H O H A X I H V M F Y Y O P Z N B
E Y P Q V X T L D C Z S G J T S I A H E A W M D A Y J Q Z U O R K B
L A A E E N O T R T L R E T S L O B J R G I L L U G D C C K O B K V
R V P F Q C H H L C E O I H J Z N B K W I J R V I W D Y E E N B Y X
F U E L K V G N M F K O A A J P V K S S B G C C V E O S O V A R W Q
J I R D D W X S R O P V L G D Q L H K C M T C D H E U H A M O S A H
M F U P Q O V I D D L R M O L V O N F D N R K J H I B Y H T R T R W
X B N J P N G S E H T O L C T V L R T L V I S E T I X B I Z O N D O
D Q I C Z E G I K P O R K N Q O C U F S Q H V C T D Y N X E K A R D
F K Y C R E T T R D V P X O B R B U A O L S A H W A O A X Z D P O N
E I S A Y M M H J I Y A T C S C Z F C B L S K M D M L T A B L E B I
L H T S O C D U A A M F S V V O L H Z Z E K K S K L W P O N V M E W
C O L B A B L Z F R G I A O M B G K D R Z Q C G V D O N Q U M K E A
R B A Z R L I E F R O E J E S Z E O J Y V U L Y U R Q V X C L D T R
R G S U E H G M J S A R O U T E R D O W Y J S Z N K P W T B X O O A
W O M O T T T E D U E P S B N R M D S W Q O F F U X F V S K J K Y M
L L O U U C B W I Z K O C G R F N U P B E C O F F S R Z M R R Z A R
O R C D P S L E O M R R Z A Y T T V X Y A Z F A P X U L J H B H K Q
J C A D M K C R A W A Y G S V O T E A Q L T B U N I M M B A J C R U
V O R A O P I L L O W A Q B D X Y R O F N K Z L A A W W R O Y J S N
L D F Z C L V V A M M S B K S A O A W W P P N L B N P B U U O W W F
O L E P X Y A X E Z Z K F B K I V V X X L I M J Y D E N S S P K J N
W U E M H G N S S G G D D F R L D Z H I H L N X D L F Q H N B R O O
C O B C G M I I B P U E W H T Y E L D G X M N I J V F C E P L O C K
Z Q G U L K O K U N U F K L F U A M W L V Q F O L T B S L I P H R A
M F O O H V F Y H V U N T F X B D I H G P A H T R N K V F S N O L L
COMPARISONS: 153442
elapsed time: 1995000 nanoseconds
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Large 3

36	PRAISE
37	DISSOLVE
38	HAVE
39	EXHIBIT
40	REALISE
41	CHOOSE
42	TOSS
43	WITHDRAW
44	UNITE
45	DEFEAT
46	EXERCISE
47	ENTER
48	RISK
49	SUIT
50	CONTRAST
51	SURPRISE
52	THRUST
53	YIELD
54	EMPHASISE
55	MEASURE
56	COMPARE
57	ECHO
58	BLOSSOM
59	AMEND
60	MISS
61	DISPOSE
62	BORROW
63	SIT
64	FALL
65	MIX
66	IDENTIFY
67	COLOUR
68	CONNECT
69	RECRUIT
70	BEAR
71	MUTTER
72	CONVERT
73	RIDE
74	PUSH
75	INTERRUPT
76	CLEAN
77	WANDER
78	MEAN
79	CLEAR
80	FEEL
81	DELAY
82	SPEND
83	EXCHANGE
84	DIP
85	EMBRACE

tests > large_3.txt

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 1    A T Q I H A P E F M A C E F J S A I Y C C A J W Q E X D C Z A A R Y
 2    G K E U U A R P X F Q M S A I L C G K E F X K S F I I T D C H V M J
 3    L Z M M U M A I K C B D R A E B A O U Y H A X G A S G N C E N B J Y
 4    I N S R L F I A C R H E O Z P R C T E G E I D J S O L C K R B O P M
 5    R I Z M Q S S N A G C A H D G J X E Q Y J E I O V E A T E X D V Y Y
 6    X U H T T B E C R R E M N V E Z U D I R U I L Y N P E N N N I R W U
 7    K X L H X Z E T U H L P B G N U C E F F R V X X A Q E V A H T G N M
 8    V W Y H L S Y I G X I I C L E Z L O C S E B C Q M U I T R B D H B R
 9    R C C L R G T E O I G K Z E C D T F L K U T L K E J Y X I I T B L J
10    M Y D E U V U G A E W R K E I N H B T O S U E J K G C F S S G X J L
11    S L P P X L E E D M H L E F B B R W Z W U P A S T T I P H B U X Q N
12    S X X Z I L V I U C G T U T O A U U H F D R N Y R E S V Q J H U T E
13    N A E M K A R Y I B U D Z Z N D S N B O F F R M E S X T B A X O C P
14    K X B C Q F P F D T U O Y J G E T B L O S S O M V C A A G C I V O Y
15    M P R E S I S A H P M E R O S P E N D L R P L E N Y U P M P D I N U
16    K G Q A I Z A D D N F F R A F H G I L P U S H X O E M L L P Z G N F
17    Y N Y Y R J F W X U V V Y J E Q M O J O R B N T C K V N A Y F M E A
18    N Z I T Y W D E Z D P M M G D L R J W O G F V F C O O O G Z H B C R
19    U A U N L T W N J Q L P S F I T C S Z B H W D I P V G A I A A Q T A
20    E X N U T E S I L T E S I C R E X E J Q A Q Y V X F V T D L G L Y R
21    P K V I S E L U T N I B V G J U L F S N W W W S N F I K G U Y U W W
22    C V U O H K R E R H A B A D N U C N D T D U Q L O U F F Q E V C D F
23    V S O X J R R R A P D W I T O N Q E D D D I C N M X B R Y R K I Y N
24    R H T P J R T V U Z R R W H X I R R D V S N H H X Z W E L A S L N Q
25    C R P U M S L U Z P G I A A X T I J O K P O C O E V T M S P Z D E X
26    C L T E P J C G P Q T O S W G E D T H B Z M Y R U E Q L O V G C S E
27    C Y T S Y W O R R O B I D E N T I F Y V F E C S X R U S P S L W Q G
28    H F U I V Q R V K E Y C K A Z P Z O P K Y E S E B A E L D R A K R B
29    O O Y L R C P W B A R Q A J B S O T X D D T F N I P R A G K N S G K
30    T I C A Q E I Q L X D U R M F Q S I E P I Z W M M M R M B M B I P C
31    Q G Z E O O T E Z K L V S J E I V F M E P G L I X O V V R G U R T S
32    F K X R H W D T A U W V M A Q N E C O N T R A S T C Y G S X K W U P
33    U I A C U H Y V U T B Z Q Q E A D I W Y D L P S B Q G M A L P T E L
34    M J E H Z K S U P M T O S S T M T B I K I L V J T M I Q C A I Q O K
35
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V. Alamat Kode Program

https://github.com/malikrafsan/Word-Search-Puzzle-Solver_Stima-Tucil-1