

LAPORAN TUGAS KECIL 1

IF2211 Strategi Algoritma

Penyelesaian *Word Search Puzzle* dengan Algoritma *Brute Force*



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2022

Algoritma Brute Force

Berdasarkan program yang telah saya buat, langkah-langkah pencarian solusinya adalah sebagai berikut:

1. Program akan mengecek setiap kata sampai ketemu. Jika kata sudah ketemu ke arah tertentu, proses pencarian dengan arah lain tidak akan dilakukan karena looping akan langsung berhenti dan akan mengecek kata-kata berikutnya.
2. Program akan mengecek setiap kata dengan mencocokkannya pada setiap karakter pada *puzzle* dengan urutan arah yang akan dicek terlebih dahulu adalah vertikal ke atas, vertikal ke bawah, horizontal ke kanan, horizontal ke kiri, diagonal ke kanan atas, diagonal ke kanan bawah, diagonal ke kiri atas, dan diagonal ke kiri bawah.
3. Sebelum masuk ke dalam proses pencocokan karakter, program akan mengecek terlebih dahulu apakah panjang kata tersebut melebihi batas *puzzle*. Jika panjang kata tersebut melebihi batas *puzzle*, pencocokan karakter melalui arah tersebut tidak akan dilakukan dan dilanjutkan dengan pencocokan ke arah yang lain.

Source Program

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

using namespace std;

int main() {
    string txt;
    int baris, kolom, keywords, check, i, j, k, l, m, a, b, c;
    int checkall = 0;
    bool found;
    cout << "Masukkan nama file : ";
    cin >> txt;
    cout << "Masukkan jumlah baris : ";
    cin >> baris;
    cout << "Masukkan jumlah kolom : ";
    cin >> kolom;
    cout << "Masukkan jumlah kata kunci : ";
    cin >> keywords;
    char character[baris][kolom];
    string word[keywords];
    string line;
    ifstream file;
    file.open("../test/" + txt);
    for (i = 0; i < baris; i++) {
        for (j = 0; j < kolom; j++) {
            file >> character[i][j];
        }
    }
    int idx = 0;
    while (getline(file, line)) {
        file >> word[idx];
        idx++;
    }
    file.close();
    auto started = std::chrono::high_resolution_clock::now();
    cout <<
    "=====
    ==> << endl;
    for (i = 0; i < keywords; i++) {
        check = 0;
        found = false;
        for (j = 0; j < baris; j++) {
            for (k = 0; k < kolom; k++) {
```

```

a = j;
b = k;
c = 0;
if (a - word[i].length() + 1 >= 0) { // vertikal ke atas
    while (character[a][b] == word[i][c]) {
        a--;
        c++;
        check++;
        checkall++;
        if (word[i].length() == c) {
            found = true;
            a = j - word[i].length() + 1;
            b = k;
            c = 0;
            for (l = 0; l < baris; l++) {
                for (m = 0; m < kolom; m++) {
                    if ((l == a) && (m == b) && (c <
word[i].length())) {
                        cout << character[l][m] << ' ';
                        a++;
                        c++;
                    } else {
                        cout << '-' << ' ';
                    }
                }
                cout << endl;
            }
            break;
        }
    }
    if (found) {
        break;
    }
    check += 1;
    checkall += 1;
    a = j;
    b = k;
    c = 0;
}
if (a + word[i].length() - 1 < baris) { // vertikal ke bawah
    while (character[a][b] == word[i][c]) {
        a++;
        c++;
        check++;
        checkall++;
        if (word[i].length() == c) {
            found = true;
            a = j;

```

```

        b = k;
        c = 0;
        for (l = 0; l < baris; l++) {
            for (m = 0; m < kolom; m++) {
                if ((l == a) && (m == b) && (c <
word[i].length())) {
                    cout << character[l][m] << ' ';
                    a++;
                    c++;
                } else {
                    cout << '-' << ' ';
                }
            }
            cout << endl;
        }
        break;
    }
}
if (found) {
    break;
}
check += 1;
checkall += 1;
a = j;
b = k;
c = 0;
}
if (b + word[i].length() - 1 < kolom) { // horizontal ke kanan
    while (character[a][b] == word[i][c]) {
        b++;
        c++;
        check++;
        checkall++;
        if (word[i].length() == c) {
            found = true;
            a = j;
            b = k;
            c = 0;
            for (l = 0; l < baris; l++) {
                for (m = 0; m < kolom; m++) {
                    if ((l == a) && (m == b) && (c <
word[i].length())) {
                        cout << character[l][m] << ' ';
                        b++;
                        c++;
                    } else {
                        cout << '-' << ' ';
                    }
                }
            }
        }
    }
}

```

```

        }
        cout << endl;
    }
    break;
}
}
if (found) {
    break;
}
check += 1;
checkall += 1;
a = j;
b = k;
c = 0;
}
if (b - word[i].length() + 1 >= 0) { // horizontal ke kiri
    while (character[a][b] == word[i][c]) {
        b--;
        c++;
        check++;
        checkall++;
        if (word[i].length() == c) {
            found = true;
            a = j;
            b = k - word[i].length() + 1;
            c = 0;
            for (l = 0; l < baris; l++) {
                for (m = 0; m < kolom; m++) {
                    if ((l == a) && (m == b) && (c <
word[i].length())) {
                        cout << character[l][m] << ' ';
                        b++;
                        c++;
                    } else {
                        cout << '-' << ' ';
                    }
                }
            }
            cout << endl;
        }
        break;
    }
}
if (found) {
    break;
}
check += 1;
checkall += 1;
a = j;

```

```

        b = k;
        c = 0;
    }
    if ((a - word[i].length() + 1 >= 0) && (b + word[i].length() -
1 < kolom)) { // diagonal ke kanan atas
        while (character[a][b] == word[i][c]) {
            a--;
            b++;
            c++;
            check++;
            checkall++;
            if (word[i].length() == c) {
                found = true;
                a = j - word[i].length() + 1;
                b = k + word[i].length() - 1;
                c = 0;
                for (l = 0; l < baris; l++) {
                    for (m = 0; m < kolom; m++) {
                        if ((l == a) && (m == b) && (c <
word[i].length())) {
                            cout << character[l][m] << ' ';
                            a++;
                            b--;
                            c++;
                        } else {
                            cout << '-' << ' ';
                        }
                    }
                    cout << endl;
                }
                break;
            }
        }
    }
    if (found) {
        break;
    }
    check += 1;
    checkall += 1;
    a = j;
    b = k;
    c = 0;
}
if ((a + word[i].length() - 1 < baris) && (b +
word[i].length() - 1 < kolom)) { // diagonal ke kanan bawah
    while (character[a][b] == word[i][c]) {
        a++;
        b++;
        c++;
    }
}

```

```

        check++;
        checkall++;
        if (word[i].length() == c) {
            found = true;
            a = j;
            b = k;
            c = 0;
            for (l = 0; l < baris; l++) {
                for (m = 0; m < kolom; m++) {
                    if ((l == a) && (m == b) && (c <
word[i].length())) {
                        cout << character[l][m] << ' ';
                        a++;
                        b++;
                        c++;
                    } else {
                        cout << '-' << ' ';
                    }
                }
                cout << endl;
            }
            break;
        }
    }
    if (found) {
        break;
    }
    check += 1;
    checkall += 1;
    a = j;
    b = k;
    c = 0;
}
if ((a - word[i].length() + 1 >= 0) && (b - word[i].length() +
1 >= 0)) { // diagonal ke kiri atas
    while (character[a][b] == word[i][c]) {
        a--;
        b--;
        c++;
        check++;
        checkall++;
        if (word[i].length() == c) {
            found = true;
            a = j - word[i].length() + 1;
            b = k - word[i].length() + 1;
            c = 0;
            for (l = 0; l < baris; l++) {
                for (m = 0; m < kolom; m++) {

```



```

                                if ((l == a) && (m == b) && (c <
word[i].length())) {
                                cout << character[l][m] << ' ';
                                a++;
                                b++;
                                c++;
                                } else {
                                    cout << '-' << ' ';
                                }
                            }
                            cout << endl;
                        }
                        break;
                    }
                }
                if (found) {
                    break;
                }
                check += 1;
                checkall += 1;
                a = j;
                b = k;
                c = 0;
            }
            if ((a + word[i].length() - 1 < baris) && (b -
word[i].length() + 1 >= 0)) { // diagonal ke kiri bawah
                while (character[a][b] == word[i][c]) {
                    a++;
                    b--;
                    c++;
                    check++;
                    checkall++;
                    if (word[i].length() == c) {
                        found = true;
                        a = j;
                        b = k;
                        c = 0;
                        for (l = 0; l < baris; l++) {
                            for (m = 0; m < kolom; m++) {
                                if ((l == a) && (m == b) && (c <
word[i].length())) {
                                    cout << character[l][m] << ' ';
                                    a++;
                                    b--;
                                    c++;
                                } else {
                                    cout << '-' << ' ';
                                }
                            }
                        }
                    }
                }
            }
        }
    }
}

```

```

        }
        cout << endl;
    }
    break;
}
}
if (found) {
    break;
}
check += 1;
checkall += 1;
a = j;
b = k;
c = 0;
}
}
if (found) {
    cout << "Total perbandingan huruf yang dilakukan : " << check
<< endl;

    cout <<
"=====
==" << endl;

    break;
}
}
}
auto done = std::chrono::high_resolution_clock::now();
std::cout << "Waktu eksekusi program : " <<
std::chrono::duration_cast<std::chrono::milliseconds>(done-started).count() <<
" ms" << endl;
    cout << "Jumlah total perbandingan huruf yang dilakukan : " << checkall <<
endl;
    return 0;
}

```

Screenshots

1. 14x12x16.txt

The image shows a Visual Studio Code window with a C++ file named 'main.cpp'. The code is a simple program that reads a file '14x12x16.txt' and compares its contents with the string 'ADA' and 'N'. The program counts the number of comparisons made for each string. The output of the program is displayed in the terminal window at the bottom of the editor. The output shows that the string 'ADA' was compared 747 times, and the string 'N' was compared 67 times. The terminal window also shows the command prompt and the execution of the program. The Visual Studio Code interface includes a sidebar on the left with icons for Explorer, Search, and Run and Debug. The top of the window has a menu bar with options like File, Edit, Selection, View, Go, Run, Terminal, and Help. The bottom of the window shows a status bar with information about the current file, line, column, and encoding.

[illegible]

2. 14x14x8.txt

```
main.cpp - Tucil-1-Stima - Visual Studio Code
File Edit Selection View Go Run Terminal Help
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
PowerShell 7.2.1
Copyright (c) Microsoft Corporation.
https://aka.ms/powershell
Type 'help' to get help.
PS C:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima> cd "c:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima\src\" ; if ($?) { g++ main.cpp -o main } ; if ($?) { .\main }
Masukkan nama file : 14x14x8.txt
Masukkan jumlah baris : 14
Masukkan jumlah kolom : 14
Masukkan jumlah kata kunci : 8
-----
- - - - - S - - - - -
- - - - - G - - - - -
- - - - - A - - - - -
- - - - - R - - - - -
- - - - - I - - - - -
- - - - - L - - - - -
- - - - - H - - - - -
- - - - - E - - - - -
- - - - - M - - - - -
- - - - - U - - - - -
- - - - - N - - - - -
- - - - - D - - - - -
- - - - - K - - - - -
- - - - - J - - - - -
- - - - - A - - - - -
- - - - - S - - - - -
Total perbandingan huruf yang dilakukan : 1315
-----
- - - - - H - - - - -
- - - - - S - - - - -
- - - - - A - - - - -
- - - - - B - - - - -
- - - - - A - - - - -
Total perbandingan huruf yang dilakukan : 721
-----
- - - - - H - - - - -
- - - - - G - - - - -
- - - - - U - - - - -
- - - - - A - - - - -
- - - - - L - - - - -
- - - - - I - - - - -
- - - - - M - - - - -
- - - - - N - - - - -
- - - - - D - - - - -
- - - - - K - - - - -
- - - - - J - - - - -
- - - - - A - - - - -
- - - - - S - - - - -
Total perbandingan huruf yang dilakukan : 721
-----
- - - - - S - - - - -
- - - - - G - - - - -
- - - - - A - - - - -
- - - - - R - - - - -
- - - - - I - - - - -
- - - - - L - - - - -
- - - - - H - - - - -
- - - - - E - - - - -
- - - - - M - - - - -
- - - - - U - - - - -
- - - - - N - - - - -
- - - - - D - - - - -
- - - - - K - - - - -
- - - - - J - - - - -
- - - - - A - - - - -
- - - - - S - - - - -
Total perbandingan huruf yang dilakukan : 187
-----
- - - - - S - - - - -
- - - - - L - - - - -
- - - - - I - - - - -
- - - - - H - - - - -
- - - - - E - - - - -
- - - - - M - - - - -
- - - - - U - - - - -
- - - - - N - - - - -
- - - - - D - - - - -
- - - - - K - - - - -
- - - - - J - - - - -
- - - - - A - - - - -
- - - - - S - - - - -
Total perbandingan huruf yang dilakukan : 183
-----
- - - - - G - - - - -
- - - - - U - - - - -
- - - - - M - - - - -
- - - - - S - - - - -
Total perbandingan huruf yang dilakukan : 882
-----
Waktu eksekusi program : 136 ms
Jumlah total perbandingan huruf yang dilakukan : 5853
PS C:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima\src>
```

```
main.cpp - Tucil-1-Stima - Visual Studio Code
File Edit Selection View Go Run Terminal Help
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
-----
- - - - - S - - - - -
- - - - - G - - - - -
- - - - - A - - - - -
- - - - - R - - - - -
- - - - - I - - - - -
- - - - - L - - - - -
- - - - - H - - - - -
- - - - - E - - - - -
- - - - - M - - - - -
- - - - - U - - - - -
- - - - - N - - - - -
- - - - - D - - - - -
- - - - - K - - - - -
- - - - - J - - - - -
- - - - - A - - - - -
- - - - - S - - - - -
Total perbandingan huruf yang dilakukan : 187
-----
- - - - - S - - - - -
- - - - - L - - - - -
- - - - - I - - - - -
- - - - - H - - - - -
- - - - - E - - - - -
- - - - - M - - - - -
- - - - - U - - - - -
- - - - - N - - - - -
- - - - - D - - - - -
- - - - - K - - - - -
- - - - - J - - - - -
- - - - - A - - - - -
- - - - - S - - - - -
Total perbandingan huruf yang dilakukan : 183
-----
- - - - - G - - - - -
- - - - - U - - - - -
- - - - - M - - - - -
- - - - - S - - - - -
Total perbandingan huruf yang dilakukan : 882
-----
Waktu eksekusi program : 136 ms
Jumlah total perbandingan huruf yang dilakukan : 5853
PS C:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima\src>
```

3. 16x16x6.txt

[illegible]

4. 20x18x6.txt

The image shows a Windows desktop environment. The primary focus is a Visual Studio Code (VS Code) window titled "mahapp - Tucil-1-Stima - Visual Studio Code". The "TERMINAL" tab is active, displaying the PowerShell command prompt. The user has entered the command `cd "c:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima\src\" ; if ($?) { g++ main.cpp -o main } ; if ($?) { .\main }`. The terminal output shows the execution of the program, which prompts for the number of rows (20), the number of columns (18), and the number of keys (6). It then displays a grid of characters (A, B, E, R) and calculates the total number of character comparisons (708). The VS Code interface includes a sidebar on the left with icons for Explorer, Search, and Run and Debug. The Windows taskbar at the bottom shows various application icons, including the Start button, File Explorer, Google Chrome, WhatsApp, Telegram, Discord, and several other utility and application icons. The system tray in the bottom right corner displays the date and time as 4:34 on 25/01/2022.

[illegible]

5. 22x22x50.txt

The screenshot shows the Visual Studio Code editor with a file named `main.cpp` open. The code is a C++ program that reads a filename, the number of lines, and the number of words from the user, and then prints the content of the file. The terminal window shows the output of the program, which is the content of `22x22x50.txt`.

```

File Edit Selection View Go Run Terminal Help
main.cpp - Tucil-1-Stima - Visual Studio Code
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
PowerShell 7.2.1
Copyright (c) Microsoft Corporation.
https://aka.ms/powershell
Type 'help' to get help.

PS C:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima> cd "c:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima\src\" ; if ($?) { g++ main.cpp -o main } ; if ($?) { .\main }
Masukkan nama file : 22x22x50.txt
Masukkan jumlah baris : 22
Masukkan jumlah kolom : 22
Masukkan jumlah kata kunci : 50
  
```

The status bar at the bottom indicates the current file is `main.cpp`, the cursor is at line 1, column 1, and the file is encoded in UTF-8 with CRLF line endings. The system clock shows 4:38 on 25/01/2022.

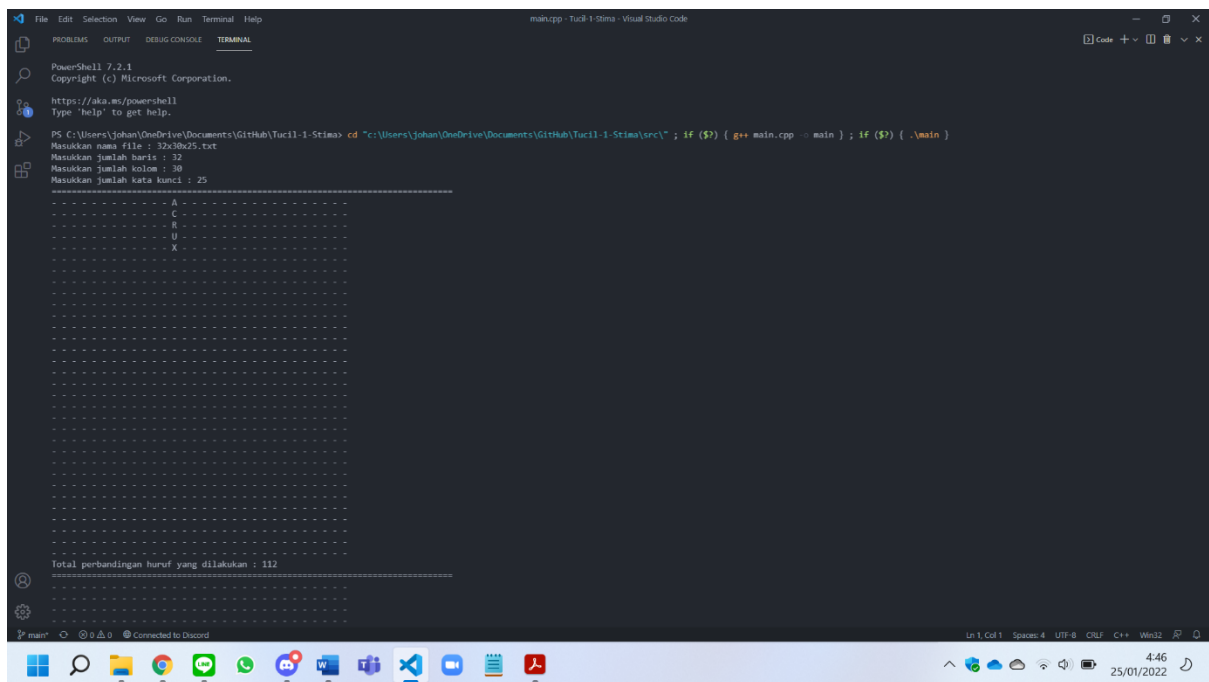
[illegible]

6. 24x24x50.txt

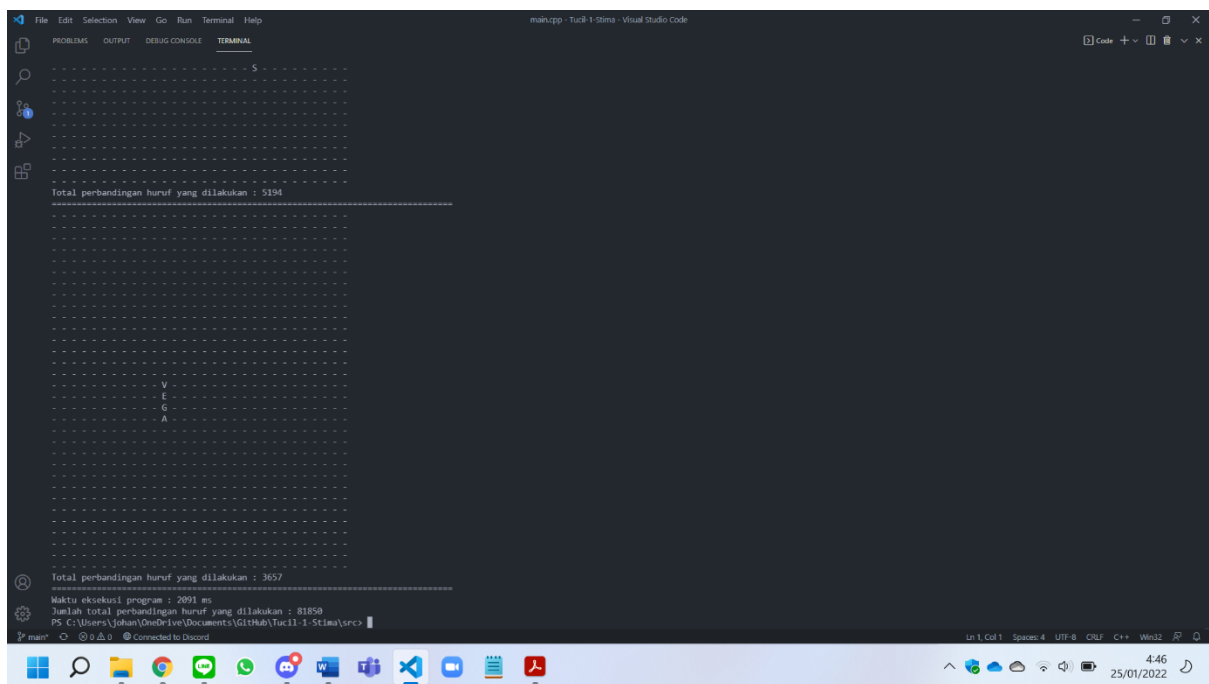
[illegible]

The image shows a Visual Studio Code editor window with a C++ program named 'main.cpp' open. The program is designed to analyze the frequency of letters in a string. It uses a 26-element array to count the occurrences of each letter from 'A' to 'Z'. The string being analyzed is 'D E S H M O I N E S'. The program calculates the total number of comparisons (2538) and the frequency of each letter. The output is displayed in the console window, showing the total number of comparisons (2538) and the frequency of each letter (e.g., D: 1, E: 2, S: 2, H: 1, M: 1, O: 1, I: 1, N: 1). The program is run in a terminal window, and the output is displayed in the console. The status bar at the bottom indicates the file is 'main.cpp', the editor is in 'Ln 1, Col 1', the encoding is 'UTF-8', the language is 'C++', and the window is 'Win32'. The system tray at the bottom shows the date and time as '443 25/01/2022'.

7. 32x30x25.txt



```
main.cpp - Tucil-1-Stima - Visual Studio Code
PROBLEMAS OUTPUT DEBUG CONSOLE TERMINAL
PowerShell 7.2.1
Copyright (c) Microsoft Corporation.
https://aka.ms/powershell
Type 'help' to get help.
PS C:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima> cd "c:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima\src\"; if ($?) { g++ main.cpp -o main }; if ($?) { .\main }
Masukkan nama file : 32x30x25.txt
Masukkan jumlah baris : 32
Masukkan jumlah kolom : 30
Masukkan jumlah kata kunci : 25
-----
- A -
- C -
- R -
- U -
- X -
-----
Total perbandingan huruf yang dilakukan : 112
-----
```



```
main.cpp - Tucil-1-Stima - Visual Studio Code
PROBLEMAS OUTPUT DEBUG CONSOLE TERMINAL
-----
- S -
-----
Total perbandingan huruf yang dilakukan : 5194
-----
-----
- V -
- E -
- G -
- A -
-----
Total perbandingan huruf yang dilakukan : 3657
-----
Waktu eksekusi program : 2091 ms
Jumlah total perbandingan huruf yang dilakukan : 81858
PS C:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima\src>
```

8. 34x34x50.txt

The image shows a Windows 10 desktop environment. In the foreground, a Visual Studio Code (VS Code) editor window is open, displaying a C++ source file named 'mah.cpp'. The file's content is as follows:

```

#include <iostream>
using namespace std;

int main()
{
    string nama;
    int baris;
    int kolom;
    int kata;
    int total;

    cout << "Masukkan nama file : ";
    getline(cin, nama);

    cout << "Masukkan jumlah baris : ";
    cin >> baris;

    cout << "Masukkan jumlah kolom : ";
    cin >> kolom;

    cout << "Masukkan jumlah kata kunci : ";
    cin >> kata;

    total = baris * kolom * kata;

    cout << "Total karakter : " << total << endl;

    return 0;
}

```

The VS Code interface includes a menu bar (File, Edit, Selection, View, Go, Run, Terminal, Help), a toolbar with icons for Explorer, Search, Source Control, and Run and Debug, and a terminal window at the bottom. The terminal shows the output of the program's execution:

```

PowerShell 7.2.1
Copyright (c) Microsoft Corporation.

https://aka.ms/powershell
Type 'help' to get help.

PS C:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima> cd "c:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima\src\" ; if ($?) { g++ main.cpp -o main } ; if ($?) { .\main }

```

The Windows taskbar at the bottom of the screen contains the Start button, a search bar, and several pinned application icons: File Explorer, Google Chrome, WhatsApp, Telegram, Discord, and others. The system tray in the bottom right corner displays the current time as 4:48 and the date as 25/01/2022.

The screenshot shows a Visual Studio Code interface with a terminal window open. The terminal displays the output of a C++ program that calculates the total number of comparisons for a given string. The input string is "YORBBORRONEZ", which has a length of 11. The program outputs "Total perbandingan huruf yang dilakukan : 6846" and "Waktu eksekusi program : 4663 ms". The terminal window has a dark theme and shows the file explorer on the left with a file named "main.cpp".

```

File Edit Selection View Go Run Terminal Help
main.cpp - Tuci11-Stima - Visual Studio Code
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
-----
Total perbandingan huruf yang dilakukan : 496
-----
Total perbandingan huruf yang dilakukan : 6846
-----
Waktu eksekusi program : 4663 ms
Jumlah total perbandingan huruf yang dilakukan : 198687
PS C:\Users\johan\OneDrive\Documents\GitHub\Tuci11-Stima\src>

```

9. 35x35x47.txt

The screenshot shows the Visual Studio Code editor with a file named `main.cpp` open. The code is a C++ program that reads a filename, the number of rows, and the number of columns from the user, and then reads that many words from a file. The terminal window shows the output of the program, which prompts the user to enter the filename, the number of rows, and the number of columns, and then displays the words read from the file.

```

File Edit Selection View Go Run Terminal Help
main.cpp - Tucil 1-Stima - Visual Studio Code
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
PowerShell 7.2.1
Copyright (c) Microsoft Corporation.

https://aka.ms/powershell
Type 'help' to get help.

PS C:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima> cd "c:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima\src\" ; if ($?) { g++ main.cpp -o main } ; if ($?) { .\main }
Masukkan nama file : 35x35d7.txt
Masukkan jumlah baris : 35
Masukkan jumlah kolom : 35
Masukkan jumlah kata kunci : 47
  
```

The status bar at the bottom indicates the current file is `main.cpp`, the cursor is at line 1, column 1, and the file is encoded in UTF-8 with CRLF line endings. The system clock shows 4:50 on 25/01/2022.

```

main.cpp - TUCIL 1-Stima - Visual Studio Code
File Edit Selection View Go Run Terminal Help
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
-----
A
D
A
Y
A

Total perbandingan huruf yang dilakukan : 7442

-----
A
D
A
Y
A

Total perbandingan huruf yang dilakukan : 7397

-----
Waktu eksekusi program : 4570 ms
Jumlah total perbandingan huruf yang dilakukan : 18846
PS C:\Users\johan\OneDrive\Documents\GitHub\Tucil-1-Stima> src

```

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

Alamat repository GitHub : <https://github.com/johannes-ws/Tucil-1-Stima>