LAPORAN TUGAS KECIL 1
STRATEGI ALGORITMA

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A. Algoritma Brute Force

0. Menerima input dari user, baik dari file maupun secara acak.
1. Dengan menggunakan konsep *backtrack* dan rekursif, mencari semua kemungkinan sequence. Memanfaatkan 2 fungsi, yaitu *horizontal* dan *vertical*:
    a. Horizontal:
    Mengiterasi semua elemen dari suatu row untuk mencari semua kemungkinan sequence yang dimulai atau dilanjutkan dari elemen tersebut. Apabila belum mencapai basis, dilanjutkan dengan memanggil fungsi *vertical*.
    b. Vertical:
    Mengiterasi semua elemen dari suatu column untuk mencari semua kemungkinan sequence yang dimulai atau dilanjutkan dari elemen tersebut. Apabila belum mencapai basis, dilanjutkan dengan memanggil fungsi *horizontal*.

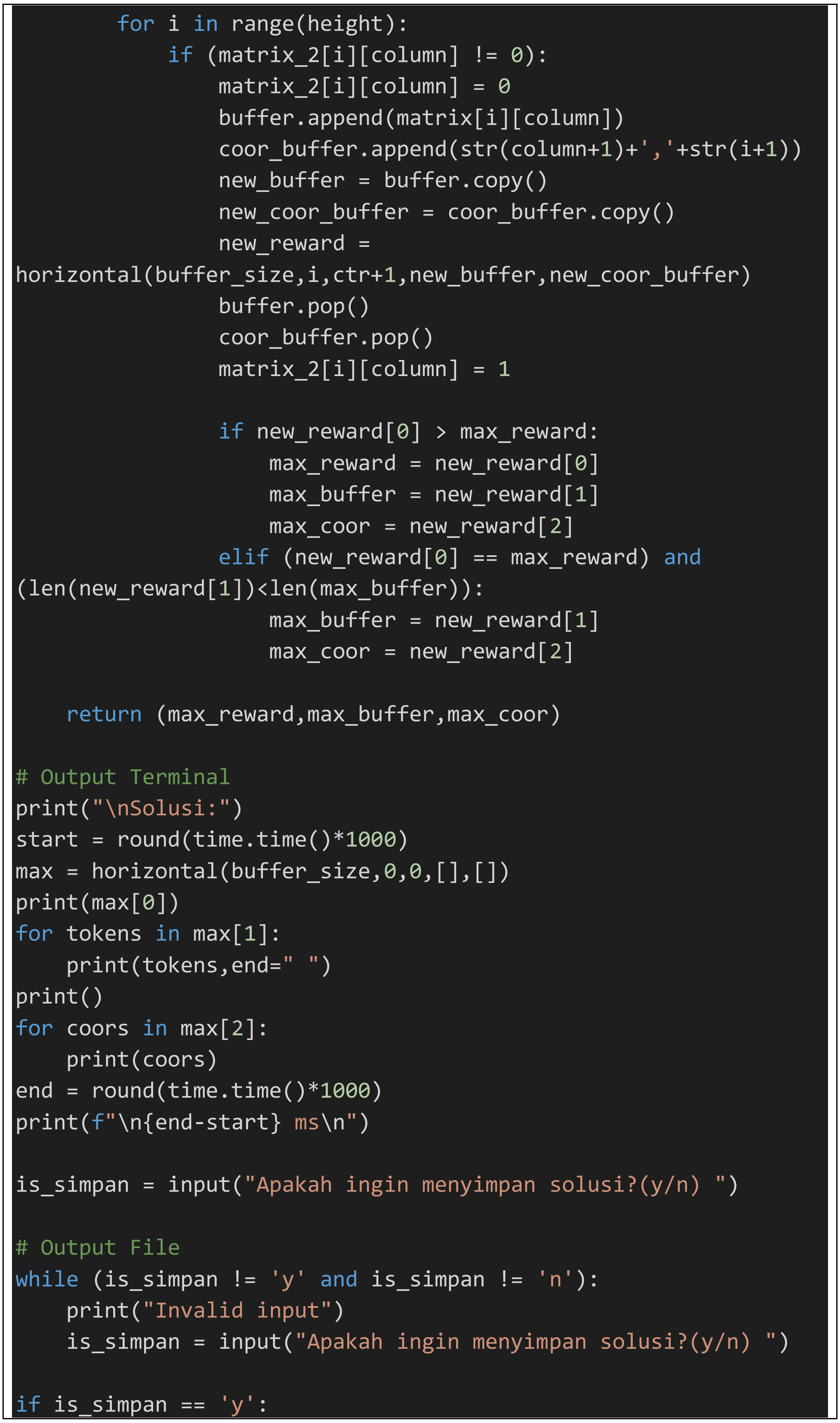
    Horizontal dan *vertical* memanfaatkan akumulator sequence. *Horizontal* dan *vertical* mencapai basis ketika akumulator sudah penuh (banyak sequence sudah mencapai ukuran buffer). Setelah mencapai basis, kedua fungsi mengembalikan reward dari sequence yang terakumulasi beserta sequencenya. Algoritma dimulai dengan memanggil fungsi *horizontal* pada row pertama (1).
2. Membandingkan *reward* antara semua kemungkinan sequence dengan cara membandingkan sequence yang dikembalikan oleh fungsi yang dipanggil dengan *reward* yang tersimpan oleh fungsi pemanggil. Menyimpan sequence dengan *reward* terbesar dan mengembalikannya sampai mencapai fungsi pertama.
3. Mengeluarkan solusi pada layar dan/atau file yang berupa sequence dengan reward terbesar.

B. Source Code

A. CLI

```python
import os.path
import time
import random

input_type = input("Apakah ingin memasukkan input melalui file
atau secara acak?(file/acak) ")
while input_type != 'file' and input_type != 'acak':
    print("Invalid input")
    input_type = input("Apakah ingin memasukkan input melalui
file atau secara acak?(file/acak) ")

# Input dari file
if input_type == 'file':
    file_name = input("Enter absolute path: ")
    while not os.path.isfile(file_name):
        print("File not found")
        file_name = input("Enter absolute path: ")

    file = open(file_name,'r')

    buffer_size = int(file.readline().rstrip())
    dimension = file.readline().rstrip().split()
    width = int(dimension[0])
    height = int(dimension[1])
    matrix = [file.readline().rstrip().split() for i in
range(height)]
    sequences_amount = int(file.readline().rstrip())
    sequences = []
    sequences_reward = []
    for i in range(sequences_amount):
        sequences.append(file.readline().rstrip().split())
        sequences_reward.append(int(file.readline().rstrip()))

    file.close()

# Input secara acak
else:
    # Pengambilan input dari user
    token_amount = int(input("Masukkan jumlah token unik: "))
    tokens = input("Masukkan token-token (terpisah dengan
spasi): ").split()
    while len(tokens) != token_amount:
        print("Jumlah token tidak sesuai")
        tokens = input("Masukkan token-token (terpisah dengan
spasi): ").split()
    buffer_size = int(input("Masukkan ukuran buffer: "))
    dimension = input("Masukkan ukuran matriks (width x height,
terpisah dengan spasi): ").split()
    width = int(dimension[0])
    height = int(dimension[1])
    sequences_amount = int(input("Masukkan jumlah sekuens: "))
    max_sequence_length = int(input("Masukkan ukuran maksimal
sekuens: "))

    # Pembuatan matriks dan sequence secara acak
    matrix = [[random.choice(tokens) for i in range(width)] for
j in range(height)]
    sequences = [[random.choice(tokens) for i in
range(random.randint(2,max_sequence_length))] for j in
range(sequences_amount)]
```

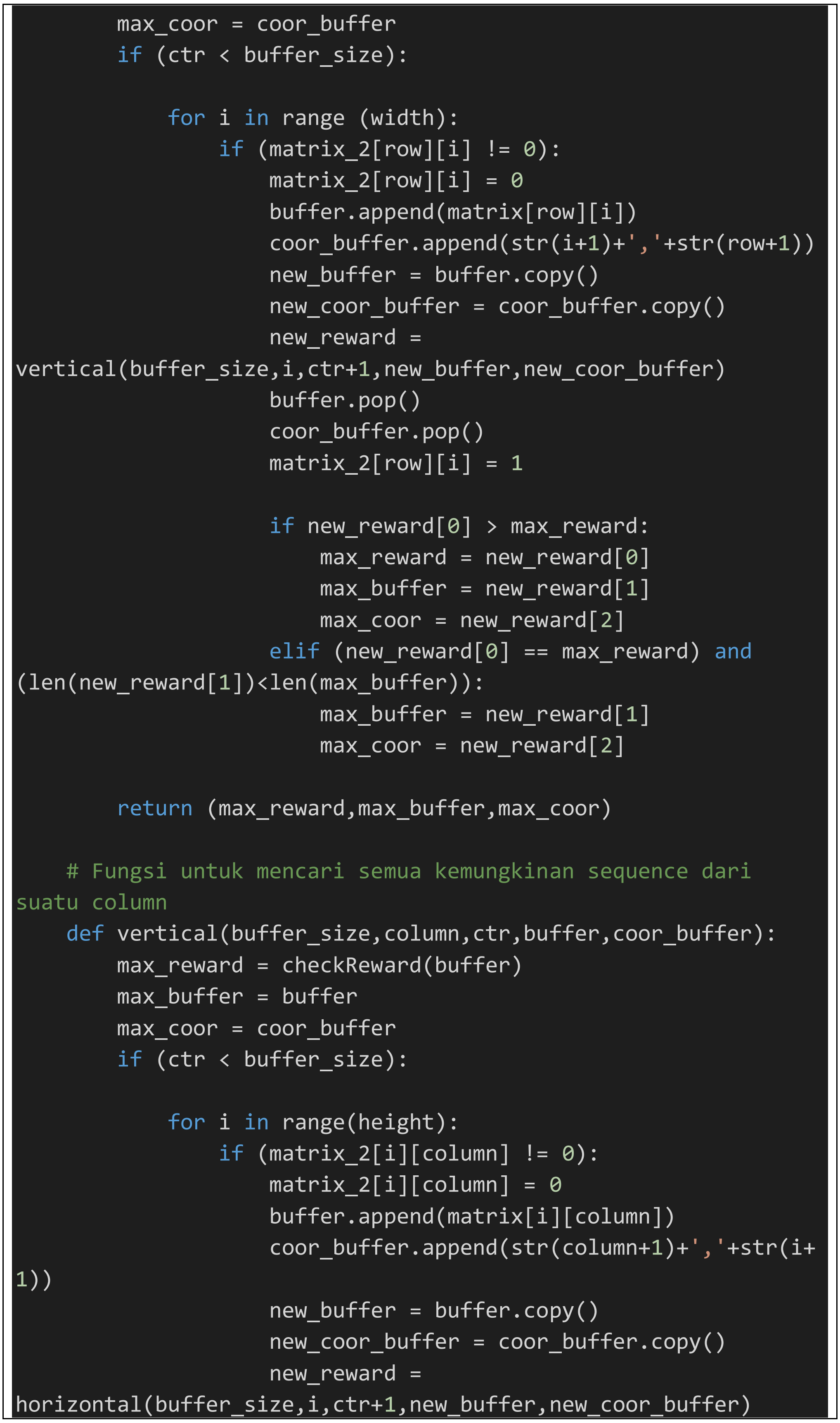
```
    sequences_reward = [random.randint(1,50) for i in 
range(sequences_amount)]

    print(f"\nBuffer Size : {buffer_size}")
    print(f"Matrix Size : {width} x {height}")
    print(f"Matrix :")
    for i in range(height):
        print(f"    {matrix[i]}")
    print(f"Jumlah Sequence : {sequences_amount}")
    print(f"Sekuens dan Reward :")
    for i in range(sequences_amount):
        print(f"    {sequences[i]} - {sequences_reward[i]}")

# cek sequence unik (kalau tidak unik, reward = 0)
for i in range(sequences_amount-1):
    for j in range(i+1,sequences_amount):
        if len(sequences[i]) == len(sequences[j]):
            is_same = True
            k = 0
            while is_same and k < len(sequences[i]):
                if sequences[i][k] != sequences[j][k]:
                    is_same = False
                k += 1
            if is_same:
                sequences_reward[j] = 0

# Inisialisasi matriks untuk mencegah node dikunjungi dua kali
matrix_2 = [[1 for i in range(width)] for j in range(height)]

# Fungsi untuk mengkalkulasi reward dari sequence (buffer)
def checkReward(buffer):
    reward = 0
    for i in range(sequences_amount):
        has_reward = False
        j = 0
        while not has_reward and j < (len(buffer)-
len(sequences[i])+1):
            is_reward = True
            k = 0
            while is_reward and k < len(sequences[i]):
                if (buffer[j+k] != sequences[i][k]):
                    is_reward = False
                k += 1
            if is_reward:
                reward += sequences_reward[i]
                has_reward = True
            j += 1

    return reward

# Fungsi untuk mencari semua kemungkinan sequence dari suatu
row
def horizontal(buffer_size,row,ctr,buffer,coor_buffer):
    max_reward = checkReward(buffer)
    max_buffer = buffer
    max_coor = coor_buffer
    if (ctr < buffer_size):

        for i in range (width):
            if (matrix_2[row][i] != 0):
                matrix_2[row][i] = 0
                buffer.append(matrix[row][i])
                coor_buffer.append(str(i+1)+','+str(row+1))
                new_buffer = buffer.copy()
                new_coor_buffer = coor_buffer.copy()
                new_reward =
vertical(buffer_size,i,ctr+1,new_buffer,new_coor_buffer)
                buffer.pop()
                coor_buffer.pop()
                matrix_2[row][i] = 1

                if new_reward[0] > max_reward:
                    max_reward = new_reward[0]
                    max_buffer = new_reward[1]
                    max_coor = new_reward[2]
                elif (new_reward[0] == max_reward) and
(len(new_reward[1])<len(max_buffer)):
                    max_buffer = new_reward[1]
                    max_coor = new_reward[2]

    return (max_reward,max_buffer,max_coor)

# Fungsi untuk mencari semua kemungkinan sequence dari suatu
column
def vertical(buffer_size,column,ctr,buffer,coor_buffer):
    max_reward = checkReward(buffer)
    max_buffer = buffer
    max_coor = coor_buffer
    if (ctr < buffer_size):
```



```
        for i in range(height):
            if (matrix_2[i][column] != 0):
                matrix_2[i][column] = 0
                buffer.append(matrix[i][column])
                coor_buffer.append(str(column+1)+','+str(i+1))
                new_buffer = buffer.copy()
                new_coor_buffer = coor_buffer.copy()
                new_reward =
horizontal(buffer_size,i,ctr+1,new_buffer,new_coor_buffer)
                buffer.pop()
                coor_buffer.pop()
                matrix_2[i][column] = 1

                if new_reward[0] > max_reward:
                    max_reward = new_reward[0]
                    max_buffer = new_reward[1]
                    max_coor = new_reward[2]
                elif (new_reward[0] == max_reward) and
(len(new_reward[1])<len(max_buffer)):
                    max_buffer = new_reward[1]
                    max_coor = new_reward[2]

    return (max_reward,max_buffer,max_coor)

# Output Terminal
print("\nSolusi:")
start = round(time.time()*1000)
max = horizontal(buffer_size,0,0,[],[])
print(max[0])
for tokens in max[1]:
    print(tokens,end=" ")
print()
for coors in max[2]:
    print(coors)
end = round(time.time()*1000)
print(f"\n{end-start} ms\n")

is_simpan = input("Apakah ingin menyimpan solusi?(y/n) ")

# Output File
while (is_simpan != 'y' and is_simpan != 'n'):
    print("Invalid input")
    is_simpan = input("Apakah ingin menyimpan solusi?(y/n) ")

if is_simpan == 'y':
    file_output_name = input("Enter absolute path: ")

    file_output = open(file_output_name,'w')
    file_output.write(str(max[0])+'\n')
    for tokens in max[1]:
        file_output.write(tokens+" ")
    file_output.write('\n')
    for coors in max[2]:
        file_output.write(coors+'\n')

    file_output.close()
```

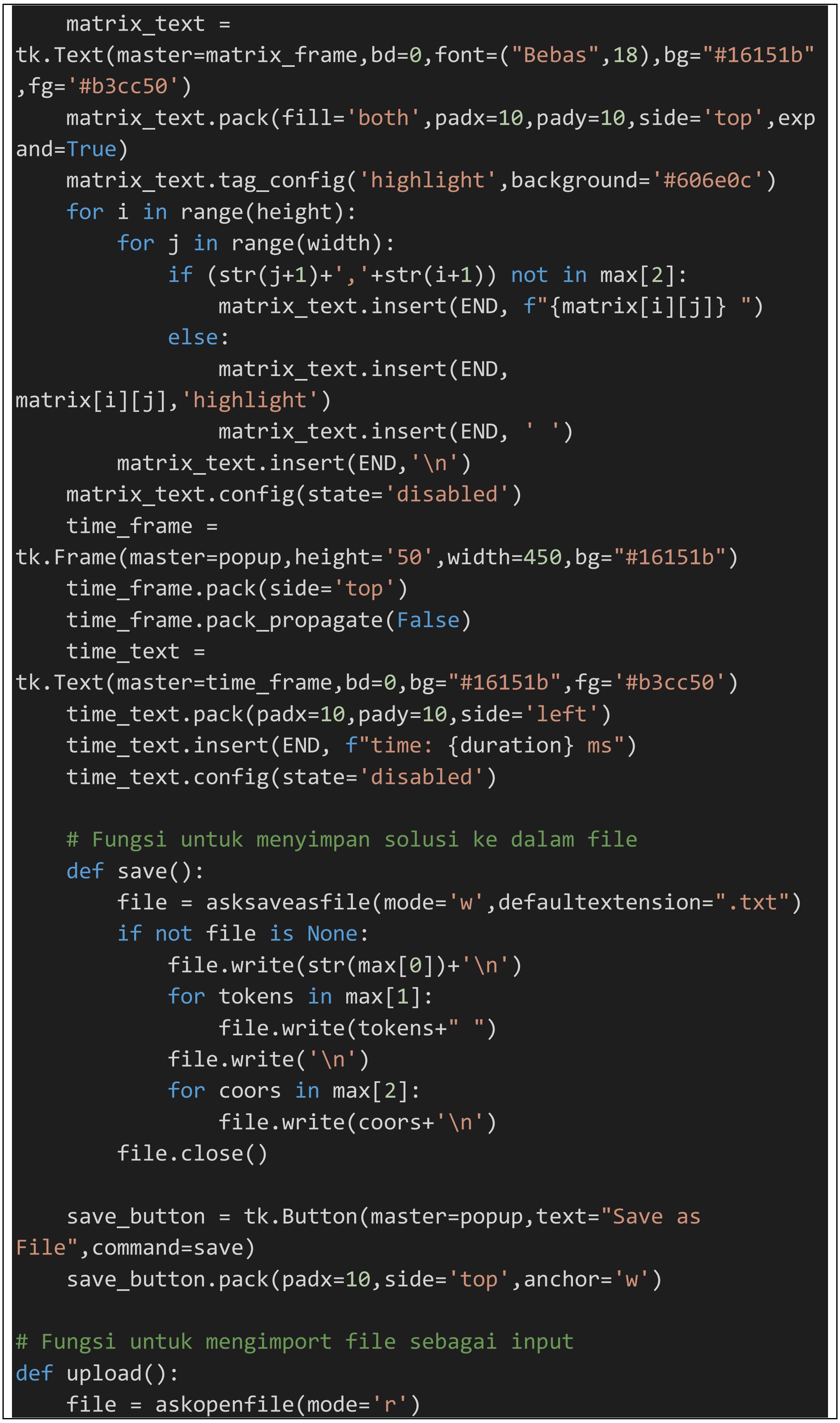
B. GUI

```
import os.path
import time
import random
import tkinter as tk
from tkinter import *
from tkinter.filedialog import askopenfile
from tkinter.filedialog import asksaveasfile

# Inisialisasi window gui
window = tk.Tk(className="python Cyberpunk 2077 Breach Protocol Solver")
window.geometry("1024x576")
window.configure(background="#16151b")
window.resizable(False,False)

# Fungsi untuk mencari solusi
def func():
    # mengambil input dari entry
    buffer_size = int(buffer_entry.get().rstrip())
    matrix = matrix_entry.get('1.0','end-1c').rstrip().split("\n")
    matrix = [line.split() for line in matrix]
    height = len(matrix)
    width = len(matrix[0])
    sequences = sequence_entry.get('1.0','end-1c').rstrip().split("\n")
    sequences = [line.split() for line in sequences]
    sequences_amount = len(sequences)
    sequences_reward = reward_entry.get('1.0','end-1c').rstrip().split("\n")
    sequences_reward = [int(amount) for amount in sequences_reward]
    # cek sequence unik (kalau tidak unik, reward = 0)
    for i in range(sequences_amount-1):
        for j in range(i+1,sequences_amount):
            if len(sequences[i]) == len(sequences[j]):
                is_same = True
                k = 0
                while is_same and k < len(sequences[i]):
                    if sequences[i][k] != sequences[j][k]:
                        is_same = False
                    k += 1
                if is_same:
                    sequences_reward[j] = 0

    # Inisialisasi matriks untuk mencegah node dikunjungi dua
kali
    matrix_2 = [[1 for i in range(width)] for j in
range(height)]

    # Fungsi untuk mengkalkulasi reward dari sequence (buffer)
    def checkReward(buffer):
        reward = 0
        for i in range(sequences_amount):
            has_reward = False
            j = 0
            while not has_reward and j < (len(buffer)-
len(sequences[i])+1):
                is_reward = True
                k = 0
                while is_reward and k < len(sequences[i]):
                    if (buffer[j+k] != sequences[i][k]):
                        is_reward = False
                    k += 1
                if is_reward:
                    reward += sequences_reward[i]
                    has_reward = True
                j += 1

        return reward

    # Fungsi untuk mencari semua kemungkinan sequence dari
suatu row
    def horizontal(buffer_size,row,ctr,buffer,coor_buffer):
        max_reward = checkReward(buffer)
        max_buffer = buffer
```

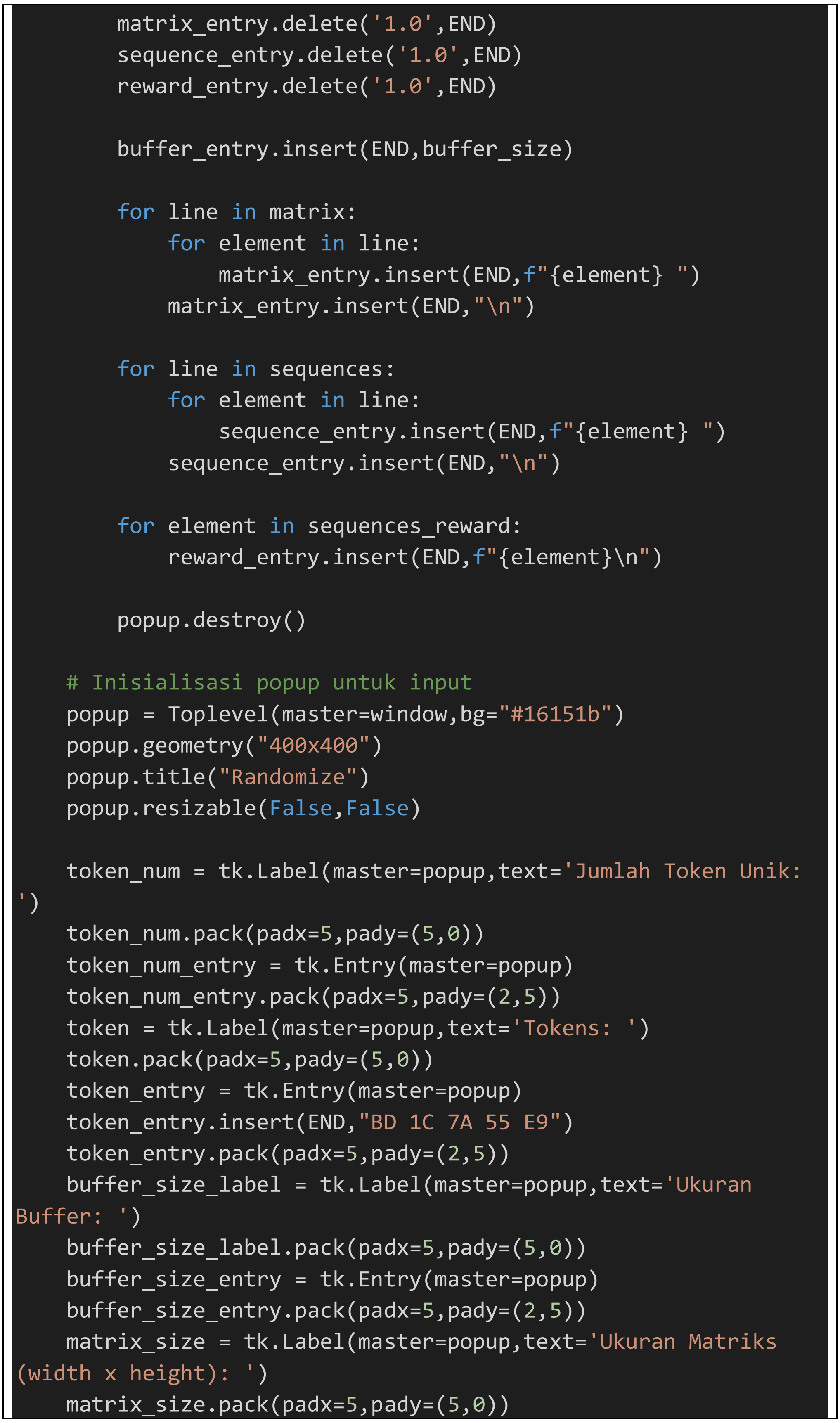


```
        max_coor = coor_buffer
        if (ctr < buffer_size):

            for i in range (width):
                if (matrix_2[row][i] != 0):
                    matrix_2[row][i] = 0
                    buffer.append(matrix[row][i])
                    coor_buffer.append(str(i+1)+','+str(row+1))
                    new_buffer = buffer.copy()
                    new_coor_buffer = coor_buffer.copy()
                    new_reward =
vertical(buffer_size,i,ctr+1,new_buffer,new_coor_buffer)
                    buffer.pop()
                    coor_buffer.pop()
                    matrix_2[row][i] = 1

                    if new_reward[0] > max_reward:
                        max_reward = new_reward[0]
                        max_buffer = new_reward[1]
                        max_coor = new_reward[2]
                    elif (new_reward[0] == max_reward) and
(len(new_reward[1])<len(max_buffer)):
                        max_buffer = new_reward[1]
                        max_coor = new_reward[2]

        return (max_reward,max_buffer,max_coor)

    # Fungsi untuk mencari semua kemungkinan sequence dari
suatu column
    def vertical(buffer_size,column,ctr,buffer,coor_buffer):
        max_reward = checkReward(buffer)
        max_buffer = buffer
        max_coor = coor_buffer
        if (ctr < buffer_size):

            for i in range(height):
                if (matrix_2[i][column] != 0):
                    matrix_2[i][column] = 0
                    buffer.append(matrix[i][column])
                    coor_buffer.append(str(column+1)+','+str(i+
1))
                    new_buffer = buffer.copy()
                    new_coor_buffer = coor_buffer.copy()
                    new_reward =
horizontal(buffer_size,i,ctr+1,new_buffer,new_coor_buffer)
```

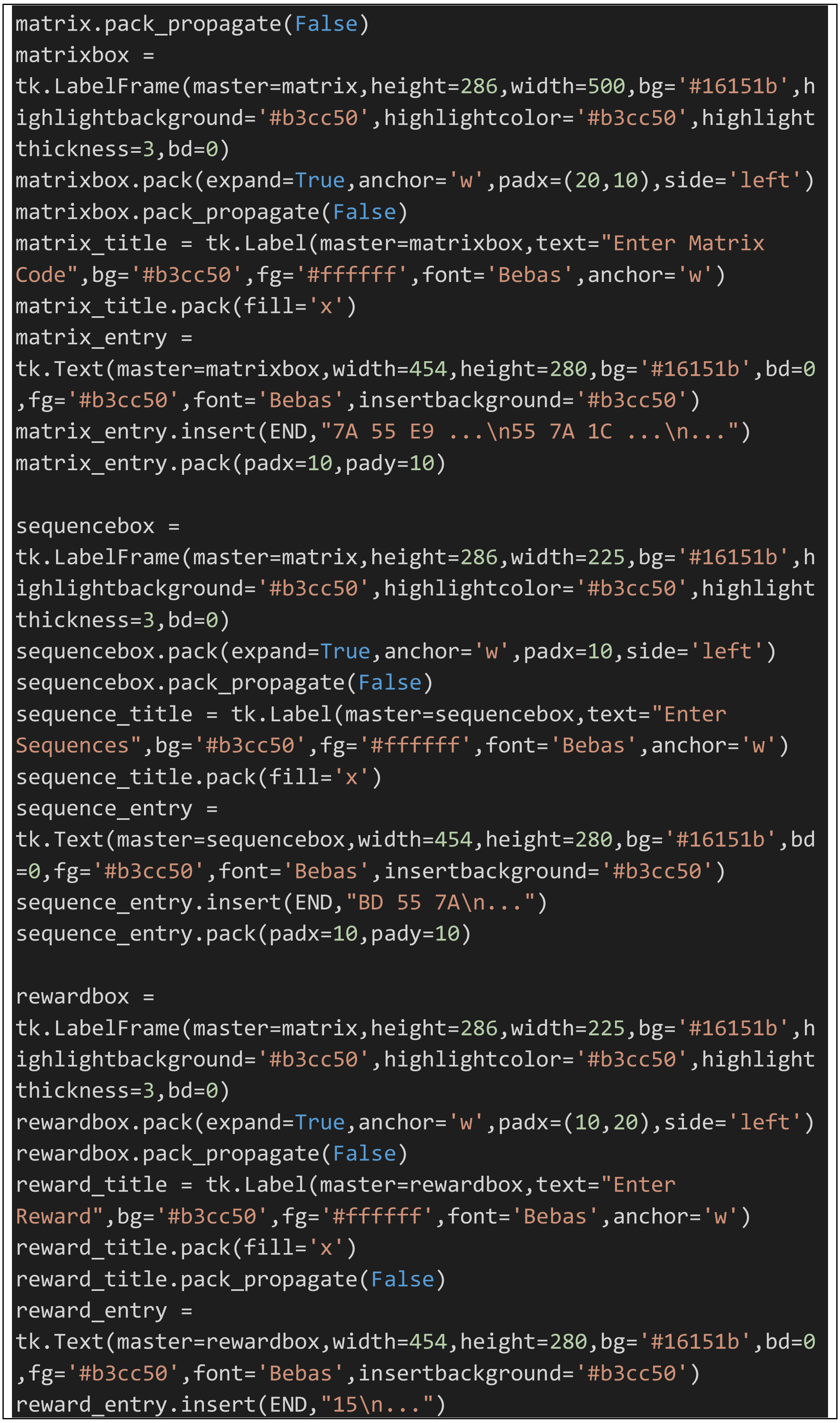
```
                    buffer.pop()
                    coor_buffer.pop()
                    matrix_2[i][column] = 1

                    if new_reward[0] > max_reward:
                        max_reward = new_reward[0]
                        max_buffer = new_reward[1]
                        max_coor = new_reward[2]
                    elif (new_reward[0] == max_reward) and
(len(new_reward[1])<len(max_buffer)):
                        max_buffer = new_reward[1]
                        max_coor = new_reward[2]

        return (max_reward,max_buffer,max_coor)

    start = round(time.time()*1000)
    max = horizontal(buffer_size,0,0,[],[])
    end = round(time.time()*1000)
    duration = end-start

    # Inisialisasi window popup untuk menampilkan solusi
    popup = Toplevel(master=window,bg="#16151b")
    popup.geometry("450x440")
    popup.title("Solution")
    popup.resizable(False,False)

    text_frame =
tk.Frame(master=popup,height='100',bg="#16151b")
    text_frame.pack(fill='x',side='top')
    text_frame.pack_propagate(False)
    solution =
tk.Text(master=text_frame,bd=0,bg="#16151b",fg='#b3cc50')
    solution.pack(fill='x',padx=10,pady=10)
    solution.insert(END, f"Reward: {max[0]}\nSequence: ")
    for tokens in max[1]:
        solution.insert(END, f"{tokens} ")
    solution.insert(END, "\nSteps: ")
    for coors in max[2]:
        solution.insert(END, f"{coors} ")
    solution.config(state='disabled')

    matrix_frame =
tk.Frame(master=popup,height='250',bg="#16151b")
    matrix_frame.pack(fill='x',side='top')
    matrix_frame.pack_propagate(False)
```



```
    matrix_text =
tk.Text(master=matrix_frame,bd=0,font=("Bebas",18),bg="#16151b"
,fg='#b3cc50')
    matrix_text.pack(fill='both',padx=10,pady=10,side='top',exp
and=True)
    matrix_text.tag_config('highlight',background='#606e0c')
    for i in range(height):
        for j in range(width):
            if (str(j+1)+','+str(i+1)) not in max[2]:
                matrix_text.insert(END, f"{matrix[i][j]} ")
            else:
                matrix_text.insert(END,
matrix[i][j],'highlight')
                matrix_text.insert(END, ' ')
        matrix_text.insert(END,'\n')
    matrix_text.config(state='disabled')
    time_frame =
tk.Frame(master=popup,height='50',width=450,bg="#16151b")
    time_frame.pack(side='top')
    time_frame.pack_propagate(False)
    time_text =
tk.Text(master=time_frame,bd=0,bg="#16151b",fg='#b3cc50')
    time_text.pack(padx=10,pady=10,side='left')
    time_text.insert(END, f"time: {duration} ms")
    time_text.config(state='disabled')

    # Fungsi untuk menyimpan solusi ke dalam file
    def save():
        file = asksaveasfile(mode='w',defaultextension=".txt")
        if not file is None:
            file.write(str(max[0])+'\n')
            for tokens in max[1]:
                file.write(tokens+" ")
            file.write('\n')
            for coors in max[2]:
                file.write(coors+'\n')
        file.close()

    save_button = tk.Button(master=popup,text="Save as
File",command=save)
    save_button.pack(padx=10,side='top',anchor='w')

# Fungsi untuk mengimport file sebagai input
def upload():
    file = askopenfile(mode='r')
    buffer_entry.delete(0,END)
    matrix_entry.delete('1.0',END)
    sequence_entry.delete('1.0',END)
    reward_entry.delete('1.0',END)

    buffer_entry.insert(END,file.readline().rstrip())
    dimension = file.readline().rstrip().split()
    for i in range(int(dimension[1])):
        matrix_entry.insert(END,file.readline())
    sequences_amount = int(file.readline().rstrip())
    for i in range(sequences_amount):
        sequence_entry.insert(END,file.readline())
        reward_entry.insert(END,file.readline())

    file.close()

# Fungsi untuk mengeluarkan popup untuk input secara acak
def openRandomize():

    # Fungsi untuk membuat matriks dan sequence secara acak
    def randomize():
        # Mengambil input pengguna
        token_amount = int(token_num_entry.get().rstrip())
        tokens = token_entry.get().rstrip().split()
        tokens = [tokens[i] for i in range(token_amount)]
        buffer_size = int(buffer_size_entry.get().rstrip())
        dimension = matrix_size_entry.get().rstrip().split()
        width = int(dimension[0])
        height = int(dimension[1])
        sequences_amount =
int(sequence_num_entry.get().rstrip())
        max_sequence_length =
int(sequence_max_entry.get().rstrip())

        # Pembuatan matriks dan sequence secara acak
        matrix = [[random.choice(tokens) for i in range(width)]
for j in range(height)]
        sequences = [[random.choice(tokens) for i in
range(random.randint(2,max_sequence_length))] for j in
range(sequences_amount)]
        sequences_reward = [random.randint(1,50) for i in
range(sequences_amount)]

        buffer_entry.delete(0,END)
```



```
        matrix_entry.delete('1.0',END)
        sequence_entry.delete('1.0',END)
        reward_entry.delete('1.0',END)

        buffer_entry.insert(END,buffer_size)

        for line in matrix:
            for element in line:
                matrix_entry.insert(END,f"{element} ")
            matrix_entry.insert(END,"\n")

        for line in sequences:
            for element in line:
                sequence_entry.insert(END,f"{element} ")
            sequence_entry.insert(END,"\n")

        for element in sequences_reward:
            reward_entry.insert(END,f"{element}\n")

        popup.destroy()

    # Inisialisasi popup untuk input
    popup = Toplevel(master=window,bg="#16151b")
    popup.geometry("400x400")
    popup.title("Randomize")
    popup.resizable(False,False)

    token_num = tk.Label(master=popup,text='Jumlah Token Unik: 
')
    token_num.pack(padx=5,pady=(5,0))
    token_num_entry = tk.Entry(master=popup)
    token_num_entry.pack(padx=5,pady=(2,5))
    token = tk.Label(master=popup,text='Tokens: ')
    token.pack(padx=5,pady=(5,0))
    token_entry = tk.Entry(master=popup)
    token_entry.insert(END,"BD 1C 7A 55 E9")
    token_entry.pack(padx=5,pady=(2,5))
    buffer_size_label = tk.Label(master=popup,text='Ukuran 
Buffer: ')
    buffer_size_label.pack(padx=5,pady=(5,0))
    buffer_size_entry = tk.Entry(master=popup)
    buffer_size_entry.pack(padx=5,pady=(2,5))
    matrix_size = tk.Label(master=popup,text='Ukuran Matriks 
(width x height): ')
    matrix_size.pack(padx=5,pady=(5,0))
    matrix_size_entry = tk.Entry(master=popup)
    matrix_size_entry.insert(END,"6 6")
    matrix_size_entry.pack(padx=5,pady=(2,5))
    sequence_num = tk.Label(master=popup,text='Jumlah Sekuens:
')
    sequence_num.pack(padx=5,pady=(5,0))
    sequence_num_entry = tk.Entry(master=popup)
    sequence_num_entry.pack(padx=5,pady=(2,5))
    sequence_max = tk.Label(master=popup,text='Ukuran Maksimal
Sekuens: ')
    sequence_max.pack(padx=5,pady=(5,0))
    sequence_max_entry = tk.Entry(master=popup)
    sequence_max_entry.pack(padx=5,pady=(2,5))

    randomize_button_border =
tk.Frame(master=popup,height=33,width=73,bg='#16151b',highlight
background='#b3cc50',highlightcolor='#b3cc50',highlightthicknes
s=3,bd=0)
    randomize_button_border.pack(pady=20)
    randomize_button_border.pack_propagate(False)
    randomize_button =
tk.Button(master=randomize_button_border,command=randomize,bg='
#16151b',text='Randomize',fg='#b3cc50',font='Bebas',activebackg
round='#606e0c',bd=0)
    randomize_button.pack(expand=True)
    randomize_button.pack_propagate(False)

# Pembuatan GUI
title = tk.Frame(master=window,height='100',bg="#16151b")
title.pack(fill=tk.X)
title.pack_propagate(False)
title_label = tk.Label(master=title,text="Cyberpunk 2077 Breach
Protocol Solver",bg="#16151b",fg="#d1ed5b",font=("Bebas",18))
title_label.pack(side="left",padx=20)

frame = tk.Frame(master=window,height='150',bg='#16151b')
frame.pack(fill=tk.X)
frame.pack_propagate(False)
buffer =
tk.Frame(master=frame,height='150',width='540',bg='#16151b')
buffer.pack(side='left')
buffer.pack_propagate(False)
bufferbox =
tk.LabelFrame(master=buffer,height=145,width=500,bg='#16151b',h
ighlightbackground='#b3cc50',highlightcolor='#b3cc50',highlightthickness=3,bd=0)
bufferbox.pack(expand=True,anchor='w',padx=20,side='left')
bufferbox.pack_propagate(False)
buffer_title_label = tk.Label(master=bufferbox,text="Specify Buffer Size",bg='#b3cc50',fg='#ffffff',font='Bebas',anchor='w')
buffer_title_label.pack(fill='x')
buffer_entry_text = tk.StringVar()
buffer_entry = Entry(master=bufferbox,textvariable=buffer_entry_text,justify='center')
buffer_entry_text.set(4)
buffer_entry.pack(pady=10)

button_frame = tk.Frame(master=frame,height='150',width='484',bg='#16151b')
button_frame.pack()
button_frame.pack_propagate(False)
button_border = tk.Frame(master=button_frame,height=53,width=103,bg='#16151b',highlightbackground='#b3cc50',highlightcolor='#b3cc50',highlightthickness=3,bd=0)
button_border.pack(side='left',padx=69.5)
button_border.pack_propagate(False)
solve_button = tk.Button(master=button_border,command=func,height=50,width=100,bg='#16151b',text='Solve',fg='#b3cc50',font='Bebas',activebackground='#606e0c',bd=0)
solve_button.pack(expand=True)
solve_button.pack_propagate(False)
button_border_2 = tk.Frame(master=button_frame,height=53,width=103,bg='#16151b',highlightbackground='#b3cc50',highlightcolor='#b3cc50',highlightthickness=3,bd=0)
button_border_2.pack(side='left',padx=69.5)
button_border_2.pack_propagate(False)
randomize_button = tk.Button(master=button_border_2,command=openRandomize,height=50,width=100,bg='#16151b',text='Randomize',fg='#b3cc50',font='Bebas',activebackground='#606e0c',bd=0)
randomize_button.pack(expand=True)
randomize_button.pack_propagate(False)

matrix = tk.Frame(master=window,bg='#16151b')
matrix.pack(fill='both',expand=True)
```

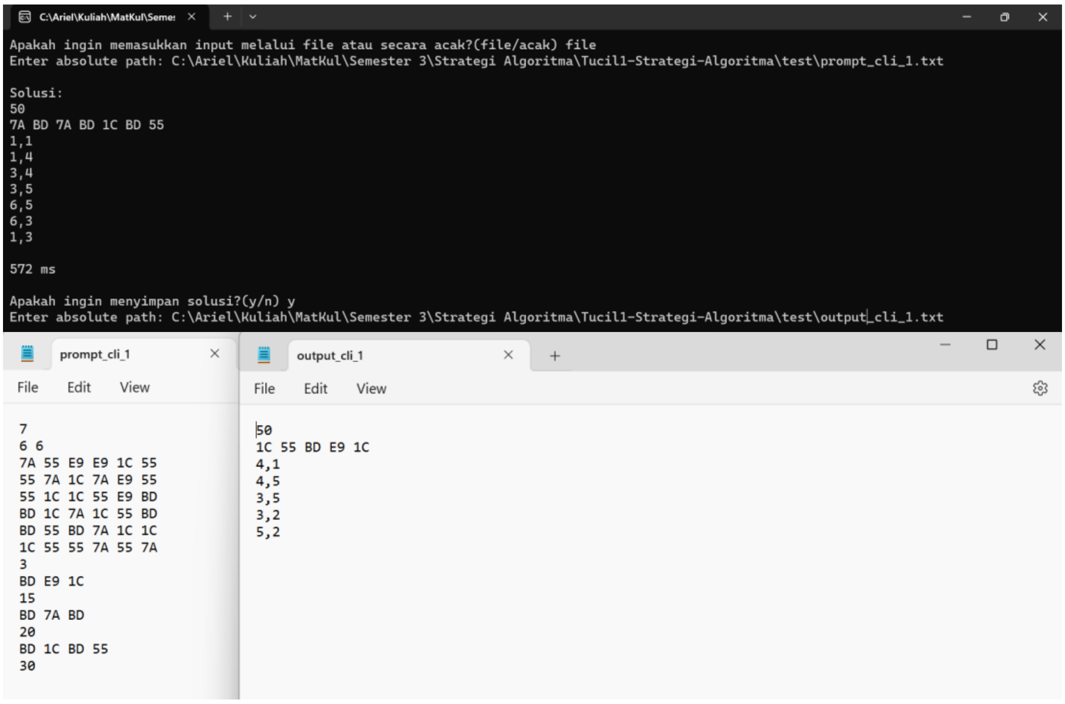


```
matrix.pack_propagate(False)
matrixbox =
tk.LabelFrame(master=matrix,height=286,width=500,bg='#16151b',h
ighlightbackground='#b3cc50',highlightcolor='#b3cc50',highlight
thickness=3,bd=0)
matrixbox.pack(expand=True,anchor='w',padx=(20,10),side='left')
matrixbox.pack_propagate(False)
matrix_title = tk.Label(master=matrixbox,text="Enter Matrix
Code",bg='#b3cc50',fg='#ffffff',font='Bebas',anchor='w')
matrix_title.pack(fill='x')
matrix_entry =
tk.Text(master=matrixbox,width=454,height=280,bg='#16151b',bd=0
,fg='#b3cc50',font='Bebas',insertbackground='#b3cc50')
matrix_entry.insert(END,"7A 55 E9 ...\n55 7A 1C ...\n...")
matrix_entry.pack(padx=10,pady=10)

sequencebox =
tk.LabelFrame(master=matrix,height=286,width=225,bg='#16151b',h
ighlightbackground='#b3cc50',highlightcolor='#b3cc50',highlight
thickness=3,bd=0)
sequencebox.pack(expand=True,anchor='w',padx=10,side='left')
sequencebox.pack_propagate(False)
sequence_title = tk.Label(master=sequencebox,text="Enter
Sequences",bg='#b3cc50',fg='#ffffff',font='Bebas',anchor='w')
sequence_title.pack(fill='x')
sequence_entry =
tk.Text(master=sequencebox,width=454,height=280,bg='#16151b',bd
=0,fg='#b3cc50',font='Bebas',insertbackground='#b3cc50')
sequence_entry.insert(END,"BD 55 7A\n...")
sequence_entry.pack(padx=10,pady=10)

rewardbox =
tk.LabelFrame(master=matrix,height=286,width=225,bg='#16151b',h
ighlightbackground='#b3cc50',highlightcolor='#b3cc50',highlight
thickness=3,bd=0)
rewardbox.pack(expand=True,anchor='w',padx=(10,20),side='left')
rewardbox.pack_propagate(False)
reward_title = tk.Label(master=rewardbox,text="Enter
Reward",bg='#b3cc50',fg='#ffffff',font='Bebas',anchor='w')
reward_title.pack(fill='x')
reward_title.pack_propagate(False)
reward_entry =
tk.Text(master=rewardbox,width=454,height=280,bg='#16151b',bd=0
,fg='#b3cc50',font='Bebas',insertbackground='#b3cc50')
reward_entry.insert(END,"15\n...")
reward_entry.pack(padx=10,pady=10)
reward_entry.pack_propagate(False)

upload_button = tk.Button(master=title,text="Import from File",command=upload)
upload_button.pack(side="left",padx=20)

window.mainloop()
```

C. Uji Coba dan Hasil

1. Test Case 1

   CLI:

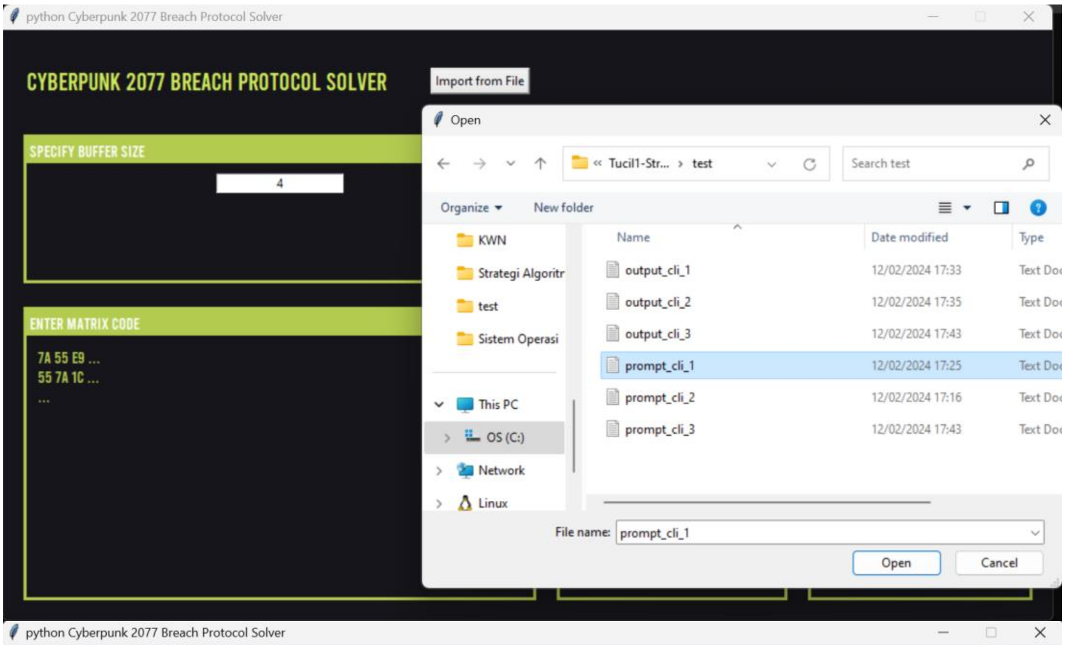


```
Apakah ingin memasukkan input melalui file atau secara acak?(file/acak) file
Enter absolute path: C:\Ariel\Kuliah\MatKul\Semester 3\Strategi Algoritma\Tucil1-Strategi-Algoritma\test\prompt_cli_1.txt

Solusi:
50
7A BD 7A BD 1C BD 55
1,1
1,4
3,4
3,5
6,5
6,3
1,3

572 ms

Apakah ingin menyimpan solusi?(y/n) y
Enter absolute path: C:\Ariel\Kuliah\MatKul\Semester 3\Strategi Algoritma\Tucil1-Strategi-Algoritma\test\output_cli_1.txt
```

```
7
6 6
7A 55 E9 E9 1C 55
55 7A 1C 7A E9 55
55 1C 1C 55 E9 BD
BD 1C 7A 1C 55 BD
BD 55 BD 7A 1C 1C
1C 55 55 7A 55 7A
3
BD E9 1C
15
BD 7A BD
20
BD 1C BD 55
30
```

```
50
1C 55 BD E9 1C
4,1
4,5
3,5
3,2
5,2
```

GUI:



SPECIFY BUFFER SIZE

4

ENTER MATRIX CODE

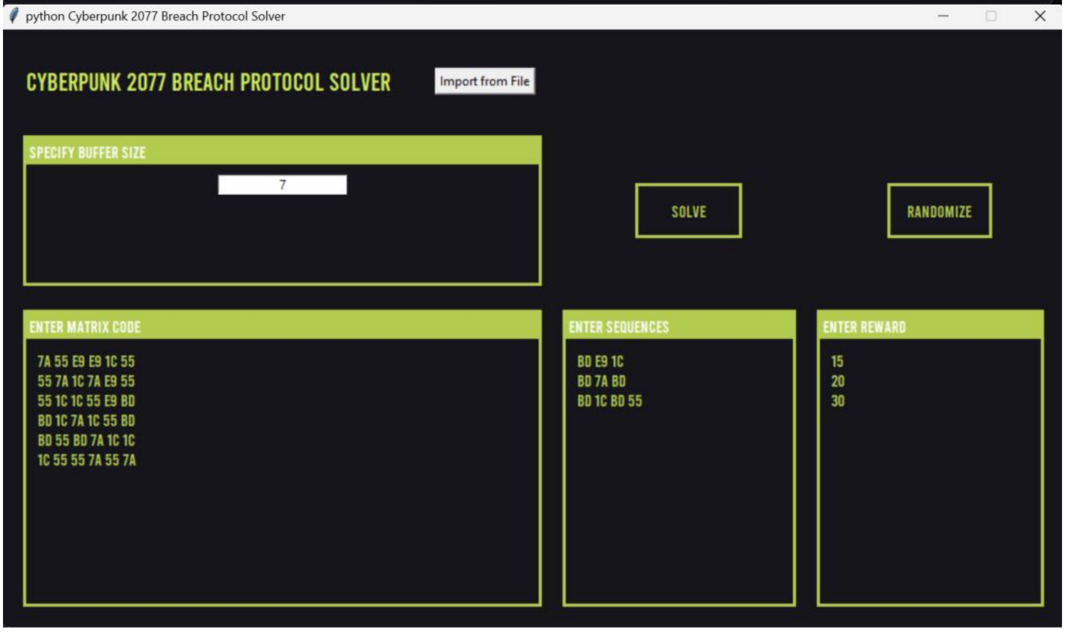
```
7A 55 E9 ...
55 7A 1C ...
...
```

Tucil1-Str... › test

Search test

Name	Date modified	Type
output_cli_1	12/02/2024 17:33	Text Do
output_cli_2	12/02/2024 17:35	Text Do
output_cli_3	12/02/2024 17:43	Text Do
prompt_cli_1	12/02/2024 17:25	Text Do
prompt_cli_2	12/02/2024 17:16	Text Do
prompt_cli_3	12/02/2024 17:43	Text Do

File name: prompt_cli_1



python Cyberpunk 2077 Breach Protocol Solver
CYBERPUNK 2077 BREACH PROTOCOL SOLVER
Import from File
SOLVE
RANDOMIZE

SPECIFY BUFFER SIZE

7

ENTER MATRIX CODE

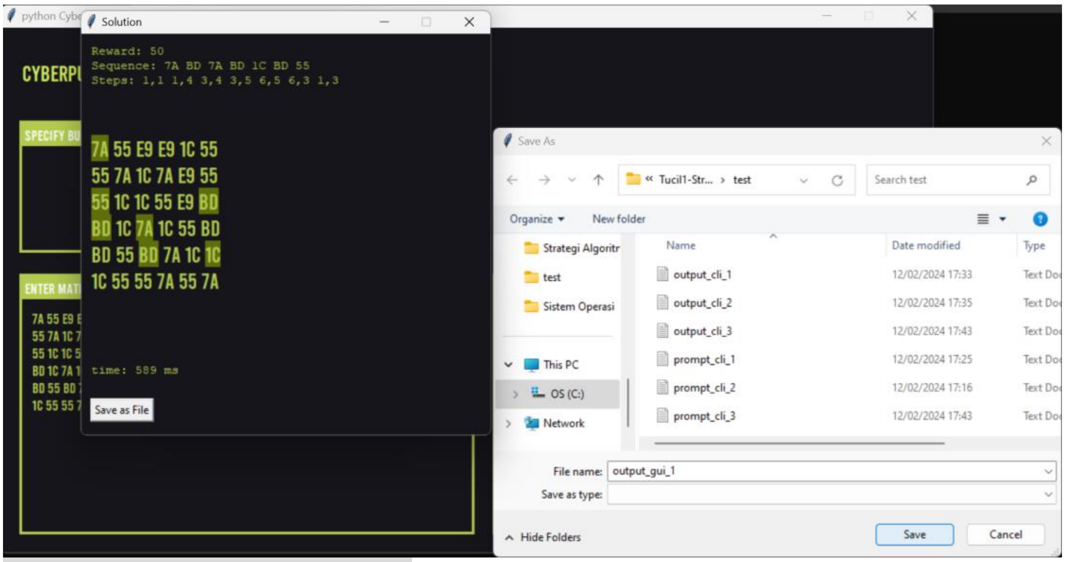
```
7A 55 E9 E9 1C 55
55 7A 1C 7A E9 55
55 1C 1C 55 E9 BD
BD 1C 7A 1C 55 BD
BD 55 BD 7A 1C 1C
1C 55 55 7A 55 7A
```

ENTER SEQUENCES

```
BD E9 1C
BD 7A BD
BD 1C BD 55
```

ENTER REWARD

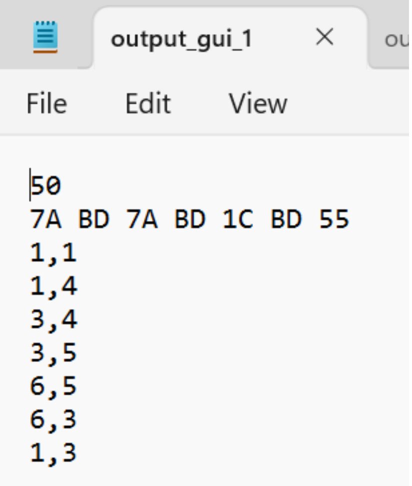
```
15
20
30
```



```
Reward: 50
Sequence: 7A BD 7A BD 1C BD 55
Steps: 1,1 1,4 3,4 3,5 6,5 6,3 1,3


7A 55 E9 E9 1C 55
55 7A 1C 7A E9 55
55 1C 1C 55 E9 BD
BD 1C 7A 1C 55 BD
BD 55 BD 7A 1C 1C
1C 55 55 7A 55 7A


time: 589 ms
```

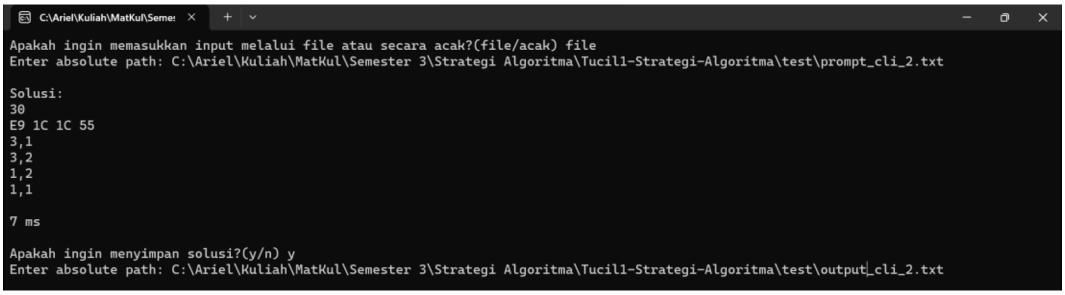
Name	Date modified	Type
output_cli_1	12/02/2024 17:33	Text Do
output_cli_2	12/02/2024 17:35	Text Do
output_cli_3	12/02/2024 17:43	Text Do
prompt_cli_1	12/02/2024 17:25	Text Do
prompt_cli_2	12/02/2024 17:16	Text Do
prompt_cli_3	12/02/2024 17:43	Text Do

File name: output_gui_1
Save as type:

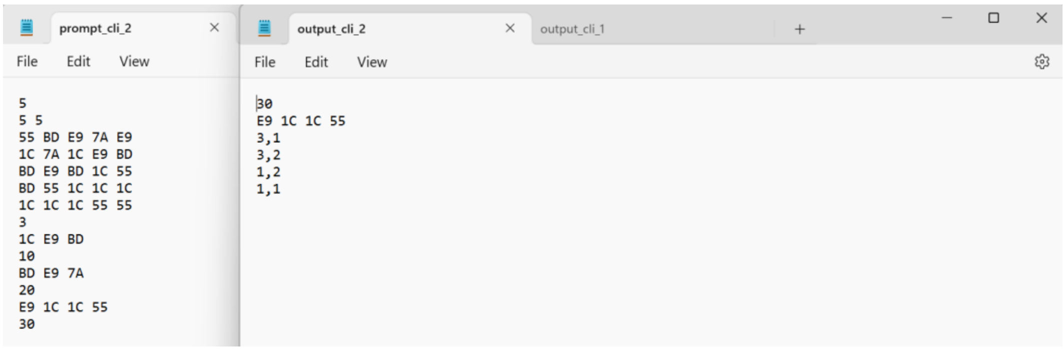


```
50
7A BD 7A BD 1C BD 55
1,1
1,4
3,4
3,5
6,5
6,3
1,3
```

2. Test Case 2
   CLI:



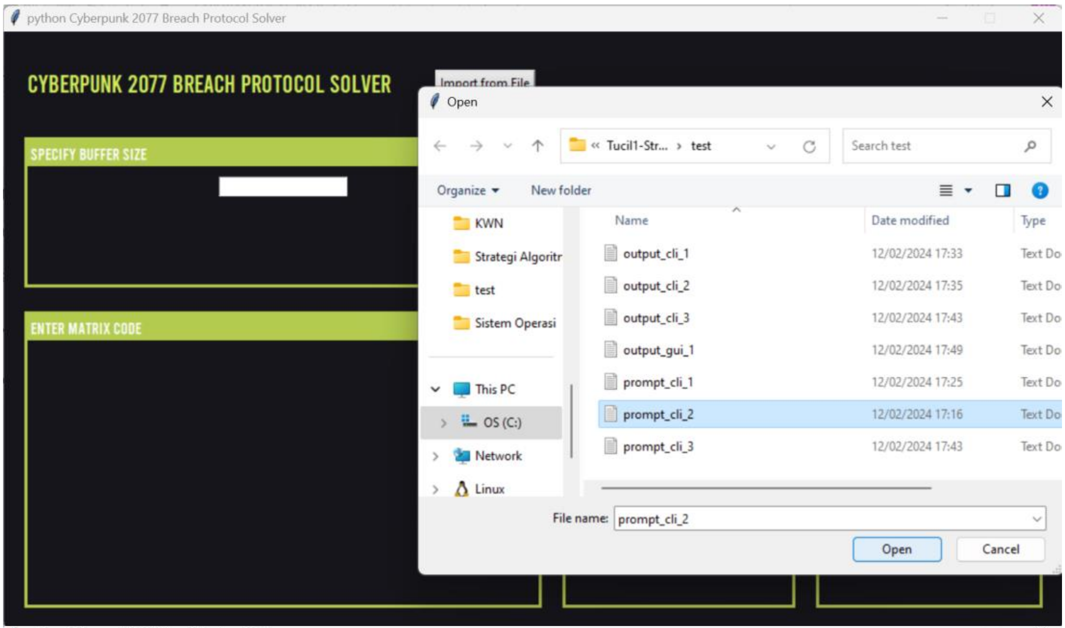
```
Apakah ingin memasukkan input melalui file atau secara acak?(file/acak) file
Enter absolute path: C:\Ariel\Kuliah\MatKul\Semester 3\Strategi Algoritma\Tucil1-Strategi-Algoritma\test\prompt_cli_2.txt

Solusi:
30
E9 1C 1C 55
3,1
3,2
1,2
1,1

7 ms

Apakah ingin menyimpan solusi?(y/n) y
Enter absolute path: C:\Ariel\Kuliah\MatKul\Semester 3\Strategi Algoritma\Tucil1-Strategi-Algoritma\test\output_cli_2.txt
```



```
5
5 5
55 BD E9 7A E9
1C 7A 1C E9 BD
BD E9 BD 1C 55
BD 55 1C 1C 1C
1C 1C 1C 55 55
3
1C E9 BD
10
BD E9 7A
20
E9 1C 1C 55
30
```

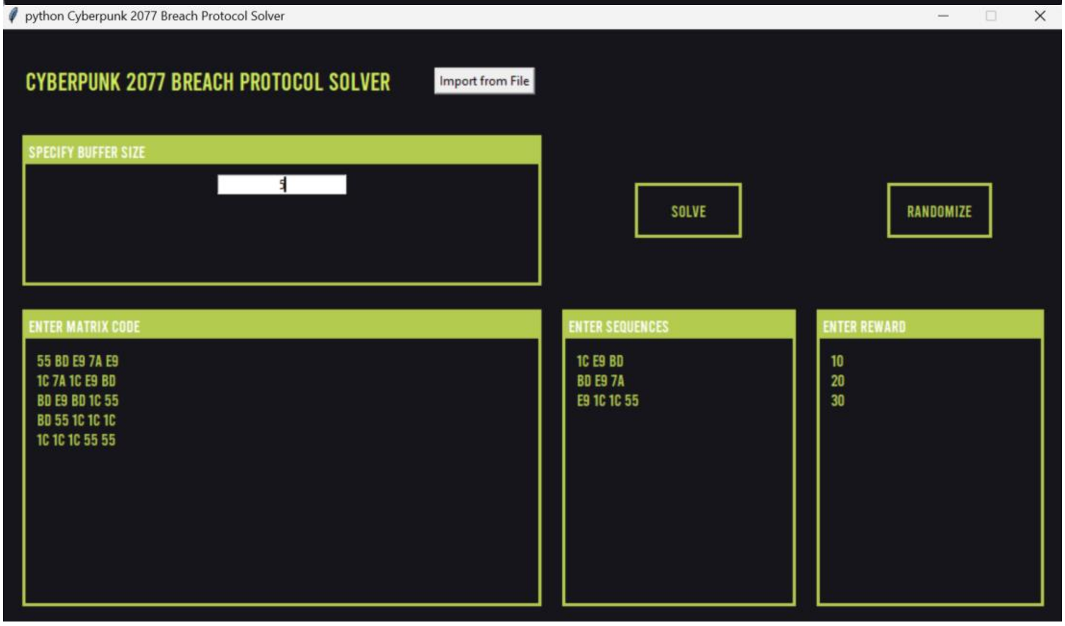
```
30
E9 1C 1C 55
3,1
3,2
1,2
1,1
```

GUI:



Name	Date modified	Type
output_cli_1	12/02/2024 17:33	Text Do
output_cli_2	12/02/2024 17:35	Text Do
output_cli_3	12/02/2024 17:43	Text Do
output_gui_1	12/02/2024 17:49	Text Do
prompt_cli_1	12/02/2024 17:25	Text Do
prompt_cli_2	12/02/2024 17:16	Text Do
prompt_cli_3	12/02/2024 17:43	Text Do

File name: prompt_cli_2


python Cyberpunk 2077 Breach Protocol Solver
CYBERPUNK 2077 BREACH PROTOCOL SOLVER
Import from File
SOLVE
RANDOMIZE

SPECIFY BUFFER SIZE: 5

ENTER MATRIX CODE

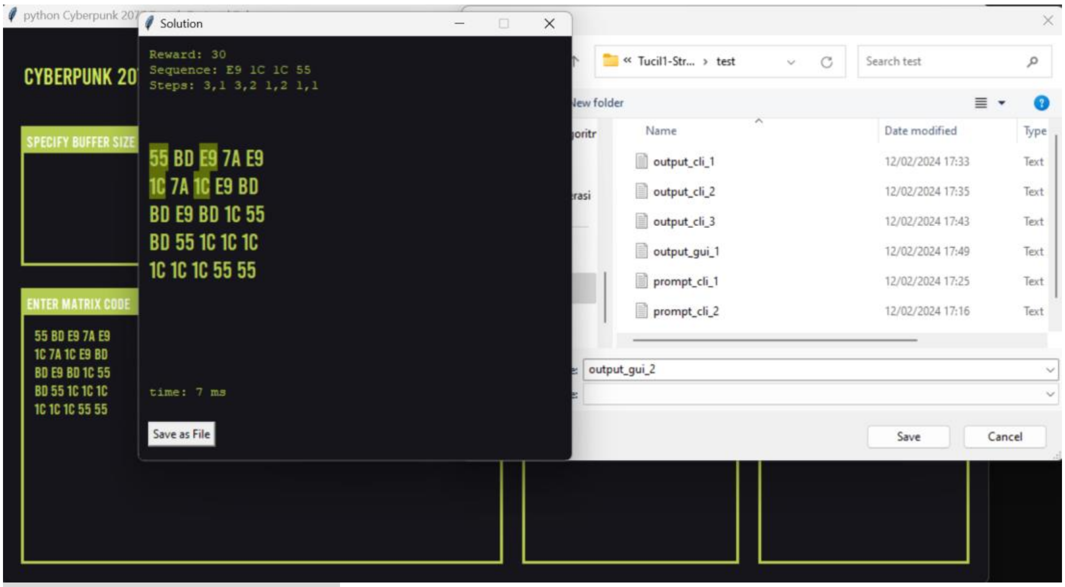
```
55 BD E9 7A E9
1C 7A 1C E9 BD
BD E9 BD 1C 55
BD 55 1C 1C 1C
1C 1C 1C 55 55
```

ENTER SEQUENCES

```
1C E9 BD
BD E9 7A
E9 1C 1C 55
```

ENTER REWARD

```
10
20
30
```



```
Reward: 30
Sequence: E9 1C 1C 55
Steps: 3,1 3,2 1,2 1,1
```

```
55 BD E9 7A E9
1C 7A 1C E9 BD
BD E9 BD 1C 55
BD 55 1C 1C 1C
1C 1C 1C 55 55
```

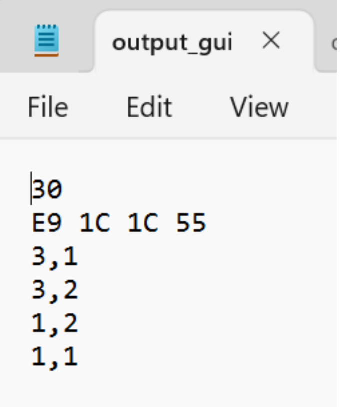
```
time: 7 ms
```

ENTER MATRIX CODE

```
55 BD E9 7A E9
1C 7A 1C E9 BD
BD E9 BD 1C 55
BD 55 1C 1C 1C
1C 1C 1C 55 55
```

Name	Date modified	Type
output_cli_1	12/02/2024 17:33	Text
output_cli_2	12/02/2024 17:35	Text
output_cli_3	12/02/2024 17:43	Text
output_gui_1	12/02/2024 17:49	Text
prompt_cli_1	12/02/2024 17:25	Text
prompt_cli_2	12/02/2024 17:16	Text

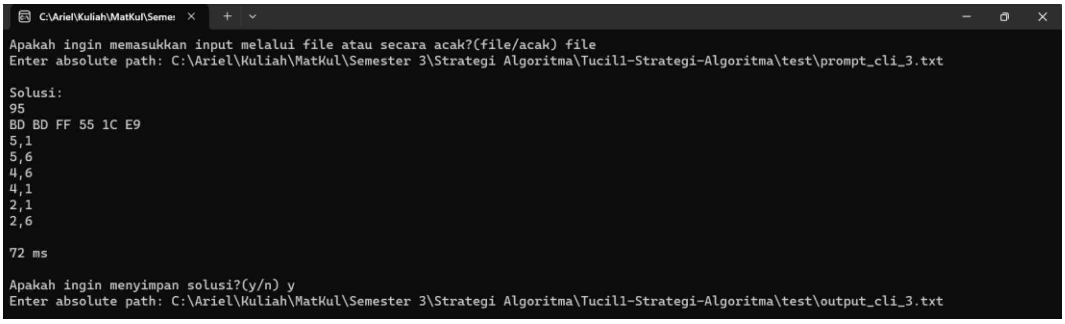
File name: output_gui_2



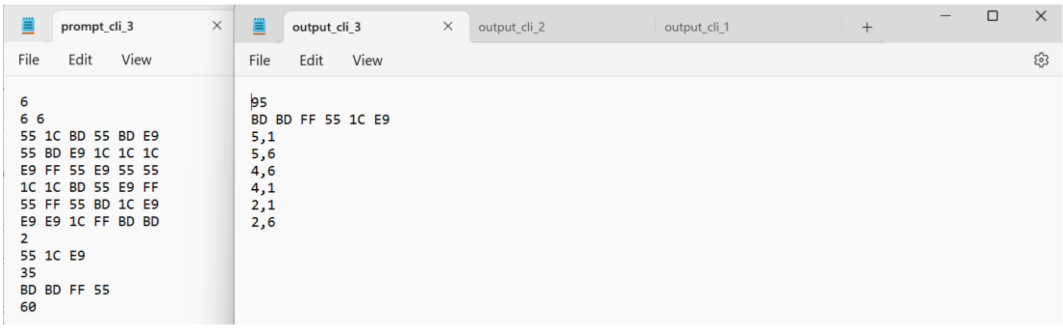
```
30
E9 1C 1C 55
3,1
3,2
1,2
1,1
```

3. Test Case 3

CLI:



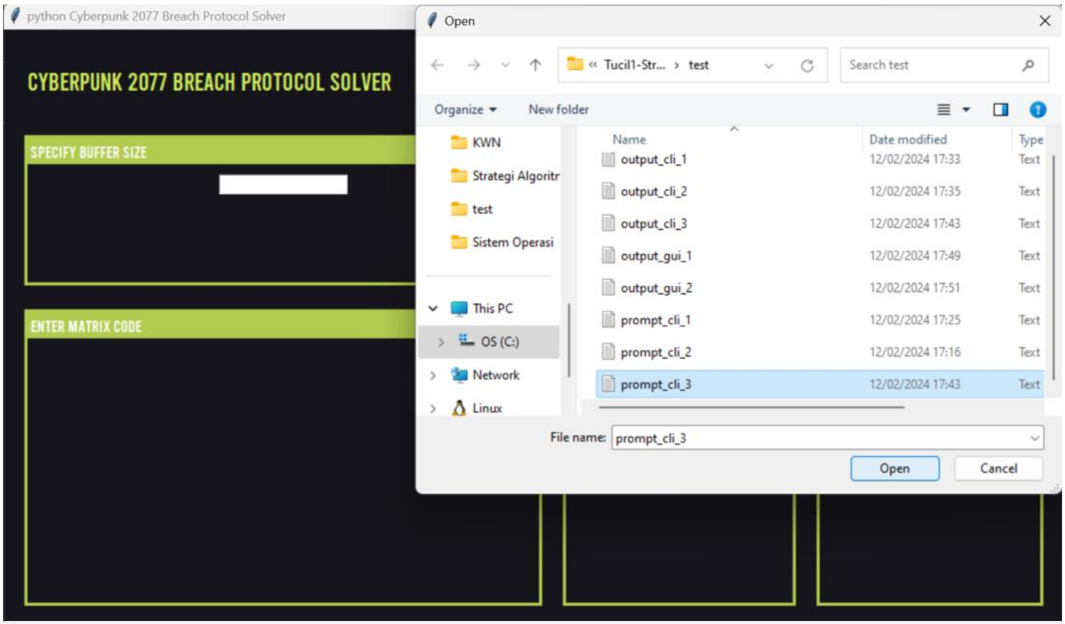
```
Apakah ingin memasukkan input melalui file atau secara acak?(file/acak) file
Enter absolute path: C:\Ariel\Kuliah\MatKul\Semester 3\Strategi Algoritma\Tucil1-Strategi-Algoritma\test\prompt_cli_3.txt

Solusi:
95
BD BD FF 55 1C E9
5,1
5,6
4,6
4,1
2,1
2,6

72 ms

Apakah ingin menyimpan solusi?(y/n) y
Enter absolute path: C:\Ariel\Kuliah\MatKul\Semester 3\Strategi Algoritma\Tucil1-Strategi-Algoritma\test\output_cli_3.txt
```



```
6
6 6
55 1C BD 55 BD E9
55 BD E9 1C 1C 1C
E9 FF 55 E9 55 55
1C 1C BD 55 E9 FF
55 FF 55 BD 1C E9
E9 E9 1C FF BD BD
2
55 1C E9
35
BD BD FF 55
60
```

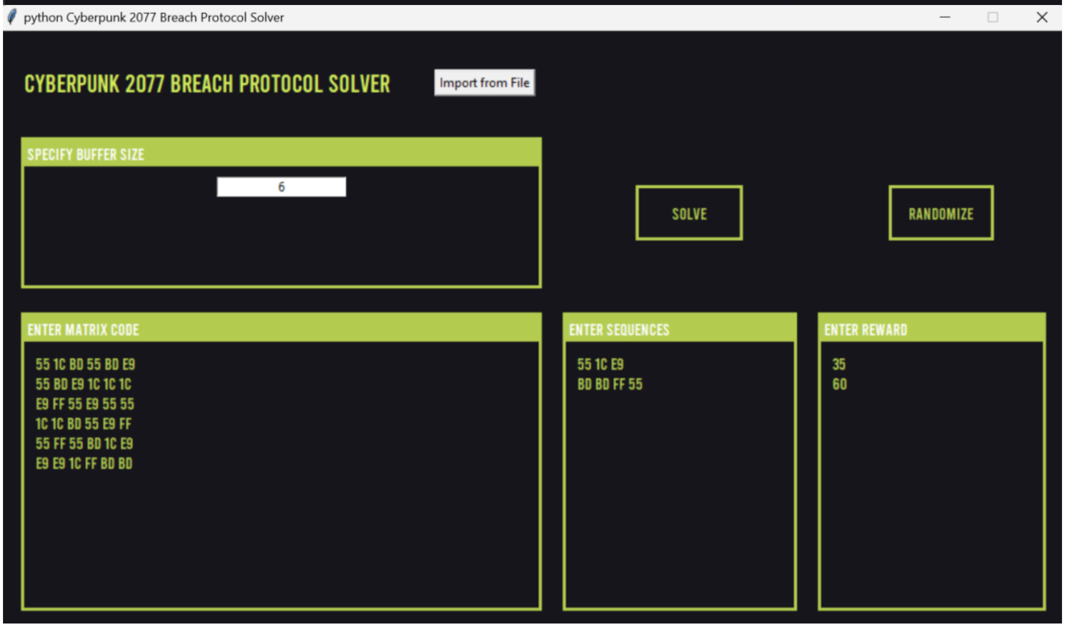
```
95
BD BD FF 55 1C E9
5,1
5,6
4,6
4,1
2,1
2,6
```

GUI:



Name	Date modified	Type
output_cli_1	12/02/2024 17:33	Text
output_cli_2	12/02/2024 17:35	Text
output_cli_3	12/02/2024 17:43	Text
output_gui_1	12/02/2024 17:49	Text
output_gui_2	12/02/2024 17:51	Text
prompt_cli_1	12/02/2024 17:25	Text
prompt_cli_2	12/02/2024 17:16	Text
prompt_cli_3	12/02/2024 17:43	Text

File name: prompt_cli_3


python Cyberpunk 2077 Breach Protocol Solver
CYBERPUNK 2077 BREACH PROTOCOL SOLVER
Import from File
SOLVE
RANDOMIZE

SPECIFY BUFFER SIZE: 6

ENTER MATRIX CODE

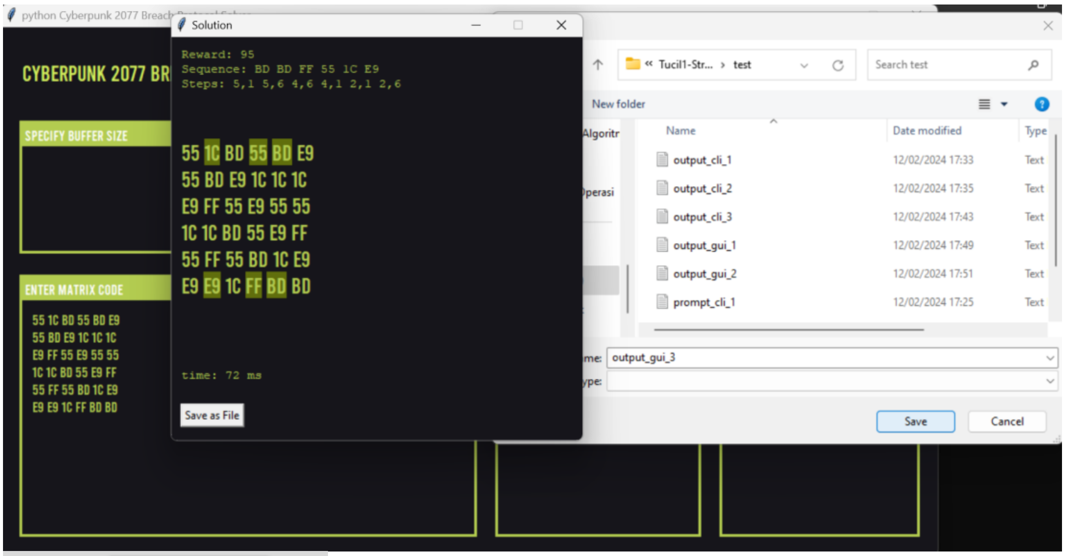
```
55 1C BD 55 BD E9
55 BD E9 1C 1C 1C
E9 FF 55 E9 55 55
1C 1C BD 55 E9 FF
55 FF 55 BD 1C E9
E9 E9 1C FF BD BD
```

ENTER SEQUENCES

```
55 1C E9
BD BD FF 55
```

ENTER REWARD

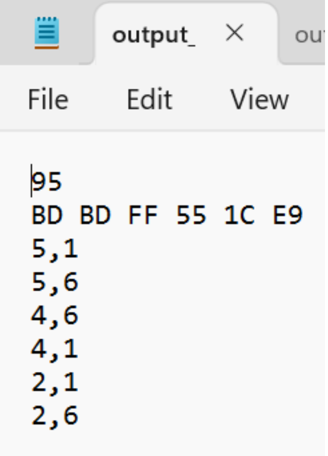
```
35
60
```



python Cyberpunk 2077 Breach Protocol Solver
CYBERPUNK 2077 BR
SPECIFY BUFFER SIZE
ENTER MATRIX CODE
Solution
Save as File
Tucil1-Str... › test
Search test
New folder
Algoritr
)perasi
Name
Date modified
Type
output_cli_1 12/02/2024 17:33 Text
output_cli_2 12/02/2024 17:35 Text
output_cli_3 12/02/2024 17:43 Text
output_gui_1 12/02/2024 17:49 Text
output_gui_2 12/02/2024 17:51 Text
prompt_cli_1 12/02/2024 17:25 Text
me: output_gui_3
ype:
Save
Cancel

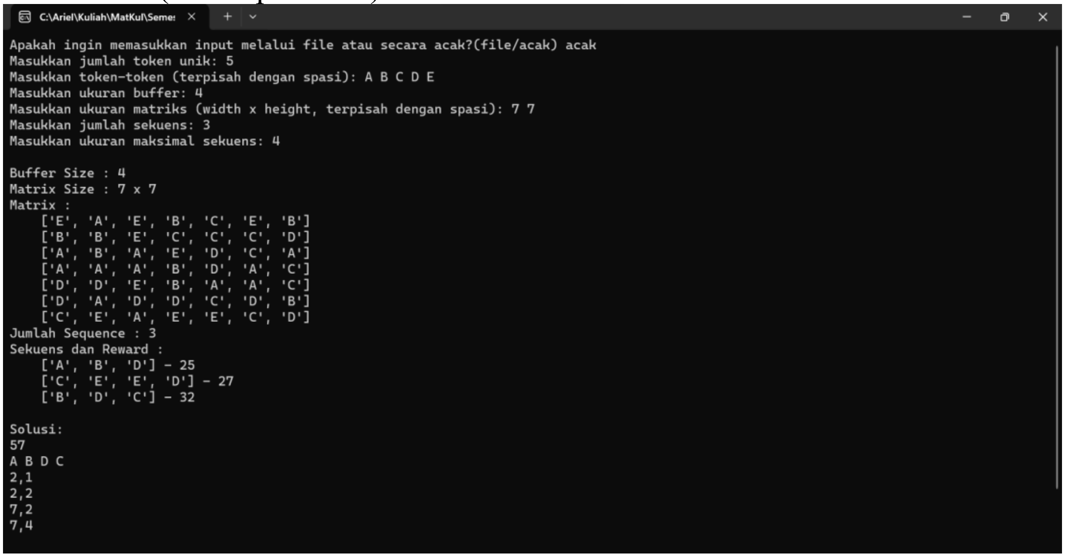
```
55 1C BD 55 BD E9
55 BD E9 1C 1C 1C
E9 FF 55 E9 55 55
1C 1C BD 55 E9 FF
55 FF 55 BD 1C E9
E9 E9 1C FF BD BD
```

```
Reward: 95
Sequence: BD BD FF 55 1C E9
Steps: 5,1 5,6 4,6 4,1 2,1 2,6



55 1C BD 55 BD E9
55 BD E9 1C 1C 1C
E9 FF 55 E9 55 55
1C 1C BD 55 E9 FF
55 FF 55 BD 1C E9
E9 E9 1C FF BD BD



time: 72 ms
```

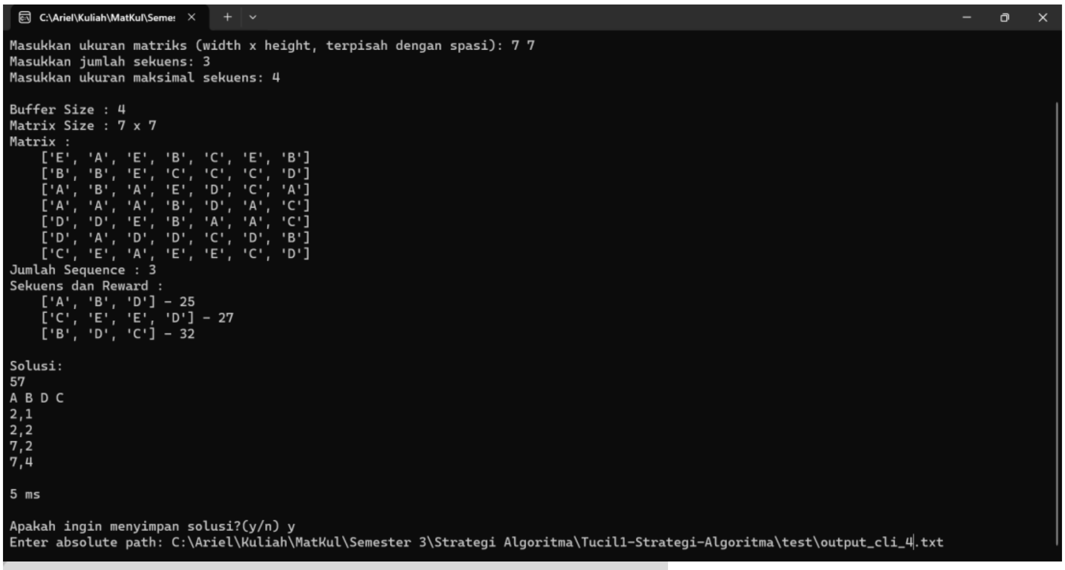


```
95
BD BD FF 55 1C E9
5,1
5,6
4,6
4,1
2,1
2,6
```

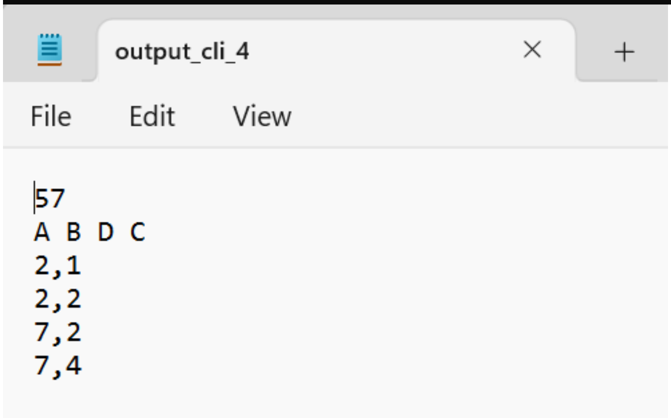
4. Test Case 4 (CLI Input Acak)



```
Apakah ingin memasukkan input melalui file atau secara acak?(file/acak) acak
Masukkan jumlah token unik: 5
Masukkan token-token (terpisah dengan spasi): A B C D E
Masukkan ukuran buffer: 4
Masukkan ukuran matriks (width x height, terpisah dengan spasi): 7 7
Masukkan jumlah sekuens: 3
Masukkan ukuran maksimal sekuens: 4

Buffer Size : 4
Matrix Size : 7 x 7
Matrix :
    ['E', 'A', 'E', 'B', 'C', 'E', 'B']
    ['B', 'B', 'E', 'C', 'C', 'C', 'D']
    ['A', 'B', 'A', 'E', 'D', 'C', 'A']
    ['A', 'A', 'A', 'B', 'D', 'A', 'C']
    ['D', 'D', 'E', 'B', 'A', 'A', 'C']
    ['D', 'A', 'D', 'D', 'C', 'D', 'B']
    ['C', 'E', 'A', 'E', 'E', 'C', 'D']
Jumlah Sequence : 3
Sekuens dan Reward :
    ['A', 'B', 'D'] - 25
    ['C', 'E', 'E', 'D'] - 27
    ['B', 'D', 'C'] - 32

Solusi:
57
A B D C
2,1
2,2
7,2
7,4
```

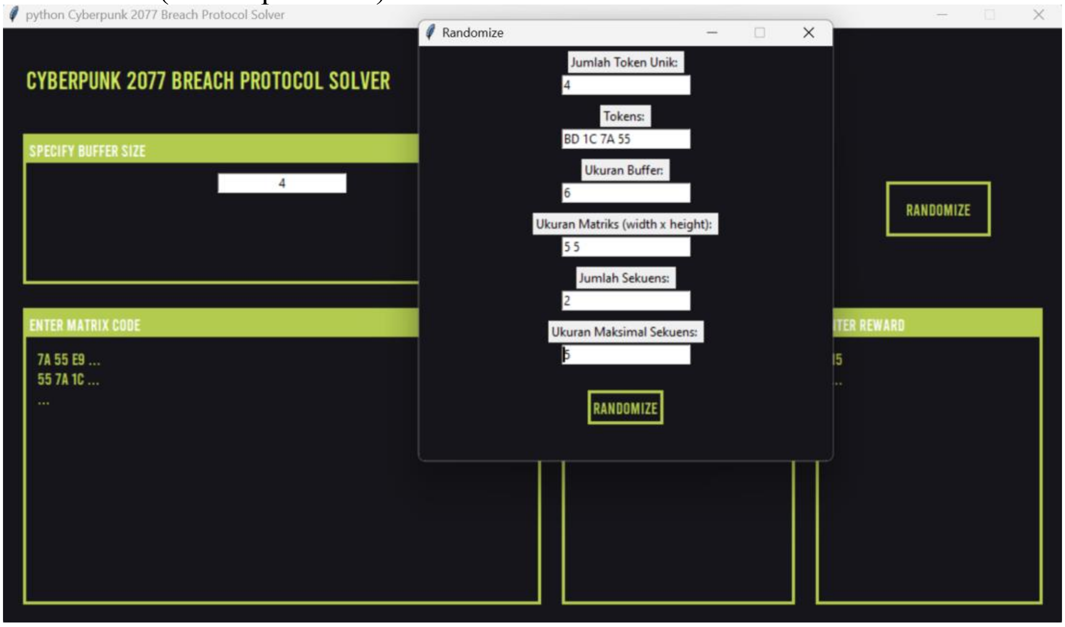


```
Masukkan ukuran matriks (width x height, terpisah dengan spasi): 7 7
Masukkan jumlah sekuens: 3
Masukkan ukuran maksimal sekuens: 4

Buffer Size : 4
Matrix Size : 7 x 7
Matrix :
    ['E', 'A', 'E', 'B', 'C', 'E', 'B']
    ['B', 'B', 'E', 'C', 'C', 'C', 'D']
    ['A', 'B', 'A', 'E', 'D', 'C', 'A']
    ['A', 'A', 'A', 'B', 'D', 'A', 'C']
    ['D', 'D', 'E', 'B', 'A', 'A', 'C']
    ['D', 'A', 'D', 'D', 'C', 'D', 'B']
    ['C', 'E', 'A', 'E', 'E', 'C', 'D']
Jumlah Sequence : 3
Sekuens dan Reward :
    ['A', 'B', 'D'] - 25
    ['C', 'E', 'E', 'D'] - 27
    ['B', 'D', 'C'] - 32

Solusi:
57
A B D C
2,1
2,2
7,2
7,4

5 ms

Apakah ingin menyimpan solusi?(y/n) y
Enter absolute path: C:\Ariel\Kuliah\MatKul\Semester 3\Strategi Algoritma\Tucil1-Strategi-Algoritma\test\output_cli_4.txt
```



```
57
A B D C
2,1
2,2
7,2
7,4
```

5. Test Case 5 (GUI Input Acak)



python Cyberpunk 2077 Breach Protocol Solver
CYBERPUNK 2077 BREACH PROTOCOL SOLVER
SPECIFY BUFFER SIZE
ENTER MATRIX CODE
TER REWARD
RANDOMIZE
Randomize
RANDOMIZE

4

7A 55 E9 ...
55 7A 1C ...
...

Jumlah Token Unik: 4

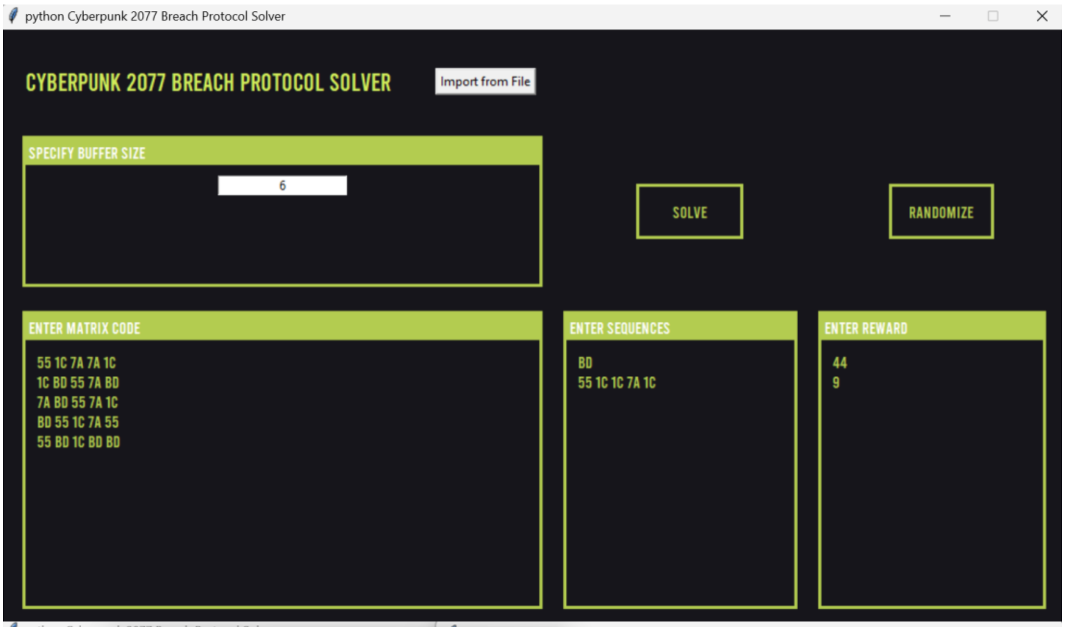
Tokens: BD 1C 7A 55

Ukuran Buffer: 6

Ukuran Matriks (width x height): 5 5

Jumlah Sekuens: 2

Ukuran Maksimal Sekuens: 5


python Cyberpunk 2077 Breach Protocol Solver
CYBERPUNK 2077 BREACH PROTOCOL SOLVER
Import from File
SOLVE
RANDOMIZE

SPECIFY BUFFER SIZE

6

ENTER MATRIX CODE

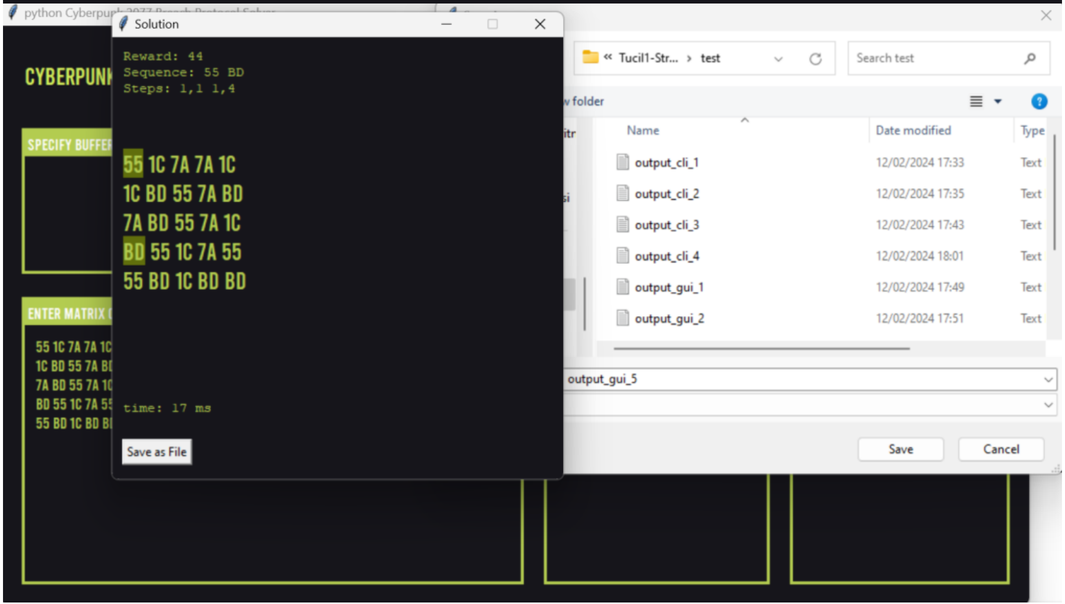
```
55 1C 7A 7A 1C
1C BD 55 7A BD
7A BD 55 7A 1C
BD 55 1C 7A 55
55 BD 1C BD BD
```

ENTER SEQUENCES

```
BD
55 1C 1C 7A 1C
```

ENTER REWARD

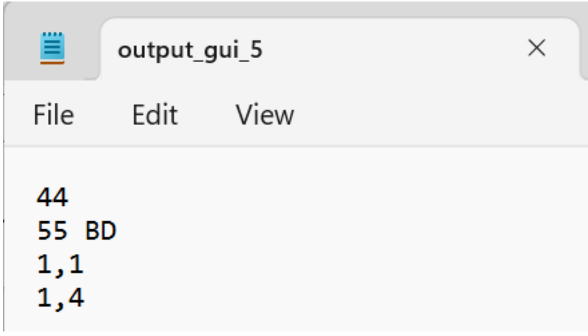
```
44
9
```



```
Reward: 44
Sequence: 55 BD
Steps: 1,1 1,4


55 1C 7A 7A 1C
1C BD 55 7A BD
7A BD 55 7A 1C
BD 55 1C 7A 55
55 BD 1C BD BD


time: 17 ms
```

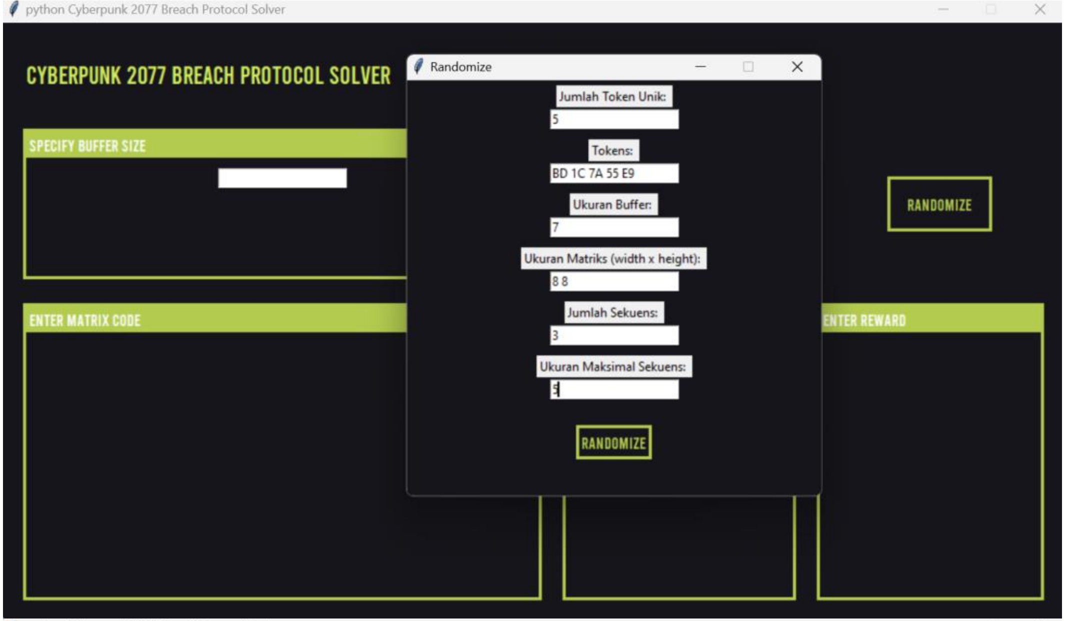
Name	Date modified	Type
output_cli_1	12/02/2024 17:33	Text
output_cli_2	12/02/2024 17:35	Text
output_cli_3	12/02/2024 17:43	Text
output_cli_4	12/02/2024 18:01	Text
output_gui_1	12/02/2024 17:49	Text
output_gui_2	12/02/2024 17:51	Text

output_gui_5



```
44
55 BD
1,1
1,4
```

6. Test Case 6 (GUI Input Acak)


python Cyberpunk 2077 Breach Protocol Solver
CYBERPUNK 2077 BREACH PROTOCOL SOLVER
SPECIFY BUFFER SIZE
ENTER MATRIX CODE
ENTER REWARD
RANDOMIZE
Randomize
RANDOMIZE

Jumlah Token Unik: 5

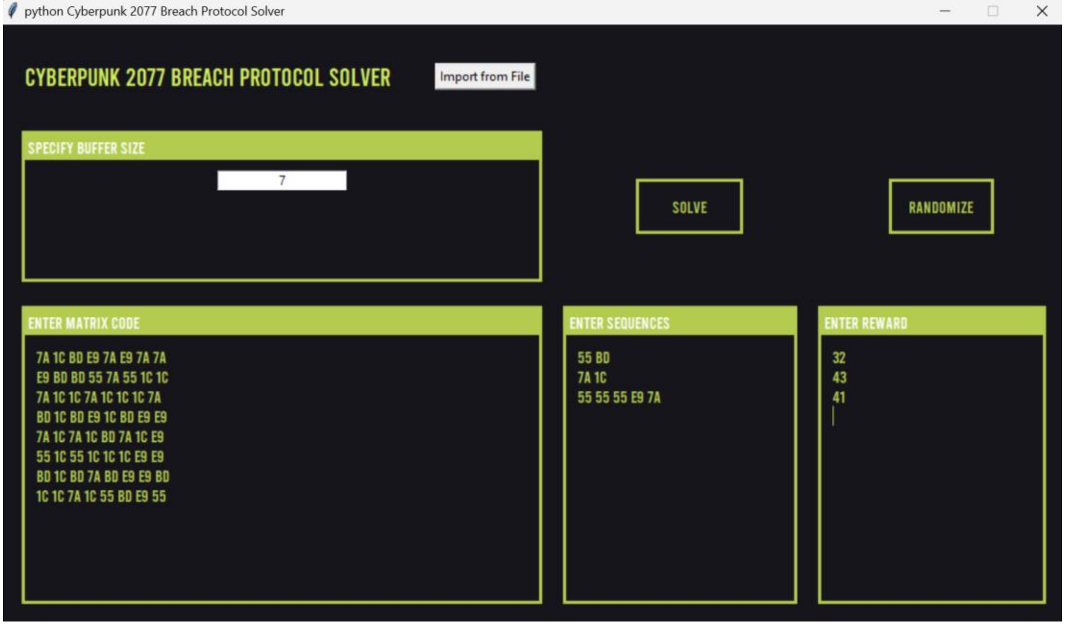
Tokens: BD 1C 7A 55 E9

Ukuran Buffer: 7

Ukuran Matriks (width x height): 8 8

Jumlah Sekuens: 3

Ukuran Maksimal Sekuens: 5


python Cyberpunk 2077 Breach Protocol Solver
CYBERPUNK 2077 BREACH PROTOCOL SOLVER
Import from File
SOLVE
RANDOMIZE

SPECIFY BUFFER SIZE: 7

ENTER MATRIX CODE

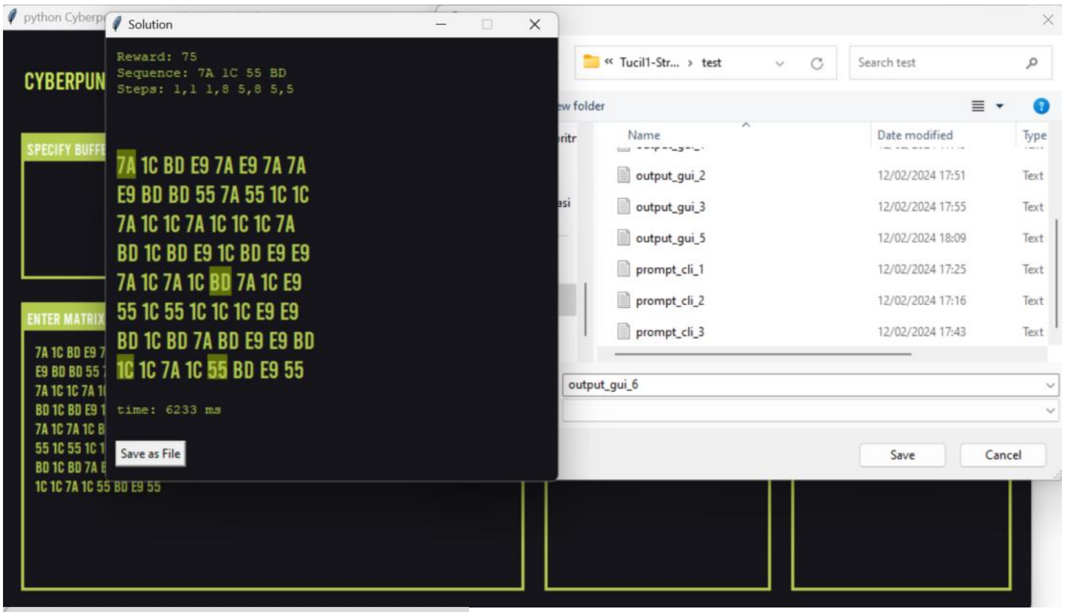
```
7A 1C BD E9 7A E9 7A 7A
E9 BD BD 55 7A 55 1C 1C
7A 1C 1C 7A 1C 1C 1C 7A
BD 1C BD E9 1C BD E9 E9
7A 1C 7A 1C BD 7A 1C E9
55 1C 55 1C 1C 1C E9 E9
BD 1C BD 7A BD E9 E9 BD
1C 1C 7A 1C 55 BD E9 55
```

ENTER SEQUENCES

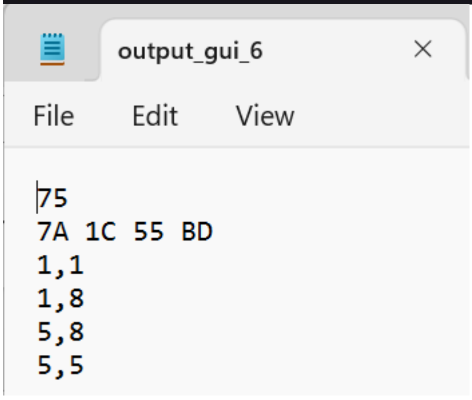
```
55 BD
7A 1C
55 55 55 E9 7A
```

ENTER REWARD

```
32
43
41
```


python Cyberp
Solution
CYBERPUN
SPECIFY BUFFE
ENTER MATRIX
Tucil1-Str... › test
Search test
ew folder
Name
Date modified
Type
output_gui_2 12/02/2024 17:51 Text
output_gui_3 12/02/2024 17:55 Text
output_gui_5 12/02/2024 18:09 Text
prompt_cli_1 12/02/2024 17:25 Text
prompt_cli_2 12/02/2024 17:16 Text
prompt_cli_3 12/02/2024 17:43 Text
output_gui_6
Save
Cancel
Save as File

```
Reward: 75
Sequence: 7A 1C 55 BD
Steps: 1,1 1,8 5,8 5,5


7A 1C BD E9 7A E9 7A 7A
E9 BD BD 55 7A 55 1C 1C
7A 1C 1C 7A 1C 1C 1C 7A
BD 1C BD E9 1C BD E9 E9
7A 1C 7A 1C BD 7A 1C E9
55 1C 55 1C 1C 1C E9 E9
BD 1C BD 7A BD E9 E9 BD
1C 1C 7A 1C 55 BD E9 55

time: 6233 ms
```



```
75
7A 1C 55 BD
1,1
1,8
5,8
5,5
```

Pranala Repository

https://github.com/Ariel-HS/Tucil1-Strategi-Algoritma.git

Checklist

Poin	Ya	Tidak
1. Program berhasil dikompilasi tanpa kesalahan	✓	
2. Program berhasil dijalankan	✓	
3. Program dapat membaca masukan berkas .txt	✓	
4. Program dapat menghasilkan masukan secara acak	✓	
5. Solusi yang diberikan program optimal	✓	
6. Program dapat menyimpan solusi dalam berkas .txt	✓	
7. Program memiliki GUI	✓	