## Chapter 5.3 From Grammar Analysis Tree to Logic Query Plan

In the Chapter 5.1, we have already construct a Grammar Analysis Tree of Query Statement, then in the next step, we need to convert the Grammar Tree to the Logic Query Plan.

***Steps:***

1. Using one or more Relation Algebra Operator to substitute node and structure in the Grammar Tree according to appropriate Group.
2. Convert the Relation Algebra Operator to the expected Expression, here it may be converted to the most efficient Physical Query Plan.

### Chapter 5.3.1 Convert to Relation Algebra

Here we may explain some rules to convert SQL Grammar Tree to the Algebra Logic Query Plan.

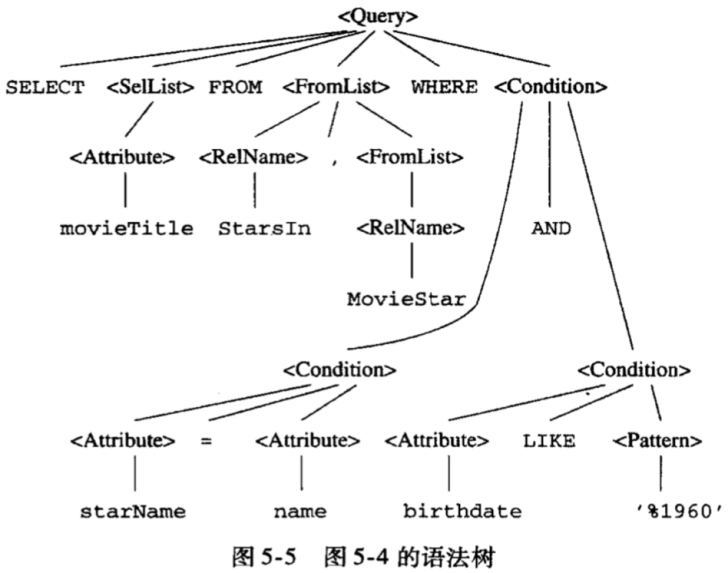
***Rule:****(This rule makes us to convert the simple ‘select - from - where’ structure to the Relation Algebra.)*

* If there has one <Condition> without sub <Query>, then we can use one Relation Algebra Expression to substitute the whole part - Selection List, from list and condition, the Algebra Expression from bottom to top consist with the contents below:

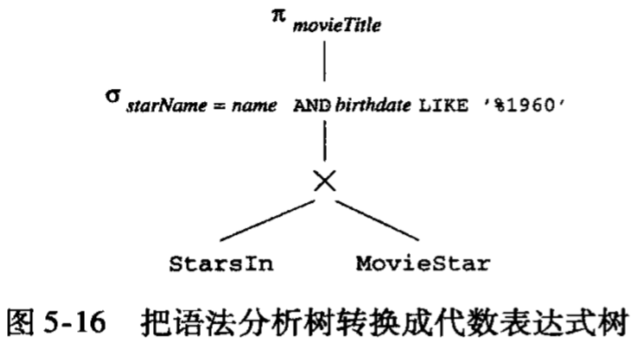
1. <FromList> - all Relation Product is the Operator Parameter for below.
2. Selection C, here C needs to be substituted by the <Condition > Expression, also Selection is the Operator Parameter for below.
3. Projection L, here L is the attributes list in the <SelList>.

***Example:***

Let’s consider the Grammar Analysis Tree in the example 5 - 5.



Here, we get the ***(1)*** Product of two Relations StarsIn and MovieStar in the *from list*, and ***(2)*** proceed Selection by using the sub - tree in <Condition> root, and ***(3)*** Project to the Selection list movieTitle. Finally, get the Relation Algebra Expression below:



### Chapter 5.3.2 Remove Sub - Query from Condition

### Chapter 5.3.3 Improvement from Logic Query Plan

### Chapter 5.3.4 Grouping of Combinative and Distributable Operator