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## Phase 3: Java Byte Code Generation

### Java Bytecode Generation

#### Objective

This phase of the assignment aims to practice techniques of constructing semantics rules to generate intermediate code.

#### Description:

Generated bytecode must follow Standard bytecode instructions defined in Java Virtual Machine Specification

[http://java.sun.com/docs/books/jvms/second\\_edition/html/VMSpecTOC.doc.html](http://java.sun.com/docs/books/jvms/second_edition/html/VMSpecTOC.doc.html)

[http://en.wikipedia.org/wiki/Java\\_bytecode](http://en.wikipedia.org/wiki/Java_bytecode)

Proposed grammars are required to cover the following features:

- Primitive types (**int**, **float**) with operations on them (+, -, \*, /)
  - Boolean Expressions (Bonus marks)
  - Arithmetic Expressions
  - Assignment statements
  - **If-else** statements
  - **for** loops (Bonus marks)
  - **while** loops
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## Requirements:

- 1- Write the semantics rules of the context free grammar described in the problem statement of phase 2.  
Use tools like bison <http://www.gnu.org/software/bison/> to convert a context-free grammar and semantics rules into a parse tree.
- 2- The semantics rules are used to output bytecode that follows the standard java bytecode instructions.
- 3- Generated bytecode can be tested using any of the tools  
Java Bytecode Assembler : <http://tiny2.vub.ac.be/~dvermeir/courses/compilers/javaa/>  
Jasmin: <http://jasmin.sourceforge.net/>  
Both are tools that generate .class files to be run by JVM.

## Bonus

Use your own parser generator, implemented in phase 2, instead of Bison.

## Useful Links:

[http://dinosaur.compilertools.net/bison/bison\\_6.html](http://dinosaur.compilertools.net/bison/bison_6.html)

<http://alumni.cs.ucr.edu/~lgao/teaching/bison.html>

## Notes

- 1- Each group consists of 4 students.
- 2- Each group must submit the following to the mail ["raniaismail2016@gmail.com"](mailto:raniaismail2016@gmail.com):
  - 1- Your executables and source code
- 2- A project report: make sure that your report contains at least the following:
  - a. A description of used data structures if any.
  - b. All algorithms and techniques used
  - c. Comments about used tools
  - d. Explanation of functions
  - e. Any assumptions made and their justification.

## Grading Policies

- Delivering a copy will be awfully penalized for both parties, so delivering nothing is so much better than delivering a copy.