

**Individual Assignment#6 to be submitted at the group labs on the 30th
or 31st of October 2014**
CLASS TEST#2 2006

SYNTAX OF LANGUAGES

(7) Let the grammar G be defined as follows:

```
terminals      = { 'a', 's', (, ) }
start symbol   = string
non-terminals  = { string, as, ss }
production rules = { string = 'a'
                    | 's'
                    | ( as ) string
                    | string (ss)
                    as = 'a'
                    | 'a' as
                    ss = 's'
                    | 's' ss }
```

Show how the expression "('a' 'a') 's' ('s')" can be derived in the grammar G.

(8) Show the parse tree (i.e. the syntax tree) for the expression

"('a' 'a') 's' ('s')" with respect to the grammar G.

(9) Construct a grammar for the language L which contains the following expressions, as well as other similar expressions:

{ 10001, 111, 001, 0, 10, 011, etc. }

SEMANTICS OF LANGUAGES

(10) Construct an attribute grammar for the language L which contains the following character strings as expressions, as well as other similar expressions:

{ 10001, 111, 001, 0, 10, 011, etc. }

where 10001 has value 17
111 has value 7
001 has value 1
0 has value 0
10 has value 2
011 has value 3
etc.

TEST#2 2010

SYNTAX OF LANGUAGES CLASS

(7) Let the grammar G be defined as follows:

```
terminals          = { [, ], * }
start symbol       = string
non-terminals      = { string, single, double, stars }
production rules
    = { string ::= stars
        | double double
        | double single
      single ::= [ stars ]
      double ::= [ string ] [ stars ]
      stars  ::= *
        | * stars
```

Show how the expression `[*] [*] [**]` can be derived in the grammar G.

(8) Show the parse tree (i.e. the syntax tree) for the expression

`[*] [*] [*] [**]` with respect to the grammar G.

(9) Construct a grammar for the language L which contains the following expressions, as well as other similar expressions:

`{ "20.23", "12.00power2", "04.50power3", etc`

SEMANTICS OF LANGUAGES

(10) Construct an attribute grammar for the language L so that:

```
{ "20.23"          has value 20.23
  "12.00power2"    has value 144
  "04.50power3"    has value 91.125 (that is 04.5^3)
  etc.
```

CLASS TEST#2 2011

SYNTAX OF LANGUAGES

(7) Let the grammar G be defined as follows:

```
terminals      = { 1, 2, 3, ., (, ) }

start symbol    = num

non-terminals   = { num, dig, left, right }

production rules = { num ::= dig
                    | left . right
                    | num ( num )

                    dig  ::= 1 | 2 | 3

                    left ::= dig | left dig

                    right ::= dig | dig right }
```

Show how the expression $2 (31.23)$ can be **derived** in the grammar G.

(8) Show the parse tree (i.e. the **syntax tree**) for the following expression with respect to the grammar G:

$2 (31.23)$

(9) Construct a grammar for the language L which contains the following character strings as expressions, as well as other similar expressions:

{ "1200/30", "425/25", "846/2", "3456/1067" etc. }

Note that there can be any number of digits before and after the "/" sign.

SEMANTICS OF LANGUAGES

(10) Construct an attribute grammar for the language L which contains the following character strings as expressions, as well as other similar expressions:

{ "120/30", "425/25", "846/2", "3456/1067" etc. }

Where

```
"1200/30"  has value  40
"425/25"   has value  17
"846/2"    has value 423
etc.
```