

Programming Assignment 4

Set up your VirtualBox VM if you need to; please see the page [Getting started with the VM](#) for instructions. If you have already done the previous assignments you can use the same VM.

Next, download the [Assignment 4 PDF](#). In addition to the assignment requirements, It has information about how to get the starter code up and running.

Please note that this assignment is about as complex as the previous assignment, i.e. significantly more difficult than the first two.

IMPORTANT NOTES:

- **The assignment numbers are offset by 1. Even though this is assignment 4, the directory that you will get the starter code from is named "PA5" for the C++ version and "PA5J" for the Java version.**
- **If you are using Java, once you run the make command that checks out the starter code, you will need to make a change before the code will compile. A few changes need to be made in the files `ASTParser.java` and `ClassTable.java` (which you should not otherwise modify); in particular, every instance of the class name "formalc" needs to be replaced by "formal", every instance of "class_c" needs to be replaced by "class_", and every instance of "programc" needs to be replaced by "program". Running the following command in the assignment directory will make these changes automatically:**

```
perl -p -i.bak -e  
"s/formalc/formal/g;s/class_c/class_/g;s/programc/program/g"  
ASTParser.java ClassTable.java
```

Here are some more useful resources:

- ~~The Cool Reference Manual~~ The Cool Reference Manual Code In particular, look at section 6 "Abstract Syntax Trees", section 7 "The Runtime System", and section 8 "The Garbage Collector".
- Some additional project resources including miscellaneous documentation.

As with the first three assignments, the examples are in the directory /usr/class/cs143/examples. Please copy these into your project directory if you wish to use them.

The correct version of spim is at /usr/class/cs143/bin/spim.

Once your code generator works, you should be able to compile the examples using your code generator and run them. As an example, the following should work (some output omitted):

```
$ make cgen
...
$ cp /usr/class/cs143/examples/hello_world.cl .
$ ./mycoolc hello_world.cl
$ /usr/class/cs143/bin/spim hello_world.s
SPIM Version 6.5 of January 4, 2003
Copyright 1990-2003 by James R. Larus (larus@cs.wisc.edu).
All Rights Reserved.
See the file README for a full copyright notice.
Loaded: /usr/class/cs143/lib/trap.handler
Hello, World.
COOL program successfully executed
Stats -- #instructions : 154
#reads : 27 #writes 22 #branches 28 #other 77
```

How to Submit

1. Follow the instruction in the VirtualBox VM Setup tab to create a shared folder between your virtual machine and your host machine. Download the grading script from [here](#) on your host machine and move it into your shared folder. Inside your virtual machine, move the script into the directory in which you are doing the assignment (where the cgen.cc or Cgen.java file is). If your host machine has wget, you can run the following command in your shared folder to download the script.

```
wget https://courses.edx.org/asset-  
v1:StanfordOnline+SOE.YCSCS1+3T2020+type@asset+block@pa4-grading.pl
```

This will save the script (pa4-grading.pl) in your assignment directory.

If you get a wget error, the file is also available at https://drive.google.com/file/d/1YdEZtjCoT4_mKFUcsWbvEimLLhR6S6oj/view?usp=sharing

1. Run the script by typing

```
perl pa4-grading.pl
```

Note that you can also make the script executable by running `chmod a+x pa4-grading.pl` first, and then running it directly as `./pa4-grading.pl`

2. The script will give you a grade at the end, as well as a submission code. If you want to figure out why your code generator is failing certain tests, the tests will be put in the `./grading` subdirectory. The output from your code will be in the `./grading/test-output` directory.
3. Once you are satisfied with your grade, click on the arrow above or beneath to go to the "Programming Assignment 4 Submission" quiz. You can use [this link](#) to go directly to the quiz. Copy-and-paste the code from the script (to

copy from the terminal in VirtualBox, use ctrl+shift+c) into the "Submission code:" box. Once you submit the quiz, your score should appear for the quiz. You can also resubmit the quiz if you wish to update your grade.