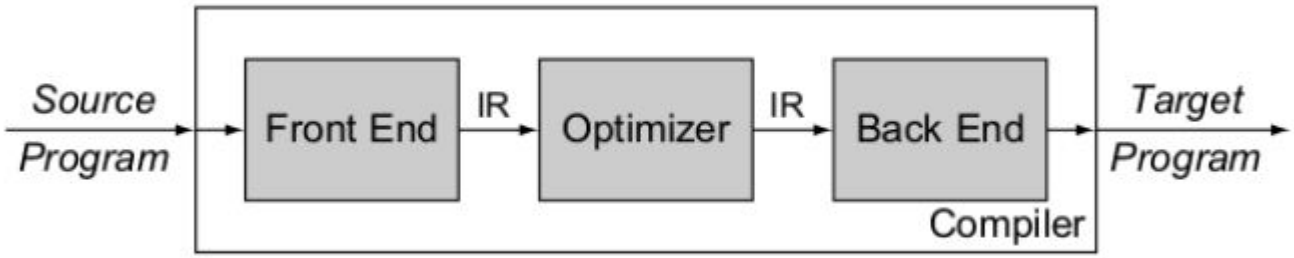
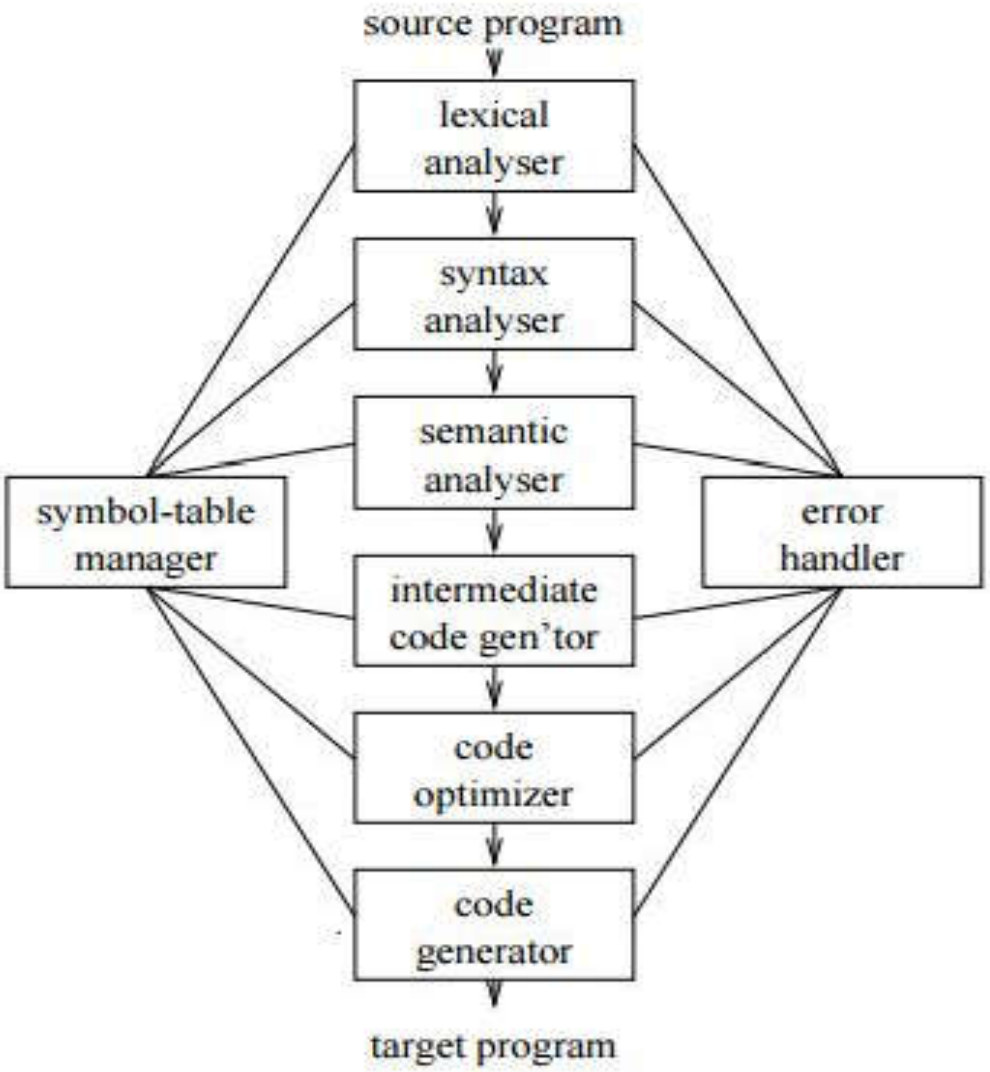
Welcome to CSE 310

Compiler

- Convert one source program to a target program
- The compilation process usually divided into several phases



Compiler


source program
lexical analyser
syntax analyser
semantic analyser
symbol-table manager
error handler
intermediate code gen'tor
code optimizer
code generator
target program

What will we do in this course?

- Construct and manage symbol table
- Perform lexical analysis using fle
- Perform syntax analysis, semantic analysis and intermediate code generation using bison
- May be some code optimization too
- So… We are going to build a COMPILER!

Some Info

- Linux platform
- No plagiarism

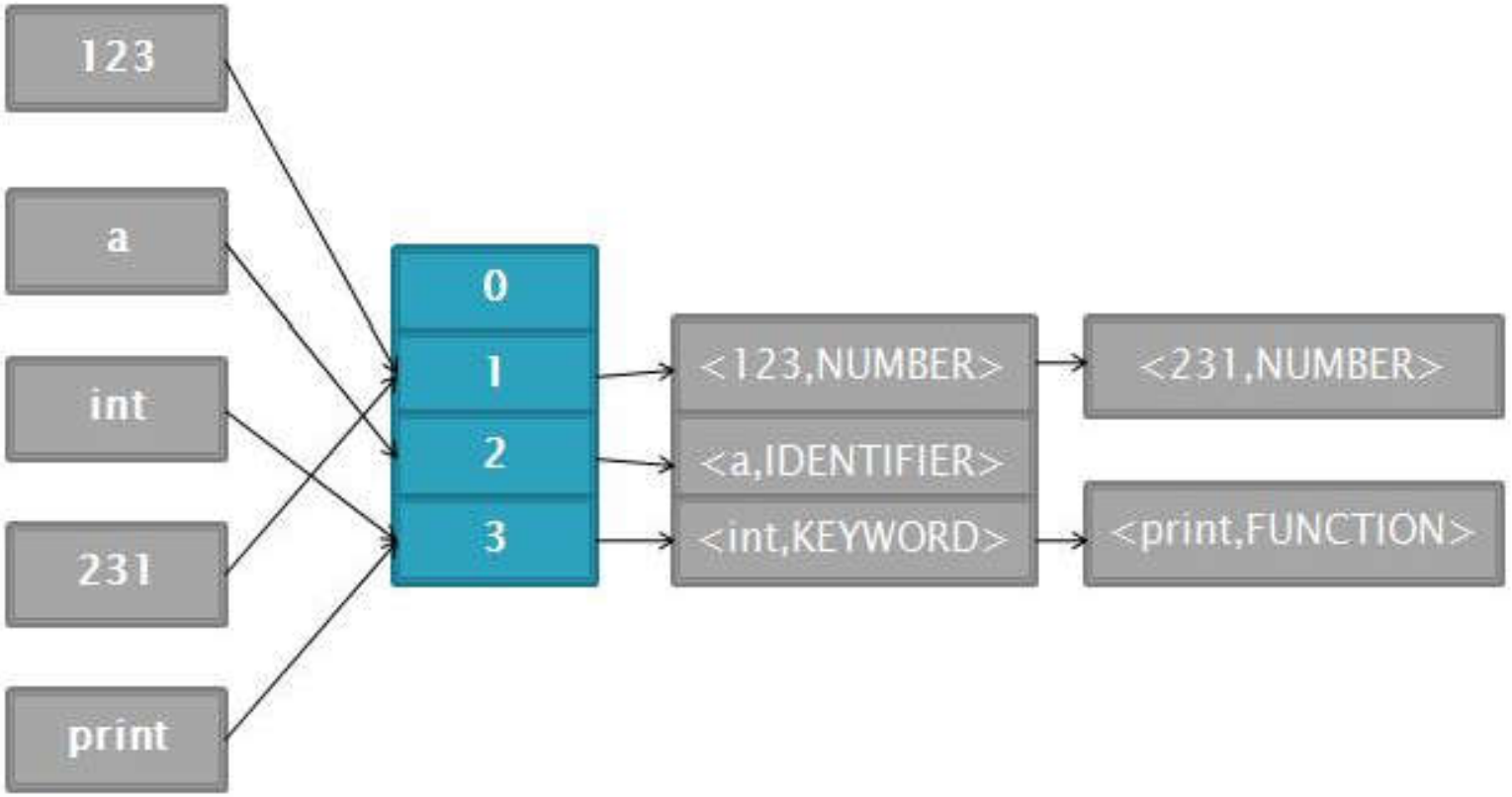
Symbol Table

- A table storing information of occurrence of various entities in the source program
- Information are:
  - Symbol Name
  - Type
  - Scope
  - Value
- Used in almost all phases of a compiler

Offline 1: Symbol Table Management

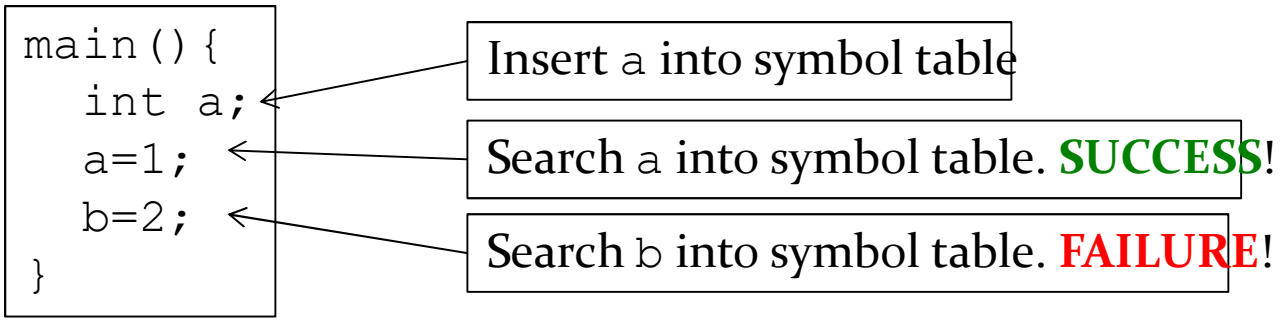
- Implement a simple symbol table
- Hash based (Chaining)
- Each entry is a two tuple <Symbol Name, Symbol Type>
- Use Symbol Name as key of hash table

Offline 1: Symbol Table Management



How Symbol Table Helps?

- How can this type of Symbol Table help?
  - Detect undeclared variable



  - Type checking
    - Add an extra field for each symbol named **datatype**
    - During an assignment operation check datatype field of RHS and LHS

How Symbol Table Helps?

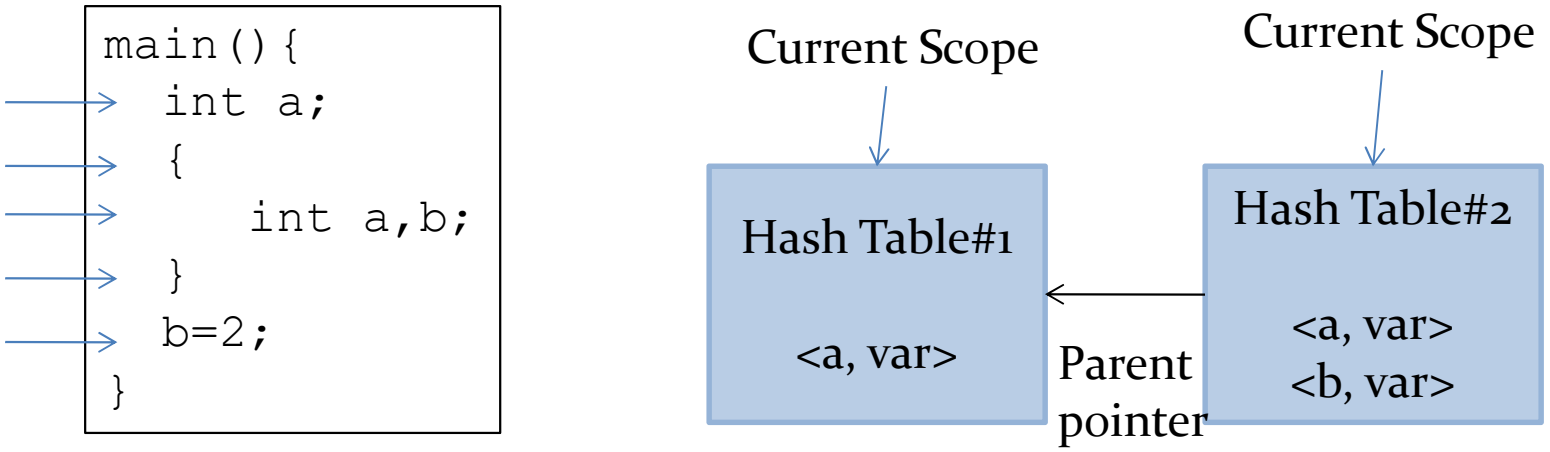
- How can this type of Symbol Table help?
  - Scope Management

```
main(){
   int a;
   {
      int a,b;
   }
   b=2;
}
```

- Need to allow duplicate entry in symbol table
- Also delete some entries when a block exits
- How to accommodate this??

Symbol Table for Scope Management

- List of Hash Tables



Offline 1: Symbol Table Management

- Three Classes
  1. SymbolInfo
     - Each entry of symbol table is an instance of SymbolInfo. (Remember two tuples!)

Offline 1: Symbol Table Management

- Three Classes
  2. ScopeTable
     - This class is the implementation of a hash table.
     - Represents each scope
     - Implement four operations
       - » Insert
       - » Lookup
       - » Delete
       - » Print

Offline 1: Symbol Table Management

- Three Classes
  3. SymbolTable
     - Maintain a list of ScopeTables
     - Implement four operations
       - » Enter Scope
       - » Exit Scope
       - » Insert
       - » Delete
       - » Print All Tables
       - » Print Current Table