

CS4215 Programming Language Implementation

Self-Assessment 01: Language Processing

The following questions serve the students of CS4215 to assess their understanding of the course material. This self-assessment is not marked. Please use the corresponding discussion forum to discuss this self-assessment.

1. Let us say you want to run a Java program “Tetris” on a Pentium processor. Let us say we have a Java-to-JVM compiler written in JVM and a Java Virtual Machine written in C. Furthermore, you have a C compiler that translates C programs to Pentium machine code. The C compiler is written in Pentium machine code. Draw all the T-diagrams of the compilation/interpretation steps needed to execute “Tetris”.
2. Draw the T-diagram that corresponds to viewing an HTML web page on MS-Explorer on an I-Mac with a Motorola PowerPC processor. The program MS-Explorer is given in Pentium machine code, and the I-Mac is emulating the Pentium processor.
3. You want to run a Lisp program called `factorial.lisp`. Rouge is a Lisp interpreter written in Ruby. JRuby is an interpreter for Ruby, written in Java. In addition to Rouge and JRuby, you have a PC with an x86 processor, a Java compiler and a Java Runtime Environment both written in x86 machine code. Draw the T-diagrams of all steps that need to be taken to execute the Lisp program `factorial.lisp` using the resources listed above.
4. You want to run a program `gcd.ruby` that is written in the language Ruby. You have two compilers and two interpreters at your disposal, as well as an x86-based PC. The compilers are:
 - A compiler from C to x86 machine code, written in x86 machine code, and
 - a compiler from Ruby to JavaScript, written in JavaScript.

The interpreters are:

- An interpreter for JavaScript programs, written in C, and
- a meta-circular interpreter for Ruby (written in Ruby itself).

Draw the T-diagrams of all steps that need to be taken to execute the Ruby program `gcd.ruby` using the resources listed above.