Cardigan

Card Game Development

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Introduction

What is Cardigan?
Here's a hint, it's not a sweater.

- Card game development & implementation language
- Built in data types which support card game elements (cards, players, etc.)
- Control structures for game play
  (rules, turns, winning conditions, etc.)

Motivation

- Developing card games is tedious
- Materials are expensive
- Physical iteration takes time

Motivation

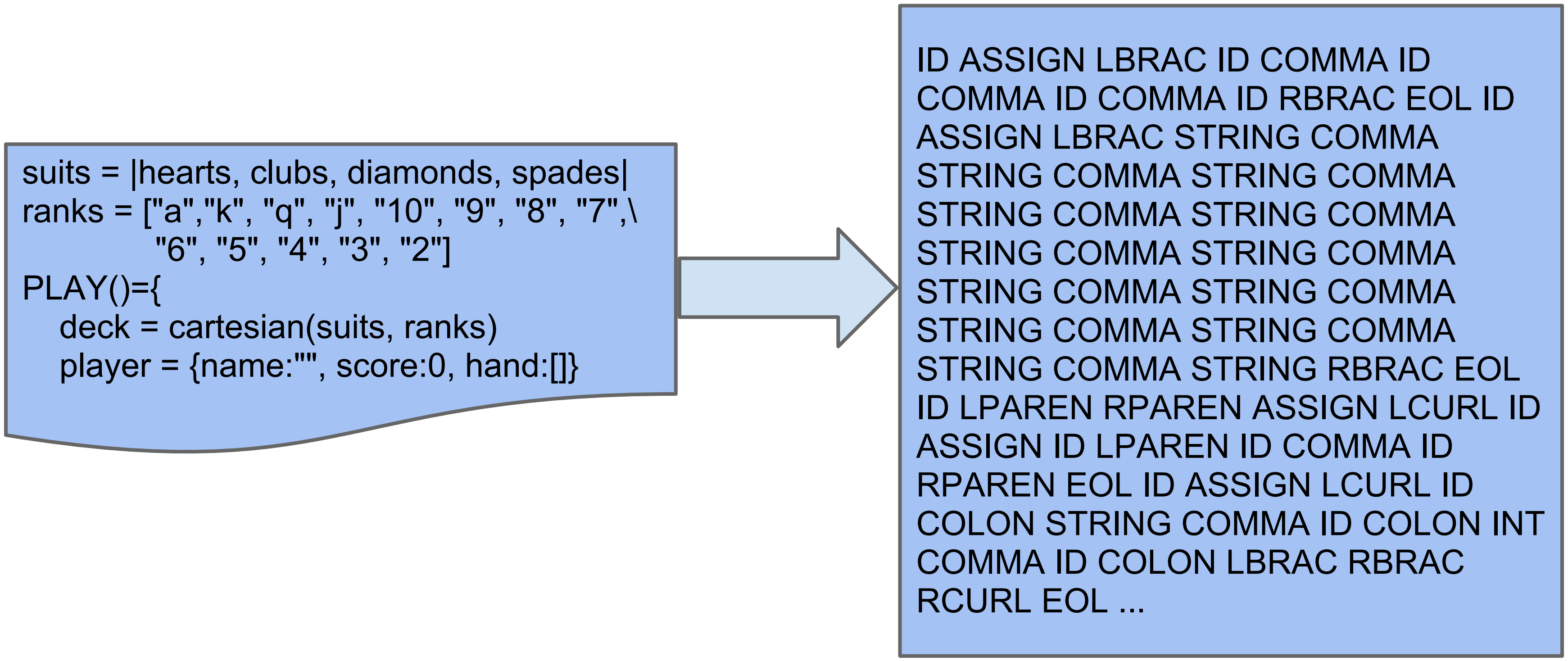
Developing in code allows

- no cost for materials
- easy modification
- fast iteration
- better development

Tutorial

scanner.mll

Lexical Analysis converts source file to tokens



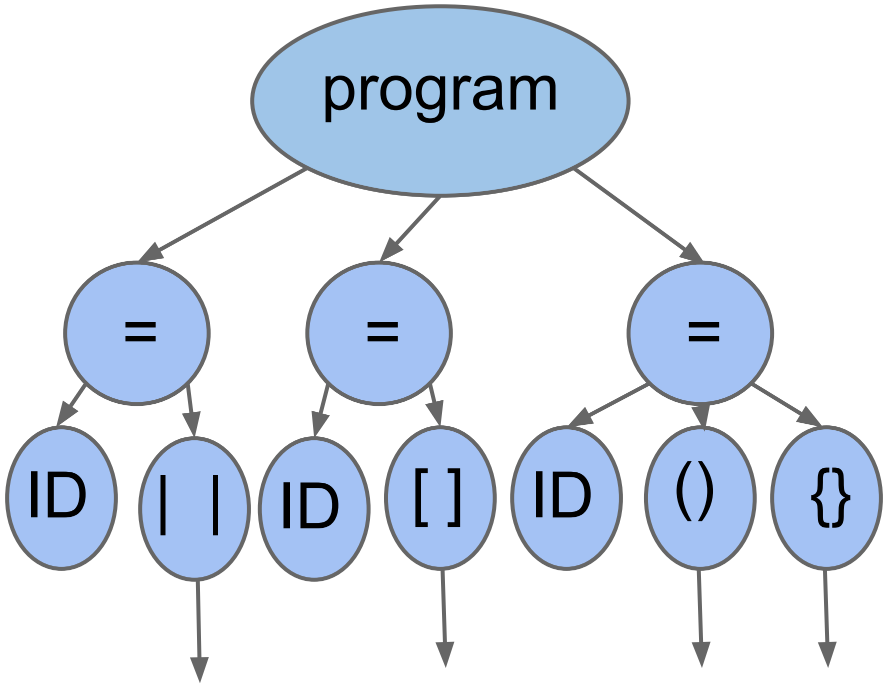
```
suits = |hearts, clubs, diamonds, spades|
ranks = ["a","k", "q", "j", "10", "9", "8", "7",\
             "6", "5", "4", "3", "2"]
PLAY()={
    deck = cartesian(suits, ranks)
    player = {name:"", score:0, hand:[]}
```

```
ID ASSIGN LBRAC ID COMMA ID
COMMA ID COMMA ID RBRAC EOL ID
ASSIGN LBRAC STRING COMMA
STRING COMMA STRING COMMA
STRING COMMA STRING COMMA
STRING COMMA STRING COMMA
STRING COMMA STRING COMMA
STRING COMMA STRING COMMA
STRING COMMA STRING RBRAC EOL
ID LPAREN RPAREN ASSIGN LCURL ID
ASSIGN ID LPAREN ID COMMA ID
RPAREN EOL ID ASSIGN LCURL ID
COLON STRING COMMA ID COLON INT
COMMA ID COLON LBRAC RBRAC
RCURL EOL ...
```

parser.mly + ast.mli

Syntactic analysis creates an abstract syntax tree

ID ASSIGN LBRAC ID COMMA ID COMMA ID COMMA ID RBRAC EOL ID ASSIGN LBRAC STRING COMMA STRING COMMA STRING COMMA STRING COMMA STRING COMMA STRING COMMA STRING COMMA STRING COMMA STRING COMMA STRING COMMA STRING COMMA STRING COMMA STRING COMMA STRING RBRAC EOL ID LPAREN RPAREN ASSIGN LCURL ID ASSIGN ID LPAREN ID COMMA ID RPAREN EOL ID ASSIGN LCURL ID COLON STRING COMMA ID COLON INT COMMA ID COLON LBRAC RBRAC RCURL EOL ...



cardigan.ml

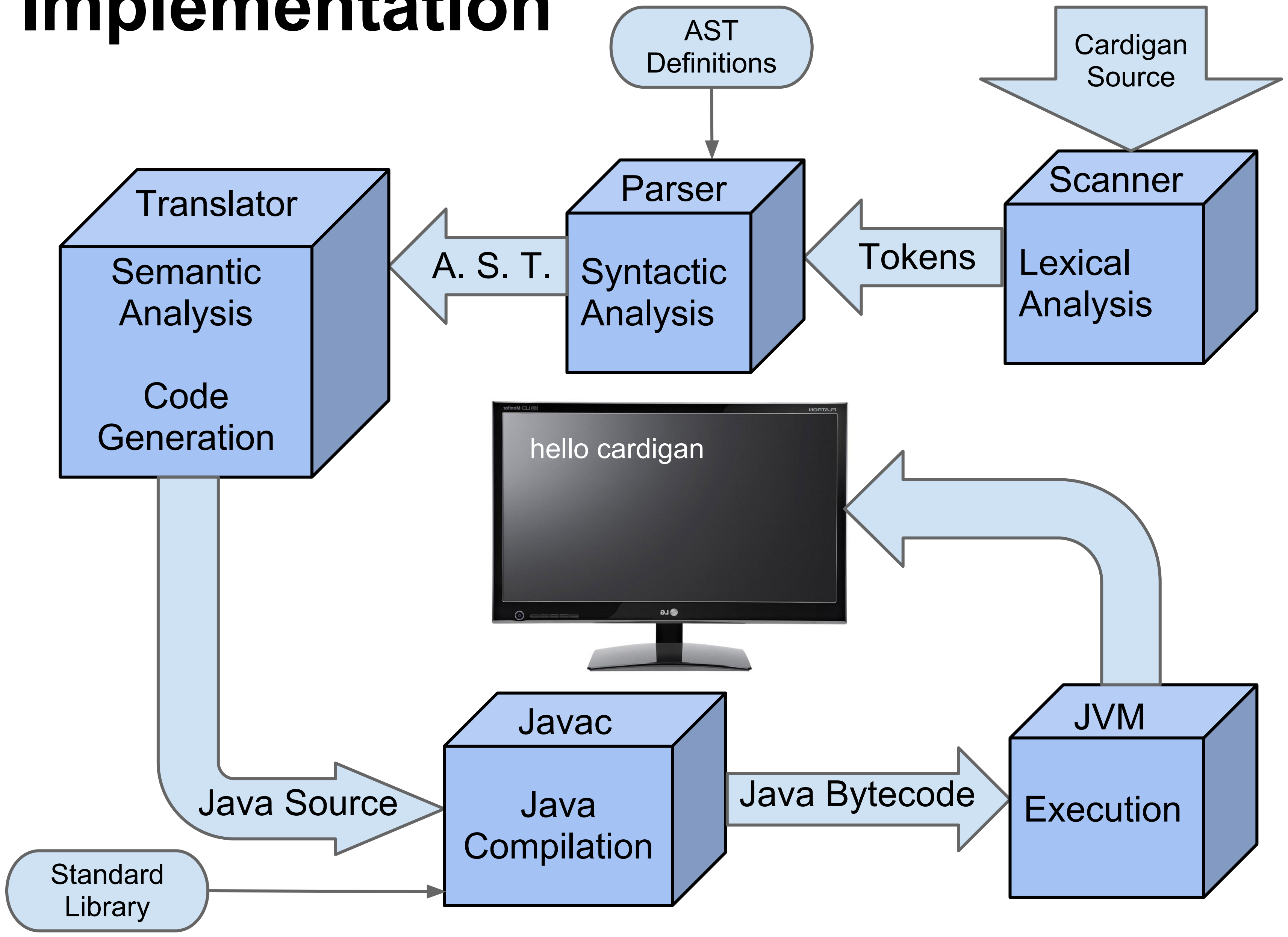
Compiling an AST in 3 stages

- Separator
  - Breaks off subtrees

- Semantic analysis
  - Keeps track of types in a symbol table
  - Checks each subtree to make sure types are valid

- Code generation
  - Creates Java code from templates

Implementation



Lessons Learned

- Newline characters are not good line delimiters
- Type inference is hard
- Ocaml is hard to debug
- It's possible to start too early
- Work with "real" code as well as tests the whole time