National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Computing

CS 354: Compiler Construction

Class: BSCS-5AB

Lab 11: Syntax Directed Defintion (SDD)-Inherited Attribute

Date: 20th December, 2018

Time: [09:00am – 12:00pm/2:00 pm – 5:00 pm]

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Introduction

Syntax Directed translation (SDT) controls the execution of a context-free grammar together with attributes and rules given in the form of Syntax Directed Definition (SDD). Attributes are associated with grammar symbols and rules are associated with productions. An attribute has a name and an associated value: a string, a number, a type, a memory location, an assigned register, strings. Attributes associated with the grammar symbols can be of two types: *Synthesized* and *Inherited*

Objectives

Successful understanding of L-attributed grammar using Bison

Tools/Software Requirement

gcc, g++, Flex and Bison

Description

Inherited Attribute: Value of attribute computed from values of attributes of the LHS grammar symbol.

Actions associated with each production in a grammar. For a production A → X Y, actions may be of the form:

Y.attr := f(A.attr,X.attr) for inherited attributes

A grammar is said to be L-attributed grammar if all of its attributes are inherited attributes such that their values depend only on:
– inherited attributes of the parent, and
– attributes of left siblings

Lab Tasks

For the givem L-attributed grammar:

Decl −> Type VarList
Type −> integer
Type −> float
VarList −> id , VarList
VarList −> id

1. Write the syntax directed definition (SDD) to find the type of variable(s) in a declaration statement and implement it in Bison. Print on console the value of each of the inherited attribute in the SDD.
2. Show the tranlstion of the implemented SDD for the declaration statement **integer x, y.**

Deliverables

You are required to upload your task (Sources & Word/PDF document) using the link created on LMS followed by a viva.