

Kelompok :

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## Program Finite Automata

### 1. String Bilangan Genap

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

```
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 statel(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 = statel(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\*\*

$L(G2) = \{ 1, 3, 5, 7, 9, 11, \dots, 17, 19, \dots, 97, 99, 101, \dots, 997, 999, 1001, \dots \}$

```
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 == '8'):
        dfa = 1
    else:
        dfa = -1
    return dfa

def statel(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 == '8'):
        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 = statel(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\*\*

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

```
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 statel(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

$L(G_4) = \{ (ab)^n \mid n > 0 \} = \{ ab, abab, ababab, \dots \}$

```
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 :

```

vika@vika:~/Downloads/Semester 7/Tugas/Teknik Kompilasi/Tugas_3$ python3 Soal4.py
enter the string: a
rejected
vika@vika:~/Downloads/Semester 7/Tugas/Teknik Kompilasi/Tugas_3$ python3 Soal4.py
enter the string: b
rejected
vika@vika:~/Downloads/Semester 7/Tugas/Teknik Kompilasi/Tugas_3$ python3 Soal4.py
enter the string: arabion, inputan, final, start, i)
accepted
vika@vika:~/Downloads/Semester 7/Tugas/Teknik Kompilasi/Tugas_3$ python3 Soal4.py
enter the string: aba
rejected
vika@vika:~/Downloads/Semester 7/Tugas/Teknik Kompilasi/Tugas_3$ python3 Soal4.py
enter the string: abb
rejected
vika@vika:~/Downloads/Semester 7/Tugas/Teknik Kompilasi/Tugas_3$ python3 Soal4.py
enter the string: abab
accepted
vika@vika:~/Downloads/Semester 7/Tugas/Teknik Kompilasi/Tugas_3$ python3 Soal4.py
enter the string: ababab
accepted
vika@vika:~/Downloads/Semester 7/Tugas/Teknik Kompilasi/Tugas_3$

```

## 5. String Kalimat\*\*

$L(G5) = \{ 01(ab)^*10 \mid n > 0 \} = \{ 01ab10, 01abab10, 01ababab10, \dots \}$

```

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