



ΙΟΝΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ – ΤΜΗΜΑ ΠΛΗΡΟΦΟΡΙΚΗΣ

Μεταγλωτιστές 2019

Προγραμματιστική Εργασία #2

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- Περιγραφή Γραμματικής

Παρακάτω παρουσιάζονται οι κανόνες της γραμματικής καθώς και αποτελέσματα ελέγχου που επιβεβαιώθηκαν από έγκυρο on-line εργαλείο.

Grammar	
Stmt_list →	Stmt Stmt_list .
Stmt →	id equal Expr print Expr.
Expr →	Term Term_tail.
Term_tail →	xor Term Term_tail .
Term →	Factor Factor_tail.
Factor_tail →	or Factor Factor_tail .
Factor →	Atom Atom_tail.
Atom_tail →	and Atom Atom_tail .
Atom →	par Expr parr id number.

Some sentences generated by this grammar: {ε, print id, id equal id, print number, print id and id, id equal number, id equal id and id, print id and number, print number and id, id equal number and id, id equal id and number, print number and number, id equal id and id and id, id equal number and number, id equal id and id and number, id equal id and number and id, id equal number and id and id, id equal id and number and number, id equal number and id and number, id equal number and number and id}

- All nonterminals are reachable and realizable.
- The nullable nonterminals are: Stmt_list Term_tail Factor_tail Atom_tail.
- The endable nonterminals are: Atom_tail Atom Factor_tail Factor Term_tail Term Expr Stmt_list Stmt.
- No cycles.

Σχήμα 1: Η Γραμματική και τα αποτελέσματα ελέγχου για LL(1) συμβατότητα.

- Πίνακας με FIRST και FOLLOW sets για όλα τα μη τερματικά σύμβολα

nonterminal	first set	follow set	nullable	endable
Stmt_list	id print	\emptyset	yes	yes
Stmt	id print	id print	no	yes
Term_tail	xor	parr id print	yes	yes
Term	par id number	parr xor id print	no	yes
Factor_tail	or	parr xor id print	yes	yes
Factor	par id number	parr or xor id print	no	yes
Atom_tail	and	parr or xor id print	yes	yes
Atom	par id number	parr and or xor id print	no	yes
Expr	par id number	parr id print	no	yes

The grammar is LL(1).

Σχήμα 2: Χαρακτηριστικά γραμματικής.

- Αποτελέσματα εξόδου

```
1 a = 1001
2 b = 1010 or a
3 print b
```

```
(venv) kwnstantina:~/workspace/compilers/erg2 $ python3 runner.py
or : 1010 or 1001
= 1011
```

```
1 a = 100110
2 b = 101010
3 print (b xor a)
```

```
(venv) kwnstantina:~/workspace/compilers/erg2 $ python3 runner.py
xor : 101010 ^ 100110
= 1100
```

```
1 a = 100110
2 b = 101010
3 c = a and b
4 print c
```

```
(venv) kwnstantina:~/workspace/compilers/erg2 $ python3 runner.py
and : 100110 and 101010
= 100010
```

Σχήμα 3: Αποτελέσματα εξόδου για έγκυρες μορφές εισόδου.

```
1 a = 1010101 ^ 1955|
2 print a
```

```
(venv) kwnstantina:~/workspace/compilers/erg2 $ python3 runner.py
Traceback (most recent call last):
  File "runner.py", line 146, in <module>
    parser.parse(fp)
  File "runner.py", line 55, in parse
    self.stmt_list()
  File "runner.py", line 59, in stmt_list
    self.stmt()
  File "runner.py", line 71, in stmt
    e = self.expr()
  File "runner.py", line 84, in expr
    t = self.term()
  File "runner.py", line 98, in term
    f = self.factor()
  File "runner.py", line 112, in factor
    a = self.atom()
  File "runner.py", line 138, in atom
    self.match('BINARY')
  File "runner.py", line 48, in match
    self.la,self.text = self.next_token()
  File "runner.py", line 43, in next_token
    return self.scanner.read()
  File "/home/ubuntu/workspace/compilers/erg2/venv/local/lib/python3.4/site-packages/plex/scanners.py", line 94, in read
    self.text, action = self.scan_a_token()
  File "/home/ubuntu/workspace/compilers/erg2/venv/local/lib/python3.4/site-packages/plex/scanners.py", line 138, in scan_a_token
    raise errors.UnrecognizedInput(self, self.state_name)
plex.errors.UnrecognizedInput: '', line 1, char 12: Token not recognised in state ''
```

```
1 a = 1010
2 b = 1010
3 c = a + b
4 print c|
```

```
(venv) kwnstantina:~/workspace/compilers/erg2 $ python3 runner.py
Traceback (most recent call last):
  File "runner.py", line 146, in <module>
    parser.parse(fp)
  File "runner.py", line 55, in parse
    self.stmt_list()
  File "runner.py", line 60, in stmt_list
    self.stmt_list()
  File "runner.py", line 60, in stmt_list
    self.stmt_list()
  File "runner.py", line 59, in stmt_list
    self.stmt()
  File "runner.py", line 71, in stmt
    e = self.expr()
  File "runner.py", line 84, in expr
    t = self.term()
  File "runner.py", line 98, in term
    f = self.factor()
  File "runner.py", line 112, in factor
    a = self.atom()
  File "runner.py", line 132, in atom
    self.match('ID_TOKEN')
  File "runner.py", line 48, in match
    self.la,self.text = self.next_token()
  File "runner.py", line 43, in next_token
    return self.scanner.read()
  File "/home/ubuntu/workspace/compilers/erg2/venv/local/lib/python3.4/site-packages/plex/scanners.py", line 94, in read
    self.text, action = self.scan_a_token()
  File "/home/ubuntu/workspace/compilers/erg2/venv/local/lib/python3.4/site-packages/plex/scanners.py", line 138, in scan_a_token
    raise errors.UnrecognizedInput(self, self.state_name)
plex.errors.UnrecognizedInput: '', line 3, char 6: Token not recognised in state ''
```

Σχήμα 4: Αποτελέσματα εξόδου για άκυρες μορφές εισόδου.

- Πηγές

Context Free Grammar Tool

Link: <http://smlweb.cpsc.ucalgary.ca/start.html>