Kelompok :

1. Muhammad Luthfi Fahrizki (54417115)
2. Muhammad Maulana Sidiq (54417120)
3. Vika Putri Ariyanti (56417094)

Program Finite Automata

1. String Bilangan Genap

L(G1) = { 2, 4, 6, 8, 10, 12,..,18, 20, ..., 98, 100, 102,....., 998, 1000, 1002,...}

```
def start(c):
   if (c == '0' or c == '2' or c == '4' or c == '6' or c == '8'):
       dfa = 0
   elif (c == '1' or c == '3' or c == '5' or c == '7' or c == '9'):
       dfa = 1
   else:
       dfa = -1
   return dfa
 def state1(c):
   if (c == '0' or c == '2' or c == '4' or c == '6' or c == '8'):
       dfa = 0
   elif (c == '1' or c == '3' or c == '5' or c == '7' or c == '9'):
       dfa = 1
   else:
       dfa = -1
   return dfa
 def cek(String):
   l = len(String)
   dfa = 0
   for i in range(l):
       if (dfa == 0):
           dfa = start(String[i])
       elif (dfa == 1):
           dfa = state1(String[i])
```

```
    if (dfa == 0) :
        print('String', String,"ACCEPTED")
    else:
        print(String,"NOT ACCEPTED")

cek("a")
cek("b")
cek("1")
cek("2")
cek("11")
cek("12")
cek("21")
cek("22")
cek("111")
cek("112")
cek("121")
cek("222")
cek("1111")
cek("1211")
cek("1121")
cek("1112")
cek("2222")
cek("2122")
cek("2212")
```

Output :

```
a NOT ACCEPTED
b NOT ACCEPTED
1 NOT ACCEPTED
2 ACCEPTED
11 NOT ACCEPTED
12 ACCEPTED
21 NOT ACCEPTED
22 ACCEPTED
111 NOT ACCEPTED
112 ACCEPTED
121 NOT ACCEPTED
222 ACCEPTED
1111 NOT ACCEPTED
1211 NOT ACCEPTED
1121 NOT ACCEPTED
1112 ACCEPTED
2222 ACCEPTED
2122 ACCEPTED
2212 ACCEPTED
```

2. String Bilangan String Ganjil**

L(G2) = { 1, 3, 5, 7, 9, 111,..,17, 19, ..., 97, 99, 101,....., 997, 999, 1001,... }

```
def start(c):
    if (c == '1' or c == '3' or c == '5' or c == '7' or c == '9'):
        dfa = 0
    elif (c == '0' or c == '2' or c == '4' or c == '6' or c == '1'):
        dfa = 1
    else:
        dfa = -1
    return dfa
 def state1(c):
    if (c == '1' or c == '3' or c == '5' or c == '7' or c == '9'):
        dfa = 0
    elif (c == '0' or c == '2' or c == '4' or c == '6' or c == '1'):
        dfa = 1
    else:
        dfa = -1
    return dfa
```

```
 def cek(String):
   l = len(String)
   dfa = 0
   for i in range(l):
       if (dfa == 0):
           dfa = start(String[i])
       elif (dfa == 1):
           dfa = state1(String[i])

   if (dfa == 0) :
       print(String,"ACCEPTED")
   else:
       print(String,"NOT ACCEPTED")

cek("a")
cek("b")
cek("1")
cek("2")
cek("11")
cek("12")
cek("21")
cek("22")
cek("111")
cek("112")
cek("121")
cek("222")
cek("1111")
cek("1211")
cek("1121")
cek("1112")
```

Output:

```
a NOT ACCEPTED
b NOT ACCEPTED
1 ACCEPTED
2 NOT ACCEPTED
11 ACCEPTED
12 NOT ACCEPTED
21 ACCEPTED
22 NOT ACCEPTED
111 ACCEPTED
112 NOT ACCEPTED
121 ACCEPTED
222 NOT ACCEPTED
1111 ACCEPTED
1211 ACCEPTED
1121 ACCEPTED
1112 NOT ACCEPTED
```

3. **String Nama-Nama Mahasiswa Kelas 3IA88****

   L(G3) = {ARDI, BILI, BILAL, CICI, DATUL, DIYANK, FARELL, FATONI, FATTAH, GIO, KHALIF, LUTHFI, MAUL, NARIS, REKSA, RAY, SISY, VIKA, YAZID, ZIDAN }

```
def start(c):
    if (c == 'A' or c == 'M' or c == 'N'):
        dfa = 1
    elif (c == 'B' or c == 'C' or c == 'D' or c == 'F' or c == 'L' or
c == 'V' or c == 'Y'):
        dfa = 2
    elif (c == 'K'):
        dfa = 3
    elif (c == 'G' or c == 'Z'):
        dfa = 4
    elif (c == 'R' or c == 'S'):
        dfa = 5
    else:
        dfa = -1
    return dfa
 def state1(c):
    if (c == 'I'):
        dfa = 0
```

```
    elif (c == 'R' or c == 'D' or c == 'H'):
        dfa = 1
    elif (c == 'L' or c == 'A'):
        dfa = 3
    else:
        dfa = -1
    return dfa
 def state2(c):
    if (c == 'S' or c == 'D' or c == 'H'):
        dfa = 0
    elif (c == 'L' or c == 'Y' or c == 'E'):
        dfa = 1
    elif (c == 'I' or c == 'A' or c == 'T' or c == 'R' or c == 'Z'):
        dfa = 2
    elif (c == 'C' or c == 'U' or c == 'O'):
        dfa = 3
    elif (c == 'K'):
        dfa = 6
    else:
        dfa = -1
    return dfa

def state3(c):
    if (c == 'L' or c == 'I' or c == 'K'):
        dfa = 0
    elif (c == 'R'):
        dfa = 2
    elif (c == 'N' or c == 'H' or c == 'T' or c == 'F' or c == 'U'):
        dfa = 3
    elif (c == 'A'):
        dfa = 4
    else:
        dfa = -1
    return dfa
 def state4(c):
    if (c == 'O' or c == 'F'):
        dfa = 0
    elif (c == 'L' or c == 'I'):
        dfa = 4
```

```
    elif (c == 'D'):
        dfa = 5
    else:
        dfa = -1
    return dfa

def state5(c):
    if (c == 'Y' or c == 'F' or c == 'N'):
        dfa = 0
    elif (c == 'I' or c == 'F' or c == 'Q' or c == 'A' or c == 'E' or
c == 'K'):
        dfa = 5
    elif (c == 'S'):
        dfa = 6
    else:
        dfa = -1
    return dfa

def state6(c):
    if (c == 'A' or c == 'Y'):
        dfa = 0
    else:
        dfa = -1
    return dfa
 def cek(String):
    l = len(String)
    dfa = 0
    for i in range(l):
        if (dfa == 0):
            dfa = start(String[i])
        elif (dfa == 1):
            dfa = state1(String[i])
        elif (dfa == 2) :
            dfa = state2(String[i])
        elif (dfa == 3) :
            dfa = state3(String[i])
        elif (dfa == 4) :
            dfa = state4(String[i])
        elif (dfa == 5) :
```

```
            dfa = state5(String[i])
        elif (dfa == 6) :
            dfa = state6(String[i])

    if (dfa == 0) :
        print(String,"ACCEPTED")
    else:
        print(String,"NOT ACCEPTED")

cek("NADA")
cek("HANIF")
cek("ARDI")
cek("BILI")
cek("BILAL")
cek("CICI")
cek("DATUL")
cek("DIYANK")
cek("FARELL")
cek("FATONI")
cek("FATTAH")
cek("GIO")
cek("KHALIF")
cek("LUTHFI")
cek("MAUL")
cek("NARIS")
cek("REKSA")
cek("RAY")
cek("SISY")
cek("VIKA")
cek("YAZID")
cek("ZIDAN")
```

Output :

```
NADA NOT ACCEPTED
HANIF NOT ACCEPTED
ARDI ACCEPTED
BILI ACCEPTED
BILAL ACCEPTED
CICI ACCEPTED
DATUL ACCEPTED
DIYANK ACCEPTED
FARELL ACCEPTED
FATONI ACCEPTED
FATTAH ACCEPTED
GIO ACCEPTED
KHALIF ACCEPTED
LUTHFI ACCEPTED
MAUL ACCEPTED
NARIS ACCEPTED
REKSA ACCEPTED
RAY ACCEPTED
SISY ACCEPTED
VIKA ACCEPTED
YAZID ACCEPTED
ZIDAN ACCEPTED
```

Cara 2 :

```
dfa = {0:{'A':1, 'B':2, 'C':2, 'D':2, 'F':2, 'G':4, 'K':3, 'L':2,
'M':1, 'N':1, 'R':5, 'S':5, 'V':2, 'Y':2, 'Z':4},
      1:{'R':1, 'D':1, 'I':0, 'A':3, 'H':1,'L':3},
      2:{'I':2, 'L':1, 'C':3, 'Y':1, 'A':2, 'T':2, 'U':3, 'R':2,
'E':1, 'O':3, 'H':0, 'S':0, 'K':6, 'Z':2,'D':0},
      3:{'L':0, 'I':0, 'N':3, 'K':0, 'H':3, 'A':4, 'T':3, 'F':3,
'U':3, 'R':2},
      4:{'I':4, 'O':0, 'F':0, 'L':4, 'D':5},
      5:{'I':5, 'F':5, 'Q':5, 'Y':0, 'A':5, 'E':5, 'K':5, 'S':6,
'N':0},
      6:{'A':0, 'Y':0}}

def accepts(transitions,initial,accepting,s):
   state = initial
   for c in s:
       state = transitions[state][c]
   return state in accepting
```

Output :

```
accepts(dfa,0,{0},'BILI')
```

```
True
```

```
accepts(dfa,0,{0},'BILAL')
```

```
True
```

```
accepts(dfa,0,{0},'CICI')
```

```
True
```

```
accepts(dfa,0,{0},'DATUL')
```

```
True
```

```
accepts(dfa,0,{0},'DIYANK')
```

```
True
```

```
accepts(dfa,0,{0},'FARELL')
```

```
True
```

```
accepts(dfa,0,{0},'FATONI')
```

```
True
```

```
accepts(dfa,0,{0},'GIO')
```

```
True
```

```
accepts(dfa,0,{0},'KHALIF')
```

```
True
```

```
accepts(dfa,0,{0},'LUTHFI')
```

```
True
```

```
accepts(dfa,0,{0},'MAUL')
```

```
True
```

```
accepts(dfa,0,{0},'NARIS')
```

```
True
```

```
accepts(dfa,0,{0},'RIFQY')
```

```
True
```

```
accepts(dfa,0,{0},'REKSA')
```

```
True
```

```
accepts(dfa,0,{0},'RAY')
```

```
True
```

```
accepts(dfa,0,{0},'SISY')
```

```
True
```

```
accepts(dfa,0,{0},'VIKA')
```

```
True
```

```
accepts(dfa,0,{0},'YAZID')
```

```
True
```

```
accepts(dfa,0,{0},'ZIDAN')
```

```
True
```

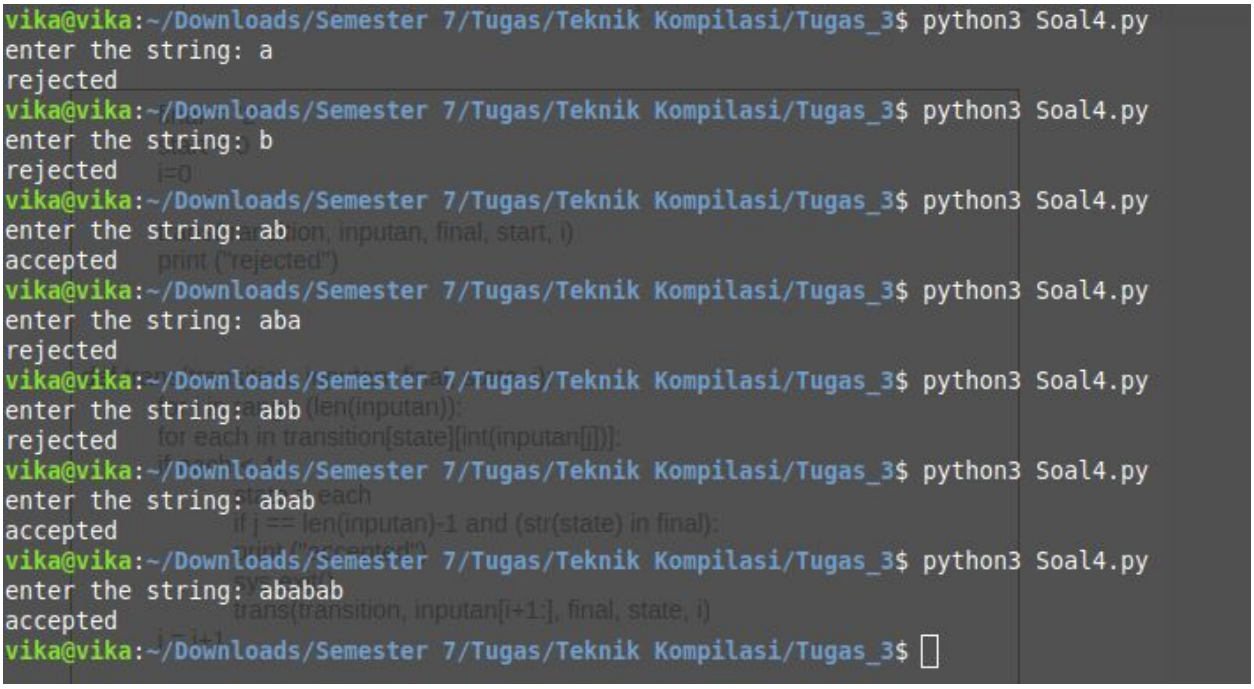
4. String Kalimat

L(G4) = { (ab;) n □ n > 0 } = { ab, abab, ababab, ...}

```
import sys

def main():
   transition = [[[0,1],[0]], [[4],[2]], [[4],[3]], [[4],[4]]]
   inputan = input("enter the string: ")
   inputan = list(inputan)
   for index in range(len(inputan)):
       if inputan[index]=='a':
```

```
            inputan[index]='0'
        else:
            inputan[index]='1'

    final = "2"
    start = 0
    i=0

    trans(transition, inputan, final, start, i)
    print ("rejected")



def trans(transition, inputan, final, state, i):
    for j in range (len(inputan)):
        for each in transition[state][int(inputan[j])]:
            if each < 4:
                state = each
                if j == len(inputan)-1 and (str(state) in final):
                    print ("accepted")
                    sys.exit()
                trans(transition, inputan[i+1:], final, state, i)
        i = i+1


main()
```

Output :



5. String Kalimat**

L(G5) = { 01(ab)*10 □ n > 0 } = { 01ab10, 01abab10, 01abababab10,...}

```
def start(c):
    if (c == '0'):
        dfa = 1
    else:
        dfa = -1
    return dfa
 def state1(c):
    if (c == '1'):
        dfa = 2
    else:
        dfa = -1
    return dfa
 def state2(c):
    if (c == '1'):
        dfa = 4
    elif (c == 'a'):
        dfa = 3
    else:
```

```
        dfa = -1
    return dfa

def state3(c):
    if (c == 'b'):
        dfa = 2
    else:
        dfa = -1
    return dfa
 def state4(c):
    if (c == '0'):
        dfa = 0
    else:
        dfa = -1
    return dfa
 def cek(String):
    l = len(String)
    dfa = 0
    for i in range(l):
        if (dfa == 0):
            dfa = start(String[i])
        elif (dfa == 1):
            dfa = state1(String[i])
        elif (dfa == 2) :
            dfa = state2(String[i])
        elif (dfa == 3) :
            dfa = state3(String[i])
        elif (dfa == 4) :
            dfa = state4(String[i])

    if (dfa == 0) :
        print(String, "ACCEPTED")
    else:
        print(String, "NOT ACCEPTED")

cek("0110")
cek("01a10")
cek("01b10")
cek("01ab10")
```

```
cek("01aba10")
cek("01abb10")
cek("01abab10")
```

Output :

```
0110 ACCEPTED
01a10 NOT ACCEPTED
01b10 NOT ACCEPTED
01ab10 ACCEPTED
01aba10 NOT ACCEPTED
01abb10 NOT ACCEPTED
01abab10 ACCEPTED
```

Hasilnya bisa dilihat di link berikut :

https://github.com/Vputri/Teknik-Kompilasi/blob/main/Teknik_Kompiilasi.ipynb