

CS 606 Compiler Constructions

Solution of Assignment # 02

Spring 2011

Total Marks = 20

Deadline

Your assignment must be uploaded / submitted before or on **May 03, 2011**

Upload Instructions

Please view the assignment submission process document provided to you by the Virtual University.

Rules for Marking

Please note that your assignment will not be graded if:

- It is submitted after due date
- The file you uploaded does not open
- The file you uploaded is copied from someone else or from internet
- It is in some format other than **.doc**

Note: Material that is an exact copy from handouts or internet would be graded zero marks. Your solution should consist of the material found through different sources and written in your own words.

Assignment Statements:

Suppose that a handle is a substring that matches a right hand side or production rule in the grammar and whose reduction to the non-terminal on the left hand side of that grammar rule is a step along the reverse of a right most derivation.

Question # 1:

Find the handles of the sentential forms occurring in the derivation of string "id + id * id" by the following grammar

$E \rightarrow E+E \mid E * E \mid id$

Solution:

Given the grammar is

$E \rightarrow E + E$

$E \rightarrow E * E$

$E \rightarrow id$

The string can be reduced to E in following steps:

(i) id + id * id (First id is handle of this sentential form)

(ii) E + id * id (Now second id is handle)

- (iii) $E + E * id$ (Now third id is handle for this sentential form)
- (iv) $E + E * E$ (Now $E * E$ is handle)
- (v) $E + E$ (Now $E + E$ is handle)
- (v) E (Reduced to string symbol).

Question # 2:

Consider the following grammar and show the handle of each right sentential form for string $(a, (a, a))$.

$$S \rightarrow (L) \mid a$$

$$L \rightarrow L, S \mid S$$

Solution:

The following sentential form will occur in reduction of $(a, (a, a))$ to S

1. $(a,(a,a))$ (handle is first a)
2. $(S,(a,a))$ (Now S is handle)
3. $(L,(a,a))$ (Now first a is handle)
4. $(L,(S,a))$ (S is handle again)
5. $(L,(L,a))$ (Now a is handle)
6. $(L,(L,S))$ (Now L is handle)
7. $(L,(L))$ ((L) is handle)
8. (L,S) (again L, S is handle)
9. (L) ((L) is handle)
10. S (finally string is reduced to starting non-terminal).