Syntax/Semantic Language

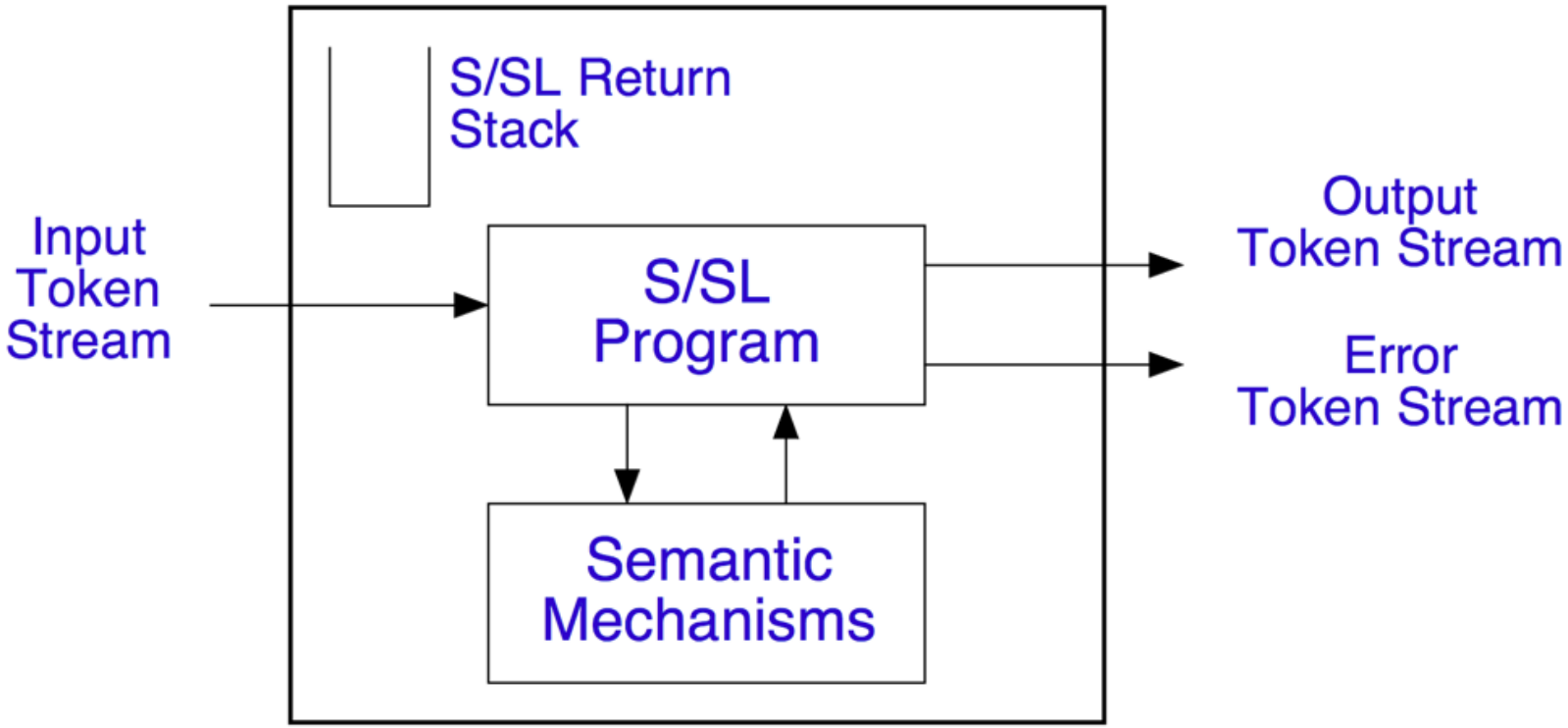
S/SL - Syntax/Semantic Language

- Special purpose language (DSL) specifically designed for implementing compilers
- Designed for specifying multi-pass compilers
- Main language (other than PT Pascal) used in this course - you will have to write S/SL programs in quizzes and on the exam
- S/SL itself is a dataless executable specification language - programs can define only constants (no variables or assignment!)
- All real data manipulation done indirectly in black boxes called semantic mechanisms (implemented elsewhere)

The S/SL Computational Model

Three Components

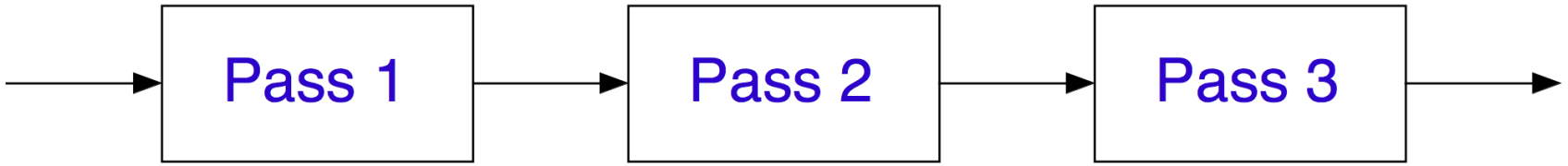
- The S/SL program (a finite-state control)
- An integer pushdown return stack implementing S/SL rule calls
- Semantic mechanisms - abstract computation modules



The S/SL Processing Model

Pipe-and-Filter Chain

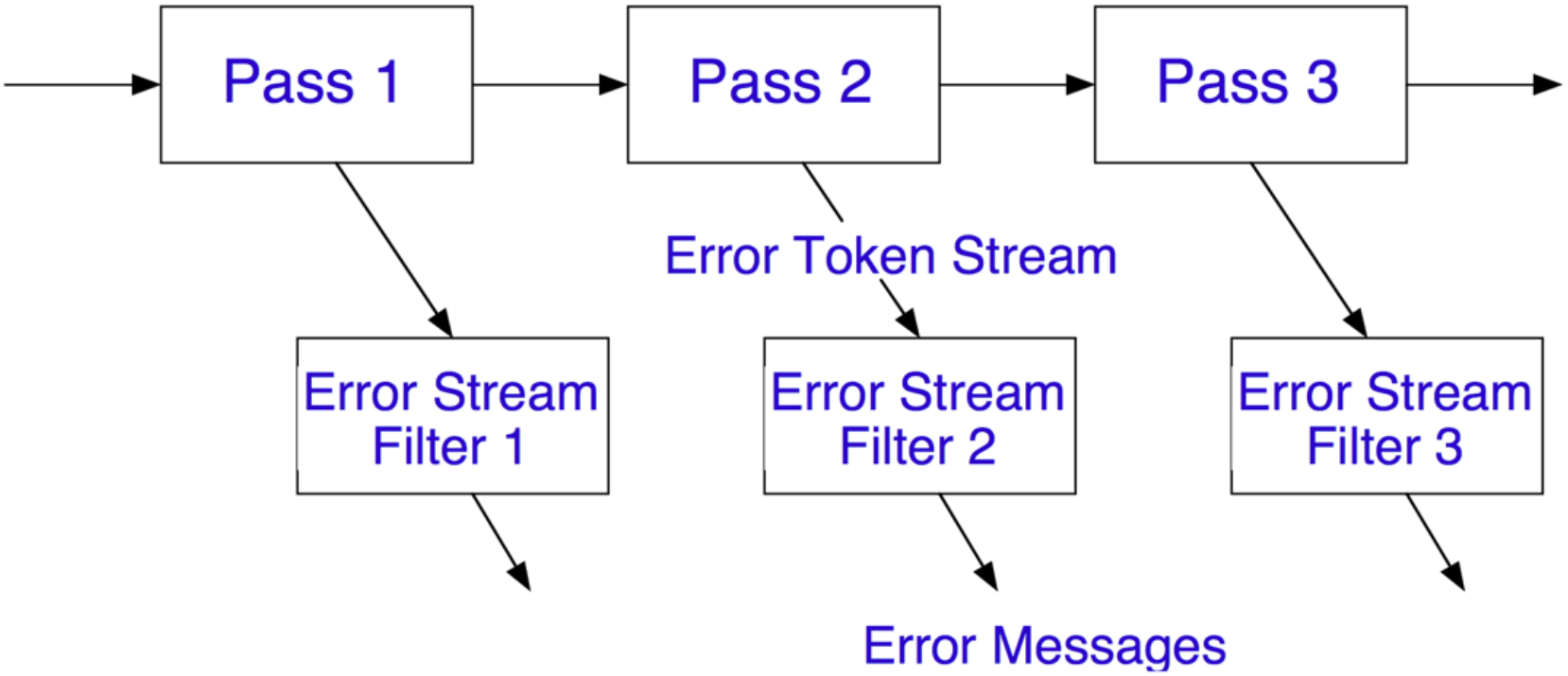
- Input/output stream model designed for joining S/SL programs end-to-end pipe-and-filter style to form multi-pass solutions
- Well suited to compiler implementation



The S/SL Processing Model with Error Streams

Pipe-and-Filter Chain

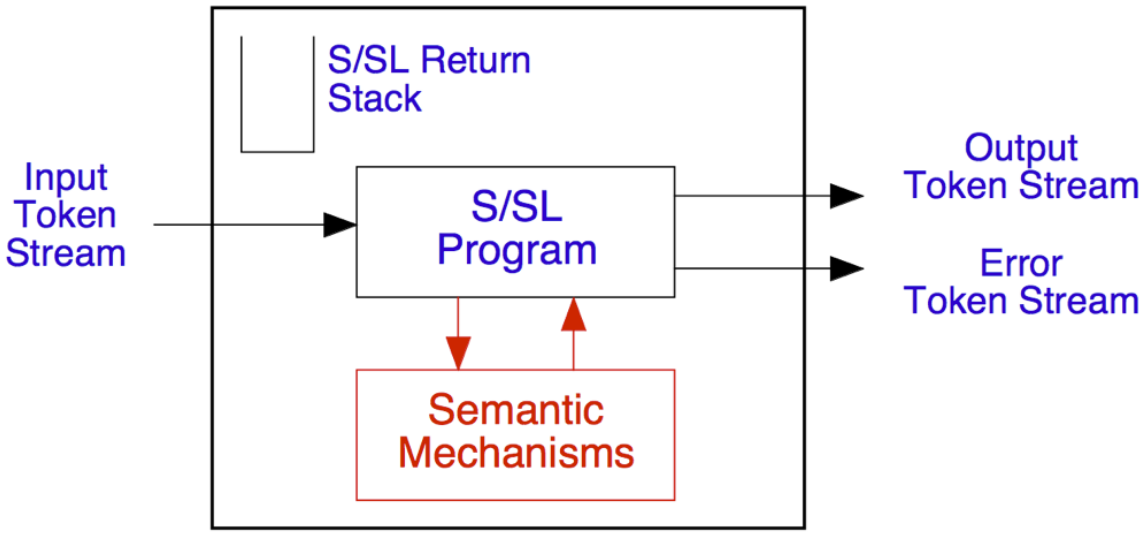
- Error stream normally does not go on to next pass, rather translated into error messages for user



Semantic Mechanisms

Enforced Information Hiding

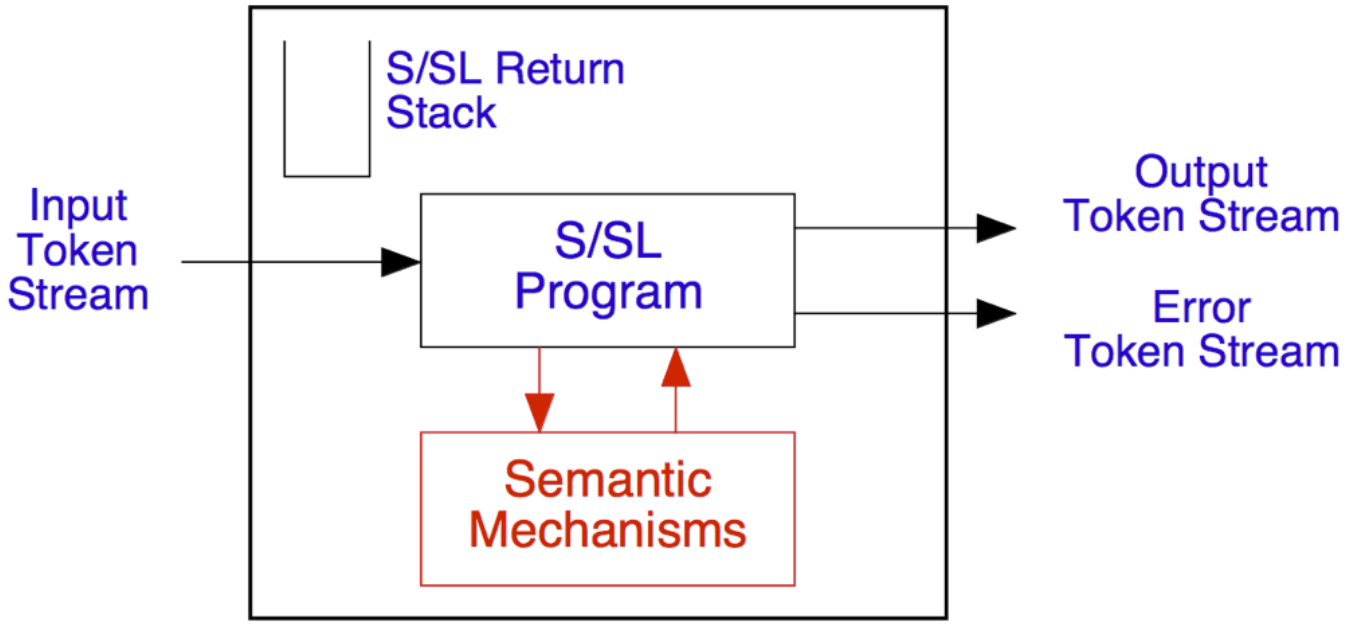
- S/SL itself is, for all intentions, a dataless programming language
- No variables, assignments, or data operations - all data manipulation is indirectly carried out in semantic mechanisms
- A small number of named constants may be referred to, and the value of the current input/output/error token, but no operations can be performed other than those provided by semantic mechanisms
- Semantic mechanisms augment this dataless world with a set of black boxes with buttons (operations) for indirect data manipulation



Semantic Mechanisms

Semantic Mechanisms

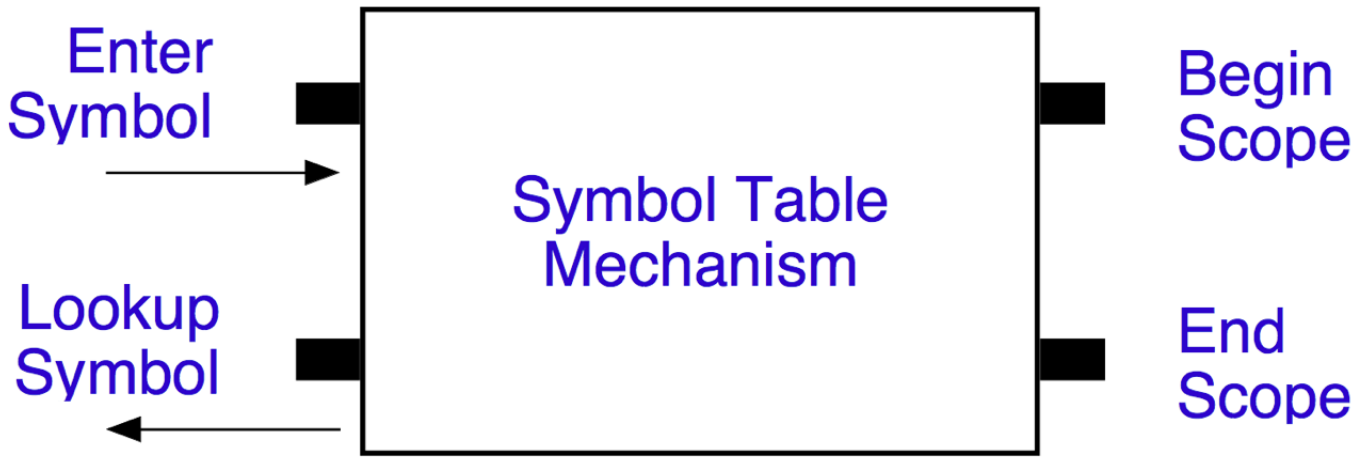
- Opaque abstract data types (like static class interfaces)
  - organize semantic operations
  - indirect manipulation of data
  - interface defined in S/SL, but implementation is hidden from the S/SL program



Semantic Mechanisms

Example

- A Symbol Table Mechanism
- From the point of view of the S/SL program, looks like an opaque magic black box
- Internally, has data structures to implement a scoped table of identifiers and their attributes



Summary

The S/SL Computational Model

- S/SL is a dataless push-down transducer language well suited to implementing multi-pass compilers
- Semantic mechanisms augment S/SL with black-box data manipulation modules that can be specified, invoked and queried from S/SL programs, but whose implementation is strictly hidden (enforced information hiding)

Next

- S/SL syntax, program structure and operations