

A Technique for Constructing Aspect Weavers using a Program Transformation Engine



Jeff Gray

Suman Roychoudhury



Department of Computer and Information Sciences
University of Alabama at Birmingham

Program Transformation - A Definition

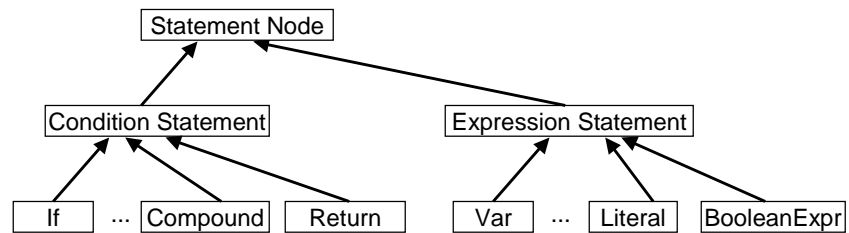


- A program is a structured object with semantics. The structure allows us to transform a program.
- Program transformation is the act of changing one program (*source*) into another (*target*).
- The *source* and *target* languages could be the same, but sometimes could be different too.



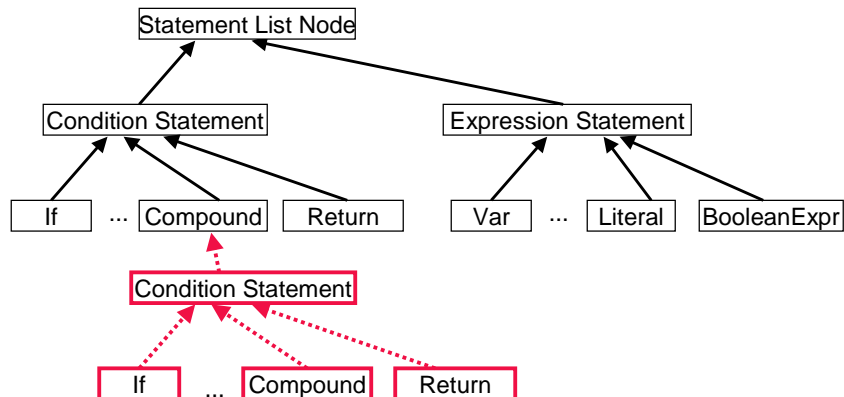
An AST representation

- The structure of the source tree is defined by the production rules associated with the grammar...



Transforming the source

- Plug in new nodes...



Case Study



- Processing Dialog Meter
- Logging of SQL Query Statements
- Language Internationalization Utility
- Database Error Handler Synchronization

Processing Dialog Meter



```
Inc(TotalInserts);  
if not  
  ProcDlg1.Process(TotalInserts/TotalCalc)  
then  
  begin  
    ProcDlg1.Canceled := True;  
    Result := True;  
    exit;  
  end;    // if not Process
```

Logging of SQL Query Statements



```
with dmSERVERS.qryCreateTriggers do
begin
    <statements that build a SQL Create
    Trigger>
    LogSQL.AddSQL(dmSERVERS.qryCreateTriggers,
    True);
    ExecSQL;
end;
```

Language Internationalization Utility



```
// The user wants to perform another search using
//the same search criteria
procedure TLangMan.SearchAgainClick(Sender:
    TObject);
begin
    // Perform an update if an edit occurred that
    //might change the focus of the listview
    if EditMadeDirtyBit then
        SaveDBControls;
    ...
end;
```

Database Error Handler Synchronization



```
function TExNullField.Handle(ServerType:
    TServerType; E : EDBEngineError) : Integer;

begin
    TExHandleCollection(Collection).LockHandle;
    try
        <database error handling code omitted here>
    finally
        TExHandleCollection(Collection).UnLockHandle;
    end;
end;
```

Weaver Construction

