Laporan Tugas Besar Mata Kuliah
Teori Bahasa dan Automata

Kelompok 2:
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A. Deskripsi Tugas Besar

Pada Tugas Besar ini, mahasiswa (secara berkelompok) diminta untuk mendefinisikan sebuah Context Free Grammar (CFG) yang merepresentasikan aturan bahasa sederhana untuk bahasa manusia. Kemudian berdasarkan CFG yang sudah didefinisikan tersebut, mahasiswa diminta untuk membuat sebuah program sederhana berbasis web (php/ java/ python/ .net/ dll.) untuk lexical analyzer (mengidentifikasi apakah sebuah lexical/token/kata valid sesuai simbol terminal yang didefinisikan) dan parser (apakah susunan token/kata sudah memenuhi aturan pada Grammar).

B. Grammar

Subjek :

1. Aku = saya
2. Koe = Kamu

Predikat :

1. Mangan = Makan
2. Ngombe = Minum
3. Tuku = Membeli

Objek :

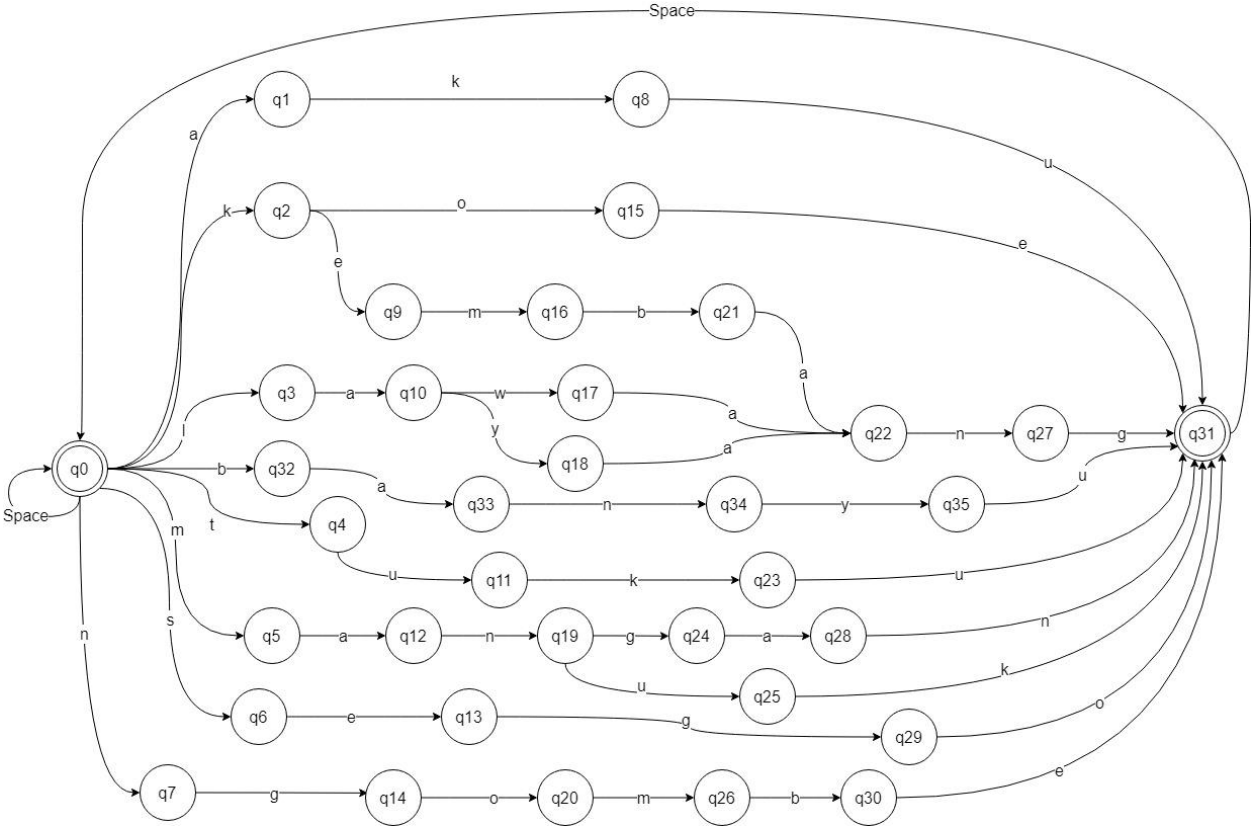
1. Kembang = Bunga
2. Banyu = Air
3. Sego = Nasi
4. Lawang = Pintu
5. Layang = Surat
6. Manuk = Burung

Kalimat yang digunakan memiliki perumusan S + P + O

C. CFG (Context-Free-Grammar)

CFG:
S → NVN
N → aku | koe | kembang | banyu | sego | lawang | layang
V → mangan | ngombe | tuku

D. Finite Automata



E. Proof of Coding (POC)

lexical.py > ...

```python
import string

sentence = input('Masukkan kalimat : ')
inputString = sentence.lower()+'#'

alphabetList = list(string.ascii_lowercase)
stateList = ['q0', 'q1', 'q2', 'q3', 'q4', 'q5', 'q6', 'q7', 'q8', 'q9', 'q10',
             'q11', 'q12', 'q13', 'q14', 'q15', 'q16', 'q17', 'q18', 'q19', 'q20',
             'q21', 'q22', 'q23', 'q24', 'q25', 'q26', 'q27', 'q28', 'q29', 'q30']

transitionTable = {}

for state in stateList:
    for alphabet in alphabetList:
        transitionTable[(state, alphabet)] = 'error'
    transitionTable[(state, '#')] = 'error'
    transitionTable[(state, ' ')] = 'error'

transitionTable['q0', ' '] = 'q0'

# aku
transitionTable['q0', 'a'] = 'q1'
transitionTable['q1', 'k'] = 'q8'
transitionTable['q8', 'u'] = 'q31'

# koe
transitionTable['q0', 'k'] = 'q2'
transitionTable['q2', 'o'] = 'q15'
transitionTable['q15', 'e'] = 'q31'
```

lexical.py > ...

```
31  #kembang
32  transitionTable['q2', 'e'] = 'q9'
33  transitionTable['q9', 'm'] = 'q16'
34  transitionTable['q16', 'b'] = 'q21'
35  transitionTable['q21', 'a'] = 'q22'
36  transitionTable['q22', 'n'] = 'q27'
37  transitionTable['q27', 'g'] = 'q31'
38
39  # lawang
40  transitionTable['q0', 'l'] = 'q3'
41  transitionTable['q3', 'a'] = 'q10'
42  transitionTable['q10', 'w'] = 'q17'
43  transitionTable['q17', 'a'] = 'q22'
44
45  # layang
46  transitionTable['q10', 'y'] = 'q18'
47  transitionTable['q18', 'a'] = 'q22'
48
49  # tuku
50  transitionTable['q0', 't'] = 'q4'
51  transitionTable['q4', 'u'] = 'q11'
52  transitionTable['q11', 'k'] = 'q23'
53  transitionTable['q23', 'u'] = 'q31'
54
55  # mangan
56  transitionTable['q0', 'm'] = 'q5'
57  transitionTable['q5', 'a'] = 'q12'
58  transitionTable['q12', 'n'] = 'q19'
59  transitionTable['q19', 'g'] = 'q24'
60  transitionTable['q24', 'a'] = 'q28'
```

lexical.py > ...

```
63  # manuk
64  transitionTable['q19', 'u'] = 'q25'
65  transitionTable['q25', 'k'] = 'q31'
66
67  # sego
68  transitionTable['q0', 's'] = 'q6'
69  transitionTable['q6', 'e'] = 'q13'
70  transitionTable['q13', 'g'] = 'q29'
71  transitionTable['q29', 'o'] = 'q31'
72
73  # ngombe
74  transitionTable['q0', 'n'] = 'q7'
75  transitionTable['q7', 'g'] = 'q14'
76  transitionTable['q14', 'o'] = 'q20'
77  transitionTable['q20', 'm'] = 'q26'
78  transitionTable['q26', 'b'] = 'q30'
79  transitionTable['q30', 'e'] = 'q31'
80
81  # banyu
82  transitionTable['q0', 'b'] = 'q32'
83  transitionTable['q32', 'a'] = 'q33'
84  transitionTable['q33', 'n'] = 'q34'
85  transitionTable['q34', 'y'] = 'q35'
86  transitionTable['q35', 'u'] = 'q31'
87
88  # accept
89  transitionTable['q0', '#'] = 'accept'
90  transitionTable['q31', '#'] = 'accept'
```

```python
#space
transitionTable['q31', ' '] = 'q0'
transitionTable['q0', ' '] = 'q0'

idxChar = 0
currenToken = ''
state = 'q0'
while state != 'accept':
    currenChar = inputString[idxChar]
    currenToken += currenChar
    state = transitionTable[(state, currenChar)]
    if state == 'q31':
        print('Current token:', currenToken, ', valid')
        currenToken = ' '
    if state == 'error':
        print('Current token:', currenToken, ', Error')
        break
    idxChar += 1

if state == 'accept':
    print('Semua token di input: ', sentence, ', valid')
```

F. Hasil Run Program

```
PS D:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA> python -u "d:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA\lexical.py"
Masukkan kalimat : koe ngombe banyu
Current token: koe , valid
Current token:   ngombe , valid
Current token:   banyu , valid
Semua token di input:  koe ngombe banyu , valid
PS D:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA> python -u "d:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA\lexical.py"
Masukkan kalimat : manuk tuku layang
Current token: manuk , valid
Current token:   tuku , valid
Current token:   layang , valid
Semua token di input:  manuk tuku layang , valid
PS D:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA> python -u "d:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA\lexical.py"
Masukkan kalimat : aku mangan sego
Current token: aku , valid
Current token:   mangan , valid
Current token:   sego , valid
Semua token di input:  aku mangan sego , valid
PS D:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA> python -u "d:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA\lexical.py"
Masukkan kalimat : aku ora seneng
Current token: aku , valid
Current token:   o , Error
PS D:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA> python -u "d:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA\lexical.py"
Masukkan kalimat : koe seneng aku
Current token: koe , valid
Current token:   sen , Error
PS D:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA> python -u "d:\KULIAH\SMT 4\TBA\Tubes\Tubes-TBA\lexical.py"
Masukkan kalimat : awakmu ora iso
Current token: aw , Error
```